



***WOMEN IN SCIENCES
AND HIGH TECHNOLOGY
IN THE BALTIC STATES***

PROBLEMS AND SOLUTIONS

FP6 BASNET PROJECT RESULTS

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AND HIGH TECHNOLOGY
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VILNIUS
2007

*So many roads, so much at stake
So many dead ends, I'm at the edge of the lake
Sometimes I wonder what it's gonna take
To find dignity*

Bob Dylan

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Preface

This book is presenting results obtained during implementation of EC FP6 project „Baltic States Network: Women in Sciences and High Technology“ (BASNET). The work shows the attempts of women scientists to understand the role they are playing in sciences. This part of the work was not easy because the initiators of the project were women working in Sciences and High Technology where women are the minority. Thus, to survive in such a community where gender equality is not recognized as a problem women should conform to the existing environment. Many of us do not dare to tell even to themselves that something is wrong. Therefore, the book follows carefully all steps made to arrive at the main BASNET purpose-creation of the Baltic States Strategy „Women in Sciences and HT“. Firstly, we studied the problems and barriers women meet in their path to science and decided on the points which should give the most immediate results. Thus, we chose the object for study women's careers in Sciences and HT and concentrated on changes in science and its management policy approaching the problem from the „top“. The sociologists helped us by performing in-depth studies of the existing situation in the Baltic States revealing the main barriers women meet in their scientific careers. Thanks to them we had the possibility to discover and prove the most painful problems existing in the scientific society. Our BASNET colleagues – science policy makers from the Baltic States Ministries of Education and Science helped us in working out the efficient Strategy how to overcome the revealed problems. For that goal a lot of work was made in studying good practices of advanced countries as well as Science and High Education management systems existing in the Baltic States and the laws controlling the social care and influencing the work and life balance situation in the region. On the other hand, a great work was done to improve women-scientists communication in the Baltic States so necessary to make women more visible in the scientific community. For this the Data Basis of Baltic States Women in Sciences and HT was established.

We hope very much that the created Strategy will be implemented in the region. Moreover, we are ready to contribute to this deed ourselves. We also feel that BASNET changed us. We became more confident and understood that we can change something in this world! For this we thank European Commission and all those who assisted in our hard but successful job.

On behalf of all BASNET partners and participants
BASNET Coordinator
Assoc. Prof. Dr. Dalia Satkovskiene

I. State-of-the-art problems of women working in sciences

I.1. Women in sciences and high technology: survey of problems

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Sciences play a key role in the understanding of the world we live in and scientists contribute strongly to the economic and cultural development and welfare of nations. That is why sciences are very important for the society. The problem of the lack of women in sciences and high technology manifests in limiting the available pool of talented people to half of humanity and in eliminating diversity. Moreover, it is evident that until women are not fully represented at the leadership level of public, professional and economic life, we cannot say that women enjoy full equal rights. Thus the problem is related to the development of democracy also. Thus the goals of the project are relevant to the society.

The problem of underrepresentation of women in sciences and HT is slowly getting recognition as “a problem” in the Baltic States. It is closer to the representatives of social sciences who face the gender equality problem as their research object while representatives of sciences usually completely ignore it. The present situation can be explained as a big gap between the above mentioned sciences and the social immaturity of the scientists working in sciences. However, the proceeding democratic processes in the society, which have accelerated after Lithuania became a member of the European Union, lead the scientists to wonder about the democratic trends not only passively but to be active in creation of science policy in Lithuania as well as in formation of its principles from the gender equality perspective.

In this article it will be discussed the gender equality problem in the sciences on the basis of one of the most fundamental natural sciences – physics. This choice was conditioned by the fact that the particularity of physics characterize in an original way of thinking which allows to be well oriented not only in the processes proceeding in nature but in other spheres too (physicists successfully work in various spheres). In the society the stereotypes exist that this way of thinking is typical of men and accordingly it can be assumed that **gender equality problem is particularly sharp here**. Analyzing problems in physics from this perspective firstly, it is noticed that women are the minority in this work field. Besides, the study shows that the number of women scientists-physicists in the most European countries is inadequately low in comparison not only to the men scientist number, but also to the number of women scientists working in other sciences as well (for example, medicine, chemistry, mathematics, and etc.). Looking at the career perspectives of women scientists in science institutions and universities it is seen that they are not equally favourable to men and women, and while climbing the academic career stairs up they are even less friendly to women.

The relevance and modernity of gender equality problem in physics is also very closely connected with quick processes of world globalization through which countries more and more depend on **highly educated work force** whose resources, generally speaking, **are limited**. Consequently, it is thought that only a partial use of the potential of talented women in this sphere can have **serious consequences for the future of science** and - with it closely related – the development of **new technologies**. Research shows that women have an original way of thinking. That is why it is thought that the implementation of gender equality in sciences will give **new perspectives** for the **physics** itself. It is also noticed that women are more apt to take care of others than men. This

women's feature could stimulate positive changes during the application of science achievements and the improvement of social climate in the research teams.

The science of physics is based on mathematical logics, it is developed enough and the work results of scientists working in this sphere can be evaluated rather objectively. For that reason it is thought that it would enable researchers to introduce additional, more objective criteria of scientific activity.

The first time gender equality in sciences problem was raised on an international level in 1995 in Beijing during United Nations' (UN) Women Congress and was formulated in its directives. EU gives a lot of attention to the question of gender equality in sciences and its organizations as European Commission, which has organized broad problem research on the European level (**ETAN** and **ENWISE** programmes), has included this question as a separate article into the science sponsorship (**FR6**) programme.

