



Meta-analysis of gender and science research

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Dr. Laura Maratou-Alipranti
and Antonia Tsigoti

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1. Introduction

In the 80s Greece witnessed the start of the creation of a legal framework that addresses equality between men and women. The General Secretariat for Equality of the Ministry of the Interior, established since 1985, is the competent body in Greece responsible for the designing and implementing equal opportunities policies in all sectors, takes all the necessary initiatives for the implementation of gender mainstreaming in all Sectoral or Regional Operational Plans under the 3rd Framework Community Support Framework 2000-2006, as well as the implementation of *positive measures* that promote gender equality and the elimination of gender stereotypes and occupational segregation. The central authority in Greece for research and technology policy in Greece is the General Secretariat for Research & Technology (GSRT).

A large part of the legislative regulations was accomplished by adapting Hellenic legislation to international agreements and Community directives. Many laws were also passed following the pressure of the women's movement in Greece. However, the adoption of *positive measures* for the promotion of equality between men and women was entered into the Greek Constitution very recently, in 2001, which means that before 2001 it was illegal to implement positive measures in favour of women.

Statistics from the last two decades show that female employment has risen at faster rates than the average rate of total employment in all professional categories and the inequality of representation in prestigious occupations between the sexes seems to have reduced. In 1961, only 3.7% of working women was classified under the "scientific professions" and "managerial executive personnel" categories, whereas in 1991, 19.4% of working women was found in these same occupational categories.¹ According to the latest research of the National Statistical Service of Greece (3rd quarter of 2008) the percentage of women who were classified under the category of "professionals", was 48.5%.² In 1999, the percentage of women researchers out of the total employed research staff, independently of the scientific field or employment institution, was 41%. However, women researchers who held a Ph.D. degree were only 36% out of the total male and female researchers according to the findings of this study. Moreover, the majority of women researchers are still assembled in the Social Sciences and Humanities scientific fields.

With respect the University population, while in 1969-1970, women represented only 31.4% of the total, thirty years later they prevailed over men with 58.7%. However, this numerical over-representation of women graduates does not mean that there is no gender division among University students, Academics and Scientists. Nowadays female students outnumber their male counterparts in the fields of Arts/ Humanities compared to the still male dominated fields of Physical Sciences, Engineering and Technology. However, it should be noted that women students in the latter fields are progressively increasing.

While women's participation in academia and scientific research is steadily improving, it remains low and the higher the rank is in the hierarchy, the lower the percentage of women is. The participation of female academics differs also by discipline. Female academics' participation is the highest in Humanities and the lowest in Engineering and Technology Sciences and many recent studies indicate these inequalities.

Additionally, during the 80s the first courses that dealt with the gender perspective were entering into the Greek Tertiary Education but these efforts were fragmental. Gender Studies were implemented more systematically recently in 2000 through the Operational Program "Education and Initial Vocational Training" (EPEAEK II of the Ministry of Education- 3rd European Community Support Framework)³.

It should also be noted that in the Greek Ministry of Education doesn't exist any Unit to monitor and promote gender equality as well as to implement gender policies in all levels of Education. However, only through the above mentioned Operational program diverse activities

¹ Maratou Alipranti, L., Dafna, K., Giannakopoulou, L., Kymperi, Z. & Repa, P. 2002, *Greece, Women and Science: National Report*, Ministry of Development, General Secretariat for Research and Technology (GSRT), Directorate of Planning and Programming, Athens.

² General Secretariat of the National Statistical Service of Greece, 2008, *Press Release: Labour Force Survey 3rd quarter 2008*, Downloaded on 23/01/2009, Available at: http://www.statistics.gr/eng_tables/S301_SJO_1_DT_Q3_08_Y_en.pdf.

³ Pavlidou, Th. 2006, *Gender studies: Trends/tensions in Greece and other European countries*, Ziti, Thessaloniki

aiming gender equality were planned and realised in Secondary and Tertiary Educational level during the period 2000-2008.

2. Analysis by topics

2.1. Horizontal and vertical segregation

Research questions

Horizontal and vertical segregation are two topics that have received adequate research attention, through mainly the:

- Analysis of gender composition of staff in institutions carrying out scientific work (Universities, public sector research centers) and the existing glass ceiling
- Analysis of horizontal gender segregation as regards both University students and scientists by scientific field of study or professional field, respectively
- Analysis of the choice of scientific subjects by girls and boys and occupational choices by women.