Understanding the gravity of the problem **International Union of Pure and Applied Physics (IUPAP)** has formed a working group in order to solve the problems of women physicists. To discuss the collected results in 2002 in Paris was held the first conference of Women in Physics. The conference was patronized by UNESCO and it was held in the seat of this organization. About 300 people from 65 countries participated in the conference. Country delegations participated in the discussions and, referring to the realia of their countries, proposed ideas based on which the guidelines of the strategy solving women in physics problems were formulated and the resolution of the conference was adopted.

Since the problems of women physicists-scientists have not been studied in series in the Baltic States, for reviewing them it will be used mostly the results of other countries as well as the material gained from Dr. A. Novelskaite.

Caroline Wiesner results, generalizing women situation in physics in EU and USA, show that approximately 30% of the graduates of physics faculties are women. Depending on the country they make as well from several to 30% of all having scientific degree. Yet, their number among university staff on the average is less than 5%. Thus the proportion of actively working high-qualified women physicist is notably small in all countries.

The study shows that these numbers determine two main reasons: **girls do not choose physics as a profession and women-scientists abandon their career in physics.**

Some of the factors influencing the choice of girls gifted for sciences are: inadequately **low prestige of physics in the society**, and **unattractive and inadequate image of scientists**. Both reasons are directly connected with the particularity of physics– its complexity, which in turn is related to the widely used mathematical apparatus to describe physical phenomena and society's conditional illiteracy in natural sciences, and the too small attention that is given to the popularization of sciences and those who build up the science - the scientists. The prestige of physics in Western Countries was strongly affected after it was identified with the production of atomic bombs and the effects of its probable use - pollution etc. It is noticed that girls are more sensitive to negative news about science than boys and because of that the impact of these factors on them is bigger.

Even **social environment does not motivate** girls to choose sciences as profession. A woman physicist – in the society's eyes – is not a totally normal woman. For example, the pupils' survey in England, accomplished after the physicists'-scientists' meeting with the pupils, showed that the majority had mistaken women physicists, who were telling about the advance in physics, for the wives of the men physicists or, at best, for their assistants. There are plenty such occurrences elsewhere, too.

The **physics' teaching system** is not oriented to a woman as well. The textbooks are written by men, are engaging for boys, in the given examples masculine hobbies are reflected. A **woman physicist role model** is not being formed in them which is so necessary in the upbringing and

teaching processes. As a result, girls do not see their place in physics as well as further career perspectives in science. In the sciences features typical of men are tolerated, for example, aggressiveness, and competition. Girls are **educated** otherwise. They are less bold, not aggressive; tend to learn collaborating in groups and for that reason under the environmental pressure become less confident in themselves and their chances. For example, the survey, accomplished in USA among the graduates who think their capabilities are above average, showed that girls see themselves in this hierarchy in lower positions than men.

In this case **teachers' qualification** and their **awareness about gender equality** problem is significant. Research shows that **parents' attitudes and support** are invaluable while choosing scientist's profession. It is especially important in the early age. It is reckoned that scientific thinking forms much earlier than physics is started to be taught at school (i.e. 12-14 years old).

University education does not take into account the peculiarities of women thinking as well. For instance, the research shows that women in general try to understand physics starting from **the first principles** while men usually are ready to go further, even when they do not understand them straight away. In Oxford and Liverpool (Great Britain) accomplished socio-psychological surveys showed that only some **women in physics like** application meanwhile the majority are fascinated by **"fundamental, global" physical problems** and **mathematics**. Supposedly, one of the reasons why even 35% of physics graduates in Italy are women is that physics here is taught in the mathematical context.

Dr. Aurelija Novelskaite presented generalized statistical data, obtained from Lithuanian Science and Studies department of Education and science Ministry, which show that about **one third** Lithuanian **women physicist**, having scientific degree, **have left this field**. It is thought that women-scientists refuse from physics profession because **they are not satisfied with career perspectives in science**.

The research shows that in Lithuania **women and men career tendencies in sciences are similar** to other countries. Women are the minority among Lithuanian physicists (11% of physicists). The proportion of men and women having doctoral degree in physics is about 8:1 meanwhile corresponding proportion of habilitated doctors – 44:1. The title of associated professor is given to 27% of men and 27% of women having doctoral degree. However, the full professor's title has 15% of men physicists and not a single woman.

Besides 16 men physicists are members of Lithuanian Academy of Sciences, hold leading posts in Lithuanian Science Council, head faculties, departments, confirm science programmes, announce competitions for the posts to hold and admit to them, and confirm trends and priorities of the development of institutions and physics science in general in Lithuania meanwhile not a single woman physicist in Lithuania held any leading post except for the **group leader or head of department** (and still only in those higher education institutions where department of physics is not profile), not even one woman physicist was a **member of the Lithuanian Academy of Sciences** or have participated in **forming science policy**. The only pleasant exception is an astronomer G. Tautvaišienė who started to lead the Institute of Theoretical Physics and Astronomy two years ago.

Sociologists have counted that if women and men scientific career in physics developed equally (i.e. 20 years after the doctoral dissertation would be defended habilitated doctor and 11 years after conferment of readership would be given professorship), in 2000 there should have been already 11 women having professorship in physics in Lithuania. According to Japanese Physical Society's surveys women's scientific activity (the number of the publications in a certain time period) is not only any lower than men's (except for some critical periods in her life connected with giving birth to children and their upbringing), but is even bigger than men's activity at the end of the career. The studies also show that the same scientific activity enables the man to hold considerably higher position in the academic society.

In the women physicists' opinion, a substantial factor, ensuring successful career, is scientific capacity in solving essential physical problems. The other fundamental success elements are: competence to gain recognition of the scientific community and individual success. The recognition is understood as stepping the hierarchical stairs up, the respect of the colleagues and students, official invitations to give plenary presentations, leading groups of the scientists, awards and adequate pay. Women physicists influence over society understand as the improvement of the situation in the world, country or physics. Individual success is defined by these factors: self-sufficiency, pleasure, life balance or pay, adequate to the invested efforts. The importance of each of the mentioned factors depends on particular individual and, of course, on positions held in hierarchical system.

These main stages can be marked in the way of women physicist career: the **choice** of specialization, the **nature of professional activity**, and the **competence and recognition** stages.

The first stage begins in the higher education institution and just after its completion. Here the main stress falls on the physical specialization and the choice of the professional activity path (scientific researches, pedagogical work, industry, management and etc.). At this stage it is very important to think of short-term and long-term goals and at the same time to be flexible, to foresee unexpected beneficial circumstances and outgoing perspectives.

While seeking for professionalism competence and "visibility" of the scientist grow. Here the main role plays scientific advisors and consultants as well as academic institution in which one specializes. Women physicists whose professors and scientific leaders value their knowledge and professional achievements gain **confidence** in their potency. As practice shows, women physicists, responsible for important tasks, develop professionally comparatively much faster. Women scientists from small countries who want to seek career must spend some years abroad in a distinguished laboratory. It helps to contract professional contacts, co-operation, to gain required qualification and professional reputation necessary for receiving permanent status in the native country. The career depends greatly on the success in solving significant contemporary physics science problem. On the other hand, a possibility to lead at least a small part of the project usually creates better conditions for the future career than an ordinary participation in a big project. It is especially important for women seeking career in such fields as high energy physics which requires a lot of resources. Women physicists note that it is necessary to secure the role of women physicists in this field not to be understood only as an auxiliary.

A strong influence on the development of women scientific careers has their natural role to bear and nurture children, imperfect science systems, psychological and social factors.

The period of upbringing children is difficult for all women. Studies made in Japan show that **women's scientific activity strongly reduces with the growing** number of children meanwhile tendency among **men are contrary**. It is emphasized that women face most difficulties when returning to science after the maternity leave –their scientific qualification lowers, time and big efforts are necessary for rehabilitation. For that reason some women-physicists from abroad postpone till 30-35 years old the stages of family creation and children upbringing. But physics is so fascinating and attractive that some women find a child's birth a positive impact for their career. Still some women are **forced to leave science** because of hard conditions.

Analyzing the influence of the science system first we need to define a scientist's **career concept**. A career is understood as a formal position enabling to control resources, including finances and human resources and to make decisions on the scientific problems to be solved. The existing science system is not perfect. The so called "rules of the game" were created by men. Women, as they started professional activity in sciences historically later and are a minority in sciences, must resign to established situation. **Practice of mobile scientist** in the developed countries, when the career depends on scientific groups in which physicist has worked after doctoral dissertation and relatively long period of time after doctoral dissertation to possibility gain the permanent position,

is especially unfavorable for family and children upbringing.

“The rules of the game” do not include features typical for women. Because of long-lasting patriarchal system women often lack self-confidence, unrealistically assess their possibilities, are diffident and do not know how to show their erudition and qualification, **avoid competing** with men scientists, are more responsible. For example, women seeking career, professional recognition and adequate pay understand that they have to keep to existing “rules of the game” and consciously acquire competences and experience necessary for the higher career level. As the mentioned unwritten “rules” are a set of habits, behavior and possibilities which determine who will be promoted, they aren’t clearly regulated. Sometimes “rules” prefer **high competitiveness behavior**, so called “competitive behavior physics” or „combat physics“. Such cases insult professional women scientists and remove any wish to compete while career seeking men conciliate and try again.

The science system is typical of **closed hierarchy** (the so called “old boys’ clubs”), where main science, management, personnel and other important to the scientists’ problems are solved, and from where women are excluded. Vague selection criteria, unclear competition and disproportionate representation of women and men condition women discrimination and their extrusion from the ranks of scientists.

It is believed that in order to improve the situation it is meaningful to do comprehensive socio-psychological research on scientists’ problems; to inform society changing its old attitudes; to gather demographical data, including gender, in order to observe tendencies in this field; to support and to encourage the creation of local, national, regional and international networks connecting women physicists; to involve outstanding male scientists in solving the questions of improvement of women conditions in physics; to create clear, gender non-dependent procedures and mechanisms of the approval of important decisions securing and improving for women work climate and proportional representation in science management structures. Supposedly, the mentioned means could be included in the strategy of science development and could be the basis for policy of gender equality in science.

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I.2. Overview of the problems women meet in their scientific careers

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I.2.1. Women in sciences

During the last decade the number of students, especially women-students, considerably increased in the Baltic States universities. The percent of women is growing even in the departments of “hard” sciences. However, women form a small part of research workers occupied with physics, mathematics, engineering, and HT in universities and other academic institutions. Furthermore, in general women are not reaching the highest positions; they are not adequately involved in management and policy making. The low presence of women at the highest levels of the scientific hierarchy shows the inability of research institutions to follow changes in society. Proportional representation of women and men in decision-making processes is an essential condition of democracy. Female under-representation is a violation of general principles of equity. It is a waste of human potential which could be realized for the sake of society. It is also a problem of morality in scientific community. Women who are gifted for the subject have the right to feel satisfaction of research work and to make a successful career in sciences.