Research approaches

The research on horizontal and vertical segregation focuses mainly on compilation of statistics which shows the under-representation of women in certain educational and professional fields as well as their limited presence in high positions in the scientific hierarchy, despite their qualifications. Moreover there is also cross-sectional quantitative and qualitative research conducted on both topics, which were carried out mainly by the National Centre for Social Research (EKKE) and the General Secretariat for Research & Technology (GSRT) and Universities' departments. The other identified documents are mainly bibliographical research.

The main empirical studies that have been carried out are:

- National Centre for Social Research and GSRT, which are the most important public research institutions, have conducted in 2002 a very important study about female participation in scientific research entitled "*Study on the Enhancement of the Participation of Greek Women in Scientific Research*". The study underlined the existing tendencies as regards women's positions in the research field in the public sector. It was based on collection and classification of existing statistical data, the formation of two databases - which documented the research bodies and research personnel of the public sector and the female researchers' participation in projects funded by the GSRT- and a qualitative empirical research.
- The Periktoni Network of Women Scientists, recorded and analyzed the situation of women researchers participating in R&D, the situation of women researchers in Universities and research institutes as well as their participation in decision-making centers, through both quantitative and qualitative techniques.
- Universities: Research has been conducted by Public Universities and especially by Studies Programs on Gender Issues (i.e. Undergraduate Program on Gender and Equality Issues of the University of Athens–THEFYLLIS, University of Ioannina), exploring horizontal segregation in various scientific fields regarding either the field of study among graduates or the scientific field among Teaching and Research Staff, as well as the glass ceiling phenomenon.

Various studies have also been conducted exploring the gender factor in education, such as women's inferior position in education, the girls' choice of "female" fields of studies, their decreased interest in computer science and ICT professions, their under-representation in natural and technological fields, the professional choices of men and women academics, women's participation in studies and careers relevant to Physical Science, etc.

There is a great amount of bibliographies on horizontal and vertical segregation among the teaching staff at all levels of education (from ISCED0 to ISCED6). Statistical data have been presented on a) educational choices of girls and boys, b) men and women graduates in tertiary education, c) distribution by sex and specialty of the teaching staff at all educational levels, and d) distribution by sex of administrative staff and executives.

Findings

The phenomenon of **horizontal professional segregation** in various economic sectors and professional groups is intensified over the years as the Index of Segregation (IS) indicator increased from 29.5% in 1993 to 33.6% in 2003. Despite women's increased participation in certain professional categories, they have limited presence in Physical and Technology Sciences and top managerial positions.

Despite the increased women's participation in higher education, there is no significant decrease in educational segregation. Female students outnumber their male counterparts in the fields of Arts/Humanities compared to the still male dominated fields of Physical Sciences, Engineering and Technology. Women represent only 14.4% of the permanent University Teaching Staff. In total, women represent 1/3 of the total University educational staff.

Regarding the distribution of researchers by scientific field, the percentages of women is lower in the traditionally "male" fields (i.e. Engineering, Agricultural Sciences, Natural Sciences, Medical Sciences), contrary to the "female" field of "Humanities" where the proportion of women is higher than men (52.5%). In relation to academic qualifications, male researchers more often have a PhD, while women have mainly an undergraduate degree or a postgraduate degree. In the business enterprise sector, the one and only research that has been conducted showed that women represent almost 35% of the total research personnel and only a small proportion of women researchers hold a leading position (28.2%).

Female students in higher education are also highly underrepresented in Engineering and overrepresented in Humanities. According to statistical data, women's proportion in tertiary education has risen significantly during the last decades, even in Natural Sciences (from 20% in 1971 to 43% in 2002) and Science of Engineering and Technology (from 6% in 1971 to 25% in 2002), however their presence in these fields remains limited and they are still over-represented in Humanities and Social Sciences (80% and 60% respectively).

Regarding **vertical segregation**, women have more possibilities to hold the two lowest ranks of the academic profession hierarchy than the two highest ranks. Their representation is higher in the lowest professional levels of the tenured ranks. Gender still plays an important role in the allocation of positions of responsibility in research procedures.