In the Nordic countries the research on the question of gender inequality is being carried out for several decades now while in the other European countries it is started since 1995. Finland is an interesting country to study gender in academia, with one of the highest levels of R&D investment globally and in Europe (estimate for 2002 is 3.5% of the GNP, Statistics Finland), relatively high proportions of women engaged in research activities, and explicit governmental commitment to gender equality policies, a feature shared with other Nordic countries (Eurostat 2001). Nevertheless, Finnish academic women continue to experience various forms of gender discrimination and sexism in academia. Furthermore, these experiences are not restricted to any specific career phase (pre- or postdoctoral, for example) or certain disciplinary fields or arenas of academic activities. Gendered problems related to research funding encountered by the informants were linked to many issues, such as the mismatch of parental leave with the funding systems, ‘academic’ vs. ‘biological age’, nontransparent practices in recruitment to research projects or graduate schools, lack of support and encouragement, research group dynamics, as well as sometimes overt gender bias in evaluation (Husu, 2001).

Women are particularly under-represented among academic gate-keepers and leading positions in science and science policy organizations. According to the ETAN Report (2000), to a large extent, the gate-keepers of research funding in Europe comprise middle-aged male academics. Such male domination also applies to countries such as Finland, despite the fact that the proportion of women among professors in Finland is the highest in the EU (21% in 2002). Finnish National Research Councils are, however, approaching gender parity, having had to follow the quota paragraph of the Gender Equality Act since 1995. Despite this, only 16% of the referees the RCs used in their funding decisions were women in 1999, as were only 14% of the board members of the largest Finnish research funding foundations.

Why are women indispensable in sciences?

The time came to defeat a general assumption that women scientists, as an educated élite, are a lesser priority for society. Women have to participate in the spheres of science creation and dissemination not only for the sake of their own career, but for the benefit of society as well. The necessity of women in science is evidenced by different aspects (economical, cultural, etc.):

1. women can perform research work on the same level of excellence and productivity as men, so the potential of scientists become larger when women are included;
2. women are good mentors for students and post-graduates, in taking care of them; men often leave them for themselves;
3. women have interest in science popularization;
4. women take care about ecology of scientific installations;
5. family relations are of higher quality when woman is educated and satisfied of her work;
6. women scientist is often obliged to sacrifice family for the sake of career. This has no perspective for society. Gifted women must have the conditions to have offspring because of the genetic factors as well as suitable environment to educate a child;
7. It is shown that in some countries high achievements in gender equality field (including science and HT) helped to solve demographic problem;
8. the most capable men and women working in science often together form a family. Therefore gender equality is important for men. The collaboration of men and women is necessary for reaching the higher percent of women in science and their successive career;
9. the cultural aspect of science is very important. There is a long and complex way to go between a new scientific discovery and its effects on society. It may take many years before we can expect any practical application of this discovery. But if there are no practical applications, scientific discovery is a cultural enrichment for society. For educated people it gives the possibility to be charmed by the beauty of nature or by the elegance of new scientific theory. And women have not to be excluded from creators or consumers of scientific knowledge.

There has to be equal balance between men and women in sciences for the sake of scientific society because:

1. the better result can be achieved by mix of women and men skills as well as by accommodation of different views;
2. working places would be pleasant and productive, the relations between people better if more women were in science. The motivation to work hard, necessary in science can be induced by the collaboration and not only by competitiveness;
3. the scientists who could be models of career for young people are necessary. There exist many male models but in the historical circumstances there is a shortage of female models and they are not popularized. A cultural stereotype of scientist that is not in correlation with feminality takes root in the past. Nowadays there has to be more modern women in science, well-educated professionals, not lacking femininity. It would be a good example for girls and could help in reaching gender balance in science;
4. women have to see the possibility to reach higher career levels in science, to participate in the formation of science policy. The critical mass of women is necessary for their career development. It could help to enlarge the total human potential in science.

In Western countries, periods of shortfall, in the supply of scientific personnel prompt governments to enhance women's participation in science (the directive of EU to double the number of scientists by attracting women). Although efforts have been made to increase their participation, large structural and organizational issues persist.

Why are there few women in sciences?

The lack of women in sciences is resulting from discrimination as well as their own choice based on public consciousness stereotypes. Below the main reasons influencing women choice of scientist profession will be analyzed.

Historically sciences were inaccessible for women, especially the exact sciences. Only a few women are known as great mathematicians and physicists. This situation forms the opinion that sciences can be only under the competence of men. Nowadays men scientists are inclined to coincide themselves with the minority of men, the discoveries of whom had the great impact on the scientific knowledge and life quality of society. The situation in which a female scientist model does not exist cannot help girls to choose scientists' profession.

The traditions of girls' education have also great importance: girls are not stimulated to play logical games or in a team where they could compete and gain victory. The school is not the place where girls could be stimulated to have interest in deep studying of mathematics, physics, taking part in contests. The ambitions, persistency, expediency of girls are not being developed. In the USA, the programmes devoted to attract and maintain the interest of girls in sciences are applied. The programmes work on providing the resources girls need to have the capability to move into science and engineering careers. And those programmes help.

In the Baltic States universities a majority of students are girls. But the situation is different in the departments of exact sciences, connected with HT. The percent of girls is decreasing with the stage of studies and few of them are hired to continue their research work in the universities.