Data collected within the studies of EKKE and the GSRT indicated that:

- Female researchers in public research institutions in Greece are a minority (34.7%), they hold low responsibility positions and they are assembled in low rank positions (ranks C and D) compared to men who have higher percentages in all ranks and mainly in high rank positions (ranks A and B)
- They are under-represented in senior academic, management and decision-making positions in public research institutions. The majority of appointed scientific coordinators of the projects-coordination actions are men. The presence of women as administrative executives is even more disappointing, as only 9% out of the total number of Directors and Presidents of public research centers are women
- The presence of women is limited in the administrative or scientific advisory councils of the research institutions.
- Women researchers are under-represented in Physical Science, Engineering, Technology and Agriculture while they prevail in Social sciences and Humanities

In the academic profession, women have restricted presence in managerial positions and high ranks of the academic hierarchy⁴ and extremely low participation in decision-making positions. In the University of Athens, for example, a woman Rector/Vice-Rector has never existed. Furthermore, only 6.5% of Full Professors in Science departments are women while 31% of Full Professors in Humanities departments are women. But even in traditionally women dominated departments, the leadership positions are held by male professors.

Some of the studies classified under this category deal also with issues related to other topics (i.e. identity and stereotypes) which results are described in the corresponding topics.

Gaps

The majority of studies refer to compilation of data and there are no longitudinal studies. This is mainly due to lack of systematically collected sex-disaggregated data on researchers. It

⁴ 13% of Professors, 24% of Associate Professors, 32% of Assistant Professors, 40% of Lecturers were women in 2002

should be noted that there are no available sex-disaggregated data regarding administrative/ decision-making positions in Universities.

Regarding the private non-profit sector and the business sector limited studies have been conducted about the scientific/research staff.

The few studies that have been conducted until now focus mainly on the public sector of University and Research institutes. Furthermore in-depth studies using qualitative methods are limited and publications with the results are under print.

2.2. Pay and funding

Research questions

This field has hardly been addressed in Greece. The only questions that have been scarcely addressed are:

- the analysis of sex-based wage differences in specific professions (including scientists) but not designed especially for scientific professions
- the examination of the distribution of project coordinators by gender.

Research approaches

During the bibliographical search conducted within this project, empirical studies examining the gender pay gap in relation to scientific professions were not identified, except for the research project conducted by the Research Centre for Gender Equality (KETHI) entitled "*Equal Pay–Mind the Gap*" (financed by EC and the General Secretariat for Equality). However, this research focused on pay discrimination in certain fields and professions, such as trade, tourism (hotels and restaurants), banking and health and not to science exclusively.

The other documents identified included either compilation of statistics or the examination of female researcher's attitudes (through qualitative methods) regarding the gender pay gap, working conditions, etc.

Findings

Despite the fact that sex-based differentiations in payment continue to be a significant reality in specific areas, it is important to note that in all Public Sector & Semi-public Establishments or Organizations such as Banks, Universities etc., there is not such an issue.

However, the findings of the research conducted by KETHI showed that in the retail trade sector, for example, the higher up in the hierarchy a profession is and the more specialization required, the wider the gender pay gap is.

The women's pay increment stops at the age of 35 but men's pay increases steadily until the age of 45. The gender pay gap for full-time employment in all the above mentioned sectors (trade, tourism, banking, health sector) ranged from 15.5% to 23%, on average. It should be highlighted that, in 1995, for employees in full-time positions in the health services sector, the average hourly pay of women was 73.9% of the average hourly pay of men, while in 1999 the respective figure fell significantly to 60.3%.

Few female researchers seem to be academic supervisors in research projects. Women's representation in the industrial sector is also very low and it seems that unequal earning between male and female employees exists.

The findings of the qualitative studies are controversial as in some studies the female researchers' refer that they are not satisfied with the working conditions and the low wages compared to men while in other studies they do not recognize any sex-based discrimination in salaries.

Gaps

Taking into consideration the above mentioned facts, it should be noted that the issue of gender pay gap and access to research funding between male and female scientists is not addressed in Greece and there are no empirical studies that analyze these issues.

2.3. Stereotypes and identity

Research questions

This is one of the topics that has generated the most research interest and the most publications. Two topics have been considered through qualitative and quantitative methods as well as through conceptual contributions:

- social construction of identity: the association of gender stereotypes with typical male and female choices of scientific field of study, the social construction of gendered stereotypes and their resistance to change across time, the gendered stereotypes and attitudes of teachers and their impact on educational and professional choices of men and women and the processes of socialization regarding gender roles, are analyzed. The teaching practices and textbooks in school are also analyzed.
- social construction of science: this topic has received less research attention than the previous one and more conceptual contributions towards the detection of the social perceptions which were gradually converted into “scientific” predispositions, the dominating cultural values around sexuality within traditionally “male-dominated” fields of science, the gendered “character” of science in the context of education and epistemology, as well as the identification of the promotion of the masculine image of scientists through mass media and textbooks. There are also references on gender bias in scientific language and stereotypical representations of the scientist.

The topic of *cognitive abilities* has received no research attention. Some conceptual contributions were identified, examining the scientific ideas and discussions around the cognitive sex differences and the political and social use of these ideas, as well as the efforts to attribute cognitive abilities to biological causes.

Research approaches

Regarding the social construction of identity, many studies focus on the role of school, teaching practices, teaching material and teachers’ perceptions, analyzing their impact on student’s educational and professional choices. The role of the social context (family and school) on the choices of students in relation mainly to Physical Sciences, Mathematics, Computer Sciences and ICT is examined.

Through qualitative content analysis of school textbooks it is identified that the school books give the impression that cognitive abilities are “masculine” characteristics. The impact of the promotion of the masculine image of the “maths or physical scientist” through the educational process and textbooks serving as an inhibiting factor for women’s involvement in specific scientific fields (e.g. Mathematics, ICT) is also examined.

Furthermore, significant conceptual contributions have been identified towards the reasons why the culture of Physical Sciences has been defined as “masculine” placing emphasis on the traditional educational process which fails to provide both sexes with equal participation opportunities in the different scientific fields.

Findings

The main findings can be summarized as follows:

- Teachers’ gendered differentiated perceptions and expectations which influence girls’ self-perception and professional ambitions are identified. There is also a lack of female models in science, engineering and technology; students see the distribution of women teachers in specialties characterized as traditionally female; teachers of both sexes are often not trained to become aware of sexist perceptions within the learning process. All of the above, along with family factors, discourage girls from entering into a “male-dominated” scientific career,
- It is clearly identified that the school system and its’ “hidden” curriculum contribute to the reproduction of social inequality between genders. It is identified that school textbooks represent the patriarchal family structure; men are presented to hold prestigious positions while women’s positions are outlined as marginal and connected to their traditional role of marriage, maternity and family,
- The need for training seminars for teachers of both sexes, educator’s sensitization on gender issues and the need for teachers’ substantial involvement in New Technologies in order to influence girls, towards respective professional choices are stressed,

- Quantitative data have revealed the inferior position of women in education and its patriarchal structure; gender stereotypes influence student's educational choices; 75-78% of girls choose the theoretical courses direction in secondary school, while the respective boys' percentage follows the natural science courses direction.
- It is identified that women's important role in science should be documented and that the scientist's image as a "masculine genius" must be changed. Science has been traditionally portrayed as male, masculine and exclusive and the perception of science as a male area by adolescents and young adults is reflected on their choices.

Gaps

The bibliographical references in Greece on cognitive abilities are almost inexistent. Further research should also be conducted on a) gender differences in relation to new technologies and b) science as a social construction.

The main problem in this area is that despite the research already conducted in this field, the studies do not present alternative or innovative methods towards the deconstruction of gender stereotypes; the pedagogical approaches and the teaching material still haven't really changed and the studies' results are not fully exploited. Furthermore, most of the efforts and interventions aim to change girls' choices and not both girls' and boys' choices towards traditionally "masculine" and "feminine" educational and professional fields, respectively.

2.4. Science as a labour activity

Research questions

Research in this field is focusing on:

- The exploration of personal and family life in scientific career in academia and the exploration of the working time distribution between male and female academics
- Qualitative analysis of the difficulties that women scientists face in their attempt to seek employment in research institutes, the problems they meet in the recruitment procedures as well as the working conditions and gender discrimination in career advancement.