Nevertheless, there exist young women who have the desire to do research work and develop their career in science. In this case they meet historically formed male science tradition, creating unfavourable social environment with dominating and privileged men and women being a minority. In such environment women are treated as non-perspective because of their psychological characteristics and, as supposed, because of the lack of aptitudes and competence. Nobody has proved that women are less capable for scientific work but they meet a lot of difficulties while realizing their abilities. Women reach better results in the fields of science where they are not a minority.

There exists a horizontal segregation, i.e. the segregation by fields of science: there are some fields where women form a majority, when in other fields (e.g. mathematics, physics, HT) they are a minority. Besides, there exists a vertical segregation in science – the percent of women is decreasing with higher levels of career, becoming zero at top echelons.

The explicit discrimination by gender is forbidden in democratic society but it exists in implicit form (MIT report, 1999). Often men and women do not notice it. They think that women cannot reach a suitable appreciation because of their personal features or outward circumstances. The more male is work environment, the less is notice of discrimination. The observations of women are not of interest for men, they do not pay attention to it. Discrimination relates not only to women but is a wider phenomenon. As noticed J.Scott (1988): "Gender is a primary way of signifying relationships of power." This was confirmed by research of T.Thorvaldsdóttir (2004) which showed that gender biased language, gendered characteristics were often used to raise or lower the social weight of the individual irrespective of his or her biological sex. Thus, it means that the concept "woman" defines a status.

Moreover, twofold standards are used in academic environment: men apply the higher abilities' and competence's requirements for women than women for men. Men more often reject the influence of female co-workers than women of their male colleagues. Therefore women have to work harder in order to prove them. A matter of great importance is a prejudice that woman as scientist cannot stand on the same level of excellence as men. The mistakes of men usually are not noticed when those of women are overestimated and connected with their sex. Women often suffer

because of small mistakes. Unfavourable work environment results in a career-related stress. A usual thing for women is to bear a greater family burden than for men who affirm that family is not an obstacle for their career. Women allot much time and energy for family care and feel exhausted in managing home and career. Unfavourable social environment, insufficient estimation of female scientists work in academia, low possibilities of career development as well as family cares often lead to the situation when women decline their professional ambitions and adapt themselves to status quo refusing to compete in the male environment and leaving for themselves a possibility to do research work not striving for higher positions in career. Often women leave science finding alternative occupations (sometimes related with science) where they feel better not confronting the prejudices and being appraised at their true worth. As noticed by S.Harding and E.McGregor, at present there is a conceptual shift from focusing on women identities, motivation or individual characteristics towards problematising academia, its structures and practices.

I.2.2. Barriers women meet in their scientific career

Although participation of women in sciences shows a steady increase in a lot of world countries (especially in the last decades), still there is a matter of some difficulty for them to win the suitable status in academia. Opposed to this are the historically formed cultural stereotypes, traditional conception of woman's role in society, psychological and educational peculiarities, the social environment, giving no stimulation for woman to choose scientist's profession in the male dominated and managed science world, where the career is based on male model of labour market participation. The characteristic of this world is a strong competition. Therefore not every man is inclined to reach highest administrative posts, having in mind that it will require a lot of time and energy even though it gives the financial resources and the possibility to choose the subject of research. But for men it is only a matter of choice and personal attitudes while for women the achievement of top management posts is not only a matter of their personal ambitions, but it is also a possibility to protect their women co-workers from discrimination, to influence the science policy, taking into account women interests and making a role of women in modern society more effective. These aims should be achieved step by step, non-conflicting but cooperating, by means of comprehension and support from male part of scientific society in behalf of all community. The last decades have witnessed unprecedented interest in the research dealing with the situation of women in sciences. The results are presented in a lot of publications, discussed in conferences, workshops, paying attention to obstacles women meet in their career paths that differ from those of men.

Obstacles for women, working in science institutions, include:

1. Unfavourable work environment;
2. Balancing of career and family;
3. Hierarchical, nontransparent, inflexible science organization and management system.

Unfavourable work environment

Male dominance in science institutions leads to an intrusion of gender stereotypes in the work environment. Interconnection between men's practices, academic practices, and managerial practices creates a highly gendered atmosphere. As a result, most applicants and evaluators are men, and they also serve as gate-keepers for new positions. Women's position and experience are affected by the form and structure of management and the gendering of institution. Existing

practices place women at a disadvantage relative to men both in recruitment and promotion processes, especially in sciences and HT. Comparative analysis performed in USA, Germany and India (Gupta, 2004) shows that women face the same problems in countries of different culture and development. Gendered roles and styles emanate from the social structure of science rather than from gender or national culture. N.Gupta et al. (2004) notice these aspects of discrimination:

1. women are seen as risky employees who may, at least, temporarily drop out;
2. women's family obligations taken into account and they are ignored while men are hired;
3. in the scientific labour market taking on women is considered risky with stereotyped assumptions about their aptitudes and expected skills;
4. women have to work doubly hard to prove their capabilities due to an intrusion of gender stereotypes in work environment;
5. women are excluded from certain tasks, not being put in charge of a certain engineering section because of gender role stereotypes;
6. exclusion from administration deprives women of a chance to build up contacts, prove themselves, and to make the administration more gender sensitive;

preference is given to male scientists when better or tenured positions are distributed.

The dominance of stereotypes in work environment causes the situation when women perform tasks demanding accuracy, attentiveness, patience, but not connected with scientific competence and not giving the possibility for women to show themselves as excellent scientists. This situation allows exploiting and controlling them and leads to the following consequences:

- a woman has no time to raise her competence;
- a woman's input into collective work is underestimated by her male colleagues;
- a woman is not heard out, her opinion is often neglected in discussions, it is not advised with her in making decisions;
- a woman has almost no possibility to travel to conferences;
- a woman has little possibility for successful career in science.

All this is based on traditional cultural stereotype that woman has to sacrifice herself both in private and public domains. M. Blagojevic (2004) writes: "Scientific excellence of women in this kind of environment, of prescribed women's sacrifice, where women's individual ambition is treated as ultimately negative, an 'unwomanly' feature, is something which is seen more as an excess than as a desirable quality. However, in that same environment, women's valuable resources could be quite efficiently used without adequate recognition, often even without any expectations for recognition coming from women themselves. "

The problems of working in an unfavourable environment result in a work-related stress, typical of women. Attending conferences, beginning their first academic appointment women feel the concern that they may be disregarded because of their sex despite their competence. In hostile environments, along with intellectual demands and the every day stressors connected with career, women feel additional anxiety produced by discrimination. Multiple experiences of marginalisation, rejection and diminishment, exhaust them emotionally and mentally and obstruct fulfillment of the potential of many gifted women. Discrimination is exacerbated when adaptive attempts at affiliation through women's groups are labeled as indicating women have 'special needs'. Humiliation and fear frequently lead women to understanding that to survive they must get through confusing experiences in silence.

The existing work environment in scientific institutions helps to form interpersonal barriers, emerging from noncommunication between women and men, not taking into consideration gendered relations, from men's reluctance to cooperate and hostility based on male ambitions. Conflict originates between men's perceptions of women in science and women's perceptions of themselves. Women who speak their minds or who are assertive are considered "unwomanly"

(Gupta, 2004). Men do not want to compete with women because the gains from winning the competition are relatively small, and the risk related to losing the competition is high, because this implies large honour losses (Addis, 2004). As a result, men treat women differently from the way they treat men, and women remain 'the others'.

Balancing career and family

Women scientists encounter sex-related context of sciences, connected with provision of financial resources and technical equipment (especially for physical experiments) and sale of a product. "Good science" is essentially a male model of practice. The traditional male path is one of full-time devotion to research, emphasis on early achievements, and exclusive identification of oneself with science without any other obligations. Women find such model difficult to follow due to their need for diverse identities and the family concerns. Domestic responsibilities, including child care, fall disproportionately on women. There is no family favourable environment in science institutions. Thus, women face more difficulties in balancing family and career. Giving priority to family is considered by society a virtue in a woman. Often women scientists regard partner's career as more important than their own. They create conditions for partners by taking upon themselves all domestic responsibilities and helping them by doing a great part of technical work. If they work together in the same field of sciences women give in the priority of ideas as well as of the work done for men.

Women often think that they will not be able to balance work and family if they have children. The research performed in USA Midwestern University (MWU) states a conflict between biological clock and tenure clock. MWU survey (Gupta, 2004) showed that a significantly larger number of women than men participate in tenure race without having children. Family responsibilities determine a lack of geographical mobility (affecting shift in worksite from Ph.D. to post doctorate and post doctorate to another site). Graduate female students often take up jobs not connected with science in order to avoid disturbing family by moving out. This leads to scaling down women's ambitions to accommodate family and scientific career. There are low life standards in post-soviet countries and it requires more efforts and time from women in everyday life. Moreover, scientific institutions see combining family and career as a "private affair" for women. Minimal child care facilities are absent in science institutions. Multiple roles that woman has to play need efforts in time management and rigorous self-discipline. The women who have reached high levels within the scientific community are clearly individuals who have, heretofore, been able to exercise and develop their capacity to fulfill their potential and to experience a sense of their own self-agency without suffering defeat. Nevertheless, even these women can feel vulnerable by unexpected discriminatory assaults from those who try to diminish them. It distinguishes the situation of women from men scientists.

I.2.3. Science evaluation and selection system: management, metrics, networks

As has been noticed by J. Hearn (2004) universities remain incredibly hierarchically gendered institutions. The higher the status of the university, the more men academics are likely to work there. Many academic areas, and especially in science and technology, remain at the high levels, (particularly the professorial) almost exclusively male. What are the reasons?

1. historical heritage. Science has developed in a society where men were privileged and

dominating and this was transferred into the science system. It continues as system is conservative. Men perform gendered practices in university management, research, and science evaluation sponsoring exclusionary and sexual practices;

2. specific local cultures. In the universities form specific organizational and departmental cultures (various “clubs”), conditioning cultural cloning, i.e. often unintended preference by men for men. The similar-to-me effects implicitly influence assessment and selection procedures. This privileges the contribution of men and diminishes that of women. This also produces competition between men and makes them rivals as well as supporters;
3. interconnection between men’s power and managerial power. There are many ways (Martin, 1996) in which men maintain managerial power, especially in the appointment and promotion process.