Research approaches

The empirical research on the situation of women in science in Greece is scarce. The existing research studies largely compile statistics and examine, mainly through qualitative methods, women researchers' attitudes and perceptions on the barriers and difficulties they faced during their career development.

Findings

It has been noted that the family and childcare responsibilities are the main hindering factors for women academics' career development. Women academics feel that they faced more difficulties in their career development than their male counterparts due to family responsibilities.

According to qualitative research, Greek women researchers working in the public sector consider the lack of adequate state policy and their responsibilities towards children and family to be the main hindering factors concerning their scientific career. Women researchers face many problems in their effort to combine professional and family lives. It should also be noted that in Greece there are not enough public facilities to help reconciliation of family and employment. Taking measures towards the reconciliation of family with work life is identified as a priority.

As far as female social scientists are concerned, they face higher unemployment rates than males, higher participation in part-time employment and higher employment insecurity and lower job satisfaction.

Researchers have identified that common incentives should exist for both men and women as well as the establishment of flexible working hours in research. As far as medical science is concerned, men outnumber women in pathology and surgery sectors, while women are mostly represented in laboratory and psychiatric sectors, as the latter two have lower demands in terms of years of studies, working hours and work intensity.

Gaps

The empirical research under this topic is limited and further research should be conducted dealing with the institutional constraints to the development of women in science related with the gender division of labor and the analysis of the institutional practices of work organizations. The existing research focuses mainly on the qualitative exploration of the difficulties that women scientists face during their career development. In-depth analysis of the relation between professional and private spheres must be launched.

The available information refers to the public sector, namely researchers and academics working in government research centers and higher education institutions.

Studies referring to the working conditions of scientists involved in the R&D activities of the Greek business sector are almost inexistent.

2.5. Scientific excellence

Research questions

Almost no research was identified on scientific excellence. The only topics that are scarcely analyzed are:

- the analysis of the scientific productivity of women academics
- the identification of difficulties that women researchers faced

Research approaches

Basically two studies were identified that examined in some way gender bias in scientific excellence. One study attempted to explore the position of women academics and the factors that despite having equal professional qualifications, lead to their limited participation in the highest ranks and their slower career development pace. The other study aimed to explore the working conditions and the difficulties that women researchers faced as employees in the scientific research field.

Findings

According to research carried out in 2004, women presented a more limited scientific productivity (articles etc.) compared to men.⁵ The Greek academic field doesn't set barriers on women's professional development, at least at an institutional level, although social patterns and stereotypes continue to influence both sexes' professional behaviors and choices. This is also obvious from the critical differentiation among men and women academics which was outlined in relation to the dilemma of professional career or family, which only women seemed to encounter, compared to men who hadn't ever thought about it.

In the business enterprise sector in R&D, lack of meritocracy and infrastructure has been referred by women researchers as the main barrier for participating in the scientific sector. They do not refer to direct discrimination but to indirect. The limited research activities in the country, the existence of stereotypes as well as difficulties that result from the harmonisation of family and professional life are the main axes from which obstacles result in the career of women in research.

The path to scientific progress through research is even more complicated for a woman and more intensive effort is required from her in comparison to her male colleagues. In addition, a large percentage (40%), supports the views that indeed there is difference in progress opportunities due to gender discrimination.

In general, family burdens seem to constitute barriers to scientific career development. Cultural aspects are also important, thus preventing women of equal qualification from advancing in their professional research careers while sustaining gender stereotypes.

Gaps

Bibliometric studies and in-depth studies on the difficulties to improve in the scientific career were not identified. There is a lack of studies considering the criteria of evaluation and the

⁵ Katsi, C. 2004, *Women's Position in the Academic Labour Field: Objective difficulties and subjective barriers*, Athens.

methods for selecting candidates or hiring/promoting university teaching staff and research staff.

As a result there is no empirical evidence to show the existence of gender discrimination in scientific excellence. Comparative studies should also be conducted on the recruitment potential of women working in science, both academic and industrial.

Qualitative studies conducted by the University of Athens and the University of Ioannina which analyze these issues are currently under press.

2.6 Gender in research contents

Research questions

Only very few conceptual contributions were identified on gender in research contents regarding:

- Gender bias in scientific knowledge only from the social sciences perspective and reference to the historical exclusion of women from science.
- the role of gender in the natural and social sciences through highlighting the scientific contributions of female scientists from 1900-1980 and the changes in scientists' identities and their relationship with science through time and space.