Strong male dominance is also evident in other in the power structure institutions of the science: editorial boards, research councils, peer panels, selection committees for professorships, and etc. The ways in which these organisations and groups are recruited are rather informal and lack transparency, the composition is often unbalanced and the male élite is overrepresented. In many cases, new members are invited on the basis of their expertise or their networks, not on their ability to make reliable, unprejudiced judgments. Many criteria are marked by a kind of elasticity, and can be mobilised in order to make a positive or negative judgment. Moreover, issues like ‘how to conduct assessments’, ‘how to use criteria’ and ‘how to avoid gender biases’ are not recognised as important aspects influencing the professionalism and accuracy of selection and evaluation procedures (Mottier, 2004). Such management style leads to gender bias in science evaluation system, i.e. where two individuals of different sex whose work is evaluated similarly according to given metrics are not treated in a like manner (in terms such as appointment, promotion, salary, advancement, reputation, awards, and etc.) and this way women remain in disadvantage relative to men, they receive less in the way of economic or social returns.

Academic career system is based on the traditional male model of labour market participation. Scientists – men and women – who resemble those who are in powerful positions and behave according to male model of full-time devotion and competition can be assessed as better scientists. Part-timers and ‘women returners’ (those returning to academic work after a career break) are vulnerable to a negative judgment due to limited publication records. Mobility, as required by the labour market, temporal contracts and temporal positions are unfavourable factors for family and especially for woman. Scarcity of jobs is a risk for women.

M.Foschi (2004) identifies gender-based double standards, stricter for women than for men, as the mechanism through which women are assigned less ability than men:

1. gender differences in performance evaluation when the quality of the outcome leaves room for interpretation;
2. gender differences in the number of opportunities granted to complete a task;
3. the inclusion of factors unrelated to competence when assessing women but not when assessing men (such as considerations regarding marriage and parenthood);
4. different levels of encouragement for men and women after members of both groups have completed the same task with the same level of proficiency;
5. the use of different competence standards for men and women when assessing the same (or highly similar) successful performance by both sexes.

When assessing evaluators treat performers’ sex category as a status characteristic, i.e. as an attribute that implicitly conveys information about men’s overall superiority to women, including superior competence at most tasks.

Evaluators of scientific performance tend to overestimate the accomplishments of scientists with an established reputation whereas unknown researchers need more reserve. This so-called Matthew Effect (Merton, 1968) – achievements are frequently attributed to the more famous

researcher – has been documented extensively. The gendered variant, called the Matilda Effect, has also been well documented: achievements of female researchers are frequently attributed to their male colleagues or otherwise minimised and underestimated (Rossiter, 1993; Stamhuis, 1995). Scientific career is characterised by a variety of activities but not all of them are visible, some remain behind the borders of evaluation system. It is impossible to address all the dimensions of an individual professionalism.

The commonly assumed device for reviewing research results is bibliometrics: the number of published articles and books and their citation rates. Bibliometrics looks as “unbiased”, easy to count and unequivocal indicator. But it is not a most valid. The connection between short-term publication and long-term scientific impact is weak. The system employed in bibliometrics privileges well-established fields of research with clear boundaries as well as new popular trends. In these research fields there is a possibility to participate and exchange within an established scientific community, to get funding for research, to publish in prestigious journals. Interdisciplinary fields as well as relatively narrow fields are not visible enough and using of bibliometrics is problematic. As has been emphasized by M. Blagojevic (2004), bibliometrics privileges clear and intelligible rules that successfully translate scientific publishing into economic rewards, which is not the case in issues and countries at the periphery, where nepotism not meritocracy prevails.

Another problem is a real inflation of literature. The individual competition stimulates publishing. As J.Hearn (2004) noticed, publication numbers themselves can be an outcome of a certain form of masculinity.

In the last decade a lot of research has been done on the issue of gender and publications. According to L.Schiebinger (1999) and V.Valian (1998), women tend to publish fewer articles than men with each of them being more substantive. R.Palomba (2004) showed that there is a family effect on productivity: the publication peak for men is earlier in their careers than for women. Men invest time and energy in their professional career until 36-40 years of age, a time when women are most caught up in family commitments.

Recent publications (Bordon et al., 2003) show that productivity is related to academic rank. The lower productivity of women can be explained by the fact that they are working at lower professional ranks than men. Within the same category it seems that there is no significant difference by gender.

The emphasis on bibliometrics is overdone, both because of the limitations of these measures and because it blocks more detailed measurement of contributions of women scientists (Feller, 2004). Moreover, other recent studies have pointed to the “game-like, opportunistic” behavior of scientists and their home institutions to maximize rewards by manipulating output measures, trading off, for example, publication counts for citations (Butler, 2003). Citations may be by-products of participation in larger networks. Scientists have to decide which of the multiple references put before them to cite. Assessment of the significance of any single article maybe based on professional interactions with the authors in any number of a set of formal and informal scientific settings. To the extent to which female scientists experience disadvantages in accumulating professional opportunities and visibility, so too will they experience a disadvantage in having their published work read, and thus cited (Etzkowitz et al., 2000).

Development of the alternative measures for evaluation of scientific performance is a demanding task (Feller, 2004). Metrics does not include factors important for women.

Mainstream ideas on the attribution of scientific competence are old and strongly related to the meritocratic view that individual performance determines and reflects competence. In this context the scientific forum is the best institution capable of evaluating the results of research. Peers are the ones who assess the quality of research proposals and products. The peer review system professionally produces ‘certified knowledge’. Disinterestedness and objectivity are cornerstones

of the scientific ethos (Merton, 1942). P. Bourdieu (1976) called this claim to objectivity and disinterestedness one of the strongest myths of contemporary science. The positioning of the scientist in an academic and societal force field is crucial for the way research is conducted and knowledge is produced (Haraway, 1998). Evaluators are themselves competitors for scarce resources, and as such they are stakeholders with personal goals, masking their own interest in general statements on scientific development (Bourdieu, 1976). Evaluation is not free of subjective elements, prejudice and stereotypical images partly related to gender differences, nor from hierarchical position and reputational status.