It should be stressed that research on gender related topics started mainly in 2003 when the Ministry of Education allocated a budget for research projects in Universities (EPEAEK II). Until then research on gender issues had been regarded as a secondary priority.

Research approaches and findings

There are references to the feminist movement which deeply criticized the male dominated science and research sector. The female movement and women scientists criticized the knowledge content, disputed its objectivity and proposed a new perspective on science. The development of women's and gender studies in Greece is relatively new. As a result, no research approaches were identified and theories or explanations about the gender biased construction of the scientific knowledge were not identified.

The historical analysis of the exclusion of women as subjects of political research was mentioned. Stereotypical perceptions refer to women as being more conservative than men, their limited participation in elections, the natural gender differences in political attitudes and their characterization as "politically immature". None of these perceptions are verified by empirical studies and most of the research carried out doesn't take the social division of roles into consideration.

In 2007, an effort was made to highlight the scientific contributions of both female and male scientists in Greece from 1900-1980 through a photograph exhibition depicting –directly or indirectly- both who had and has access to science, and the gender identities embodied by male and female scientists in the 20th century in Greece.

Gaps

The conceptual contributions are fragmentary and the impact of the exclusion and segregation of women from science is not analyzed. No studies were identified on the assessment of the gender impact on the research area in terms of how the gender dimension has been incorporated into the content of national programs and projects.

Most research is limited to a sex-counting approach of gender, which merely addresses issues of male/female equity and equal opportunities. However a true integration of gender into research would affect the way in which scientific knowledge is defined.

No health related research from the gender perspective was identified. The gender dimension into research methods is not clearly constructed, and levels of data analysis are often aggregated resulting in a lack of attention to the gender dimension.

2.7 Policies towards gender equality in science

Research questions

There is little research and thus few studies on gender equality policies in Greece. There is neither a systematic effort for research on the evaluation of gender equality policies in the field

of science nor comparison studies of different policies towards gender equality in science. This should also be attributed to the fact that the initiation of legislation towards gender equality in science is a very recent matter. Furthermore, recent policies deal more with equality in access to science careers than with gender differences in progression and mobility in science careers.

The topics that have been considered are:

- Identification of policies that need to be implemented in Universities. For this purpose, the studies that aim to map the current situation are published as well as press releases and proposals for equality policies in Universities
- Evaluation of some programs and actions which aim to empower women's participation in science

The other documents identified in the Greek bibliography refer to policy proposals for gender equality in science, proposals of actions to increase women's participation in still male-dominated scientific fields and occupations, description of measures and programmes and mainly qualitative research results, i.e. interviews with scientists and academics on their attitudes regarding existing or non existing gender mainstreaming measures and supportive policies for female researchers.

Research approaches

Since there is no tradition in gender equality policies in Greece, the current gender equality policy is highly influenced by EU directives. The contribution of the Constitution has been undeniable, since it guaranteed for the first time in 1975, the gender equality principle. However, important progress towards de facto gender equality was made with the provision of Article 116(§2), which was introduced into the 2001 Constitution revision. With this provision, any deviations from the principle of gender equality were eliminated and the responsibility of the State to take *special positive measures* for the elimination of any discrimination against women was established.

At an institutional level, new mechanisms have been recently established, such as the:

- Inter-Ministerial Committee for Gender Equality (2000), which prepared and compiled the National Action Programme for Gender Equality for the 2001-06 period,
- Permanent Parliamentary Committee for Equality and Human Rights (2002),
- Office for Gender Equality in the Ministry of National Defence (2004).

In 2006, the Greek Parliament adopted the Law 3488/2006 on the "*Implementation of the principle of equal treatment of men and women in the fields of access to employment, vocational training and promotion, terms and conditions of work*" which fills in a significant gap in the Greek legal order. The Law 2839/2000 requires a minimum of 1/3 of each sex to be represented in all decision-making bodies such as boards of government bodies at national and local levels. The law 3549/2007 on the reformation of the institutional framework regarding the structure and function of **Higher Education Institutions in Greece** promotes equality between men and women within the framework of their function as stated in the law. However, the enforcement of this regulation is questionable.

The most important legislative initiative was undertaken very recently (2008) by the **Periktioni Network** with the collaboration of the "Research & Technology" Committee by proposing suggestions for the improvement of the draft law on the "**Legal framework for research and technology (law 3653/2008)**". According to Article 57, for the enhancement of women researchers' representation and their equal participation in scientific boards and committees, it is provisioned -for the first time- the implementation of a quota of at least 1/3 participation of each sex in all National Scientific Committees, under the precondition that candidates have the needed qualifications in order to obtain the place. The law will enter into force on 1/1/2009.

Within the framework of the Operational Program: "*Education and Initial Vocational Training – EPEAEK II*" started relatively recently -during 2000-08- the establishment of undergraduate and postgraduate Gender Studies Programs in Universities and Technological Education Institutions (TEI). Within these programs many efforts and developments have been achieved towards the promotion of knowledge and research on gender education and gender equality. Unfortunately, all of these programs are now trying to find resources of funding for their functioning as the funding by the EC and the Ministry of Education finished in 2008. No studies have been conducted for the evaluation of such programs.

Other policy measures that have been taken to enhance women's participation in science are:

- The S&T Indicators department of the General Secretariat for Research and Technology, following recommendations from EUROSTAT, has included since 1999 a gender dimension in the questionnaires of its bi-annual surveys of the research personnel
- The creation of the **Periktoni Network** of Women Researchers with the goal of mainstreaming gender into R&D policy, promoting equal opportunities for women in R&D activities, sensitizing the public and disseminating information
- Implementation of programs, i.e. the **PENED** program (for the Enhancement of the Research Potential consisting of providing grants to young researchers to carry out a Ph.D. Young female researchers were favoured through a bonus), the **Herakleitos** program (consisting of providing scholarships to Ph.D. students and grants to research groups for publications in scientific journals. Young female researchers were favoured through a 1.05 bonus).
- *Positive actions* for young women have also been implemented, such as the Eurydice Project, which granted scholarships to female students aiming to enhance their participation in specific male-dominated specialties.

Findings

According to research⁶ in 160 business enterprises active in R&D, only 7% of these enterprises have set targets or quotas for the promotion of women's participation and the percentage of enterprises (12%) that implement policies for the enhancement of women researchers' participation is also small.

Some of the policies implemented by the Greek enterprises concern flexible time arrangements, the possibility for tele-working as well as opportunities for further training. In addition, some enterprises hold some enhancement measures for new mothers, such as the not-counting of leave days in cases of child's sickness or other family reasons.

However, those policies are adopted segmentally and according to individual enterprise wellness, and are primarily connected with the business culture of the enterprise. According to the recommendations of the Greek women researchers, more things could be achieved through the state policies and the institutionalization of best practices in the enterprises.

An interesting finding of a research project⁷ carried out by the Aristotle University of Thessaloniki, which aimed to explore the effect of the incorporation of the gender perspective in different scientific fields of Greek tertiary education, was the limited presence of gender courses in the physical sciences and technology faculties in comparison to the social sciences faculties. According to the research, the entrance of the gender courses caused significant changes and modifications in the teaching content, the teaching approach and mostly on the evaluation methods. However, the study also underlined the difficulties of incorporating the feminist perspective by changing the scientific establishment, especially in relation to the teaching process and physical sciences in order to achieve an interdisciplinary approach of gender issues.

A large number of women scientists interviewed noted that the limited and segmental existing equality policies in Science sector have to be reinforced.

A very active University in this field is the University of Athens and especially its Undergraduate Studies Programme for Gender and Equality Issues/THEFYLLIS. Important policy proposals have been released by the responsible Professors of the Programme which one goal, among others, is the promotion of gender equality in the scientific staff of Higher Education Institutions. Such proposals refer to the implementation of equal treatment measures (childcare services for the children of women academics, clear reference in the formal University documents on the equality principles), establishment of Equality Committees, and implementation of positive measures (quotas, training and development of administrative skills seminars).

⁶ Periktoni Female Researchers Network 2007, *The Greek Woman Researcher in Industrial Research and Innovation – Final Report*, General Secretariat for Research and Technology, Downloaded on 23/10/2008, Available at: http://www.gsrt.gr/default.asp?V_ITEM_ID=5585.

⁷ Pantouli, O. & Fotakopoulou, O. 2008, *The Development of the Gender Concept in Physical and Social Sciences: a quantitative and qualitative approach*, Downloaded on 29/10/2008, Available at: http://www.kallirroee.edu.gr/congress/abstracts/Pantouli_Olga.pdf.

It should also be noted that, until now, there are no Gender Equality Offices in Higher Education Institutions and Universities, which means that there is not an established body within the Universities to be responsible for the collection of data, the compilation of national reports, development of equality guides/ manuals or the development of action plans.

In 2008 the “*Observatory for the Monitoring of Gender Equality in Education*”/PIE was established by the Research Centre for Gender Equality, KETHI and the General Secretariat for Equality. The mission of the Observatory is to prepare studies, to create significant indicators and monitor the current situation in Education and evaluate the effectiveness of measures and policies implemented for combating gender discrimination at all levels of education (www.pie.gr).

One of the major problems in Greece is the shortage of expertise on gender issues. Due to this critical shortage of expertise, the opportunities offered by the Operational Programmes of the Community Support Framework for promoting gender equality were not fully exploited. However, the specific funding allocated for developing undergraduate and postgraduate courses in women’s and gender studies marked the beginning of the end of the shortage of expertise on gender issues in Greece.

Gaps

It is obvious that the establishment of gender equality policies is very recent in Greece and they have received very limited research attention and evaluation. The greatest attention at policy level has been devoted to gender equality in employment. As a result, the field of equality in science is a relatively new field of policy attention. Finally, most of the implemented programs have not been evaluated or their results have not been published.

3. Conclusions

To sum up, there is a lack of research on the issue of women in science. The most complete study on women’s participation in scientific research was published in 2002 by the National Centre for Social Research. More recent studies carried out by the Universities are mainly centered to the academic staff.

The findings of surveys clearly show that the women researchers in our country are “inferior” to men in the professional hierarchy, gender still plays an important role in the distribution of positions and in general women researchers have fewer chances for advancement.

From the existing research literature it is obvious that there is a need in equal opportunities policies implementation for the enhancement of women to remain in research, for encountering women’s the career problems, implementation of family friendly policies (child care centers and creativity centers) and gender mainstreaming in future policies.

Barriers to scientific career development of academics and researchers are mainly the social stereotypes regarding gender roles and the family responsibilities.

The main area of research are the examination of the social construction of identity, the social factors that influence girls’ and boys’ educational and professional choices and paths, as well as the compilation of statistics which provide evidence on the existence of horizontal and vertical segregation in science.

The bibliographical search revealed that the majority of studies refer to compilation of statistics on these issues and there is limited (mostly under print) in-depth research concerning the academic staff and gender inequalities in their professional career. There is also a significant lack of longitudinal and panel studies.

The topics that are barely addressed at all are:

- Pay and funding: there are no studies about the gender pay gap (apart from one study) and inequality in the access to funding has not yet been analyzed
- There is a lack of research on women scientists in the private sector, compared to the research conducted in the public sector
- There is a lack of studies regarding cognitive abilities and skills
- A lack of specialized and analytical research concerning the low representation of women in managerial positions and in academics for all scientific fields in tertiary education was identified. There are no longitudinal studies on horizontal and vertical segregation.

- There are limited studies exploring the institutional changes and structures that reproduce gender differentiations and mainly in the scientific field. There are limited researches aiming the evaluation of gender equality policies and no research on gender equality in science policies because such policies have only recently been introduced in Greece
- Further research should be conducted dealing with the institutional constraints on the development of women in science related to the gender division of labour and analysis of the institutional practices of work organizations
- Bibliometric studies and in-depth studies about the difficulties of doing and progressing in the scientific career were not identified. Results for recent studies are not available as they are under print. There is a lack of studies considering the criteria of evaluation and the methods for selecting candidates or hiring/promoting university teaching staff and research staff.

Finally, it should be noted that there are no "Equality Unit and/or Observatories within the Administration of the Universities having in charge to promote equality between men and women, carry out studies, put into practice policies and to manage the procedures for the hiring and the promotion of the scientific personnel.

An important barrier in policy application for the improvement of the position of women in the scientific community of our country is the lack of systematically collected data regarding their presence in the academic and research sectors.

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