According to research made by G. Griffin (2004) on the assessment of the projects, evaluators exclude proposals for reasons not at all focused on the scientific merit of the proposal but on extra-scientific factors in which the extent to which the evaluator had a stake in the evaluation process and organisation, etc., knowledge of the proposer as a person or the relative fame and academic standing of the referees for the proposal played a key role. In this case project gets funding not because of its scientific merit. Selection resembles the democratic deliberation process which involves reconciling conflicting views through consensus in a context of plural views and positions. Thus, the „objectivity“ of the final decision is the result of negotiation.

There are several existing studies that examine and criticise the peer review system on various grounds. Research by C. Wennerås and A. Wold (1997) found that the peer review system was not as neutral as expected. Gender and affiliation both influence the chances of obtaining a grant. Both women and men rate the quality of women's work lower than men's work, when they are aware of the sex of the author submitting a scientific article, but not when the same person's gender is unknown. As a consequence, her work has implicitly less scientific merit and ultimately her career will be penalised. As B. van der Meulen (1992) stated some years ago: "The quality that is ascribed to the objects evaluated is not a property of the object but a relation between the object and the frame of reference, ascribed by an evaluator." As majority of evaluators are men as well as they are members of various committees, they define assessment rules that reflect their views on what is important and relevant. Scientists pay most attention to well-known researchers. Reputational status creates conditions for future success.

The scarcity of women in senior positions in science means that their individual and collective opinions are less likely to be voiced in policy- and decision-making processes.

H. Etzkowitz et al. (2000) placed emphasis on the importance of social capital (access to resources and positions of power) and density of network relationships as an explanation for the observed differential performance of female and male scientists. It is not only talent and merit (i.e. individual capital) that decide whose papers will be published or whose application will be approved; this is also affected by social capital and visibility. Scientific recognition is partly a result of formal or informal network relations. The role of networks in information exchange, agenda setting, control and implicit decision-making cannot be overestimated. Because networks are often quite informal and generated by pure cooptation, women scientists seem to be subtly excluded from them even by colleagues who are not explicitly sexist in any way, but they do not want to compete with women. Exclusion from interaction leads to a lack of collaborations, contacts and recognition.

B. van Balen (2001) studied the mechanism of social closure and how it may produce social exclusion, in which she pointed to the role of informal networks. Women tend to work and publish with women, men with men, but since there are fewer women and they are generally at lower levels, women's networks tend to be smaller and less significant. As E. Cozzens (2004) notices, there is a connection between allocation of the basic resources of a laboratory, namely, space and equipment, and the fundamental networks of power among men. Processes of men-men networking are highly relevant in both research conduct and research evaluation (Burton, 1998).

A shift of decision-making power away from male exclusivity and informal networks into more

formal and professional mechanisms inclusive of women is one of the cornerstones of the strategy to increase women participation in science conduct and management.

The mechanisms that exclude women are the same as those that make the university system inefficient and conservative, and slow down progress towards knowledge. Therefore wider and more successive participation of women in academic work, including science management, is with good prospects for society and is necessary for the progress of science because it is connected with abolition of closeness and non-transparency in academia. It would open the way to science for women as well as for young men who do not have the support in long ago formed academic strata. However, the science system has to be reformed gradually not destroying existing structures and not humiliating the people established in sciences in the past.

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II. Women's careers in sciences and high technology in BASNET partner countries: Results of sociological research

II.1 Generalization of BASNET sociological research results

Introduction

This report is based on three country reports (Estonia, Latvia, and Lithuania); it uses some insights and conclusions from country reports of Poland and Romania. National reports of Estonia, Latvia and Lithuania are enclosed in this report.

The starting position of the sociological survey on women's participation in sciences and technologies was the lack of scientific evidence to explain why women are underrepresented in these fields of research. Previous research and statistical analysis showed that there were following common problems in all 5 countries embraced by the project:

- under representation of women in sciences and research;
- high under-representation of women in exact sciences and technologies;
- a large gender disproportion in the highest academic and scientific management levels;
- bigger average salaries for men researchers in comparison to women researchers;
- no evidence for improvement of this situation;
- no research on the barriers encountered by women-scientists in the sciences and technologies conducted in the Baltic States;

Therefore, in order to explore gender-related issues in sciences and high technologies (HT field) in the Baltic States, the qualitative research by three teams of researchers has been conducted simultaneously. The main objective of the research was to identify barriers (including ethical), which women-scientists in the Baltic States face in their career, and which are not, or to a lesser extent, are encountered by their men counterparts in the fields of sciences and high technology.

To achieve this objective a method of qualitative interviews with women-scientists was applied. From June to September of 2006 63 women-scientists working in the fields of physics, astronomy, chemistry, biochemistry, biophysics, mathematics and informatics were interviewed in three Baltic States (Lithuania – 23, Latvia – 20, Estonia – 20). In Lithuania there was also conducted the qualitative research of the career of men scientists: 7 qualitative interviews with men-scientists were carried out, and, additionally, 7 men-scientists were surveyed by method of an open-ended questionnaire posted by e-mail. This sample of men-respondents was a control group to reveal factors determining careers of women scientists and of no influence or smaller influence to men-scientists.

The fieldwork was scheduled from 1 May 2006 to 15 September 2006. The method of data analysis chosen was qualitative content analysis. The research methodology is presented in Appendix No. 1. Description samples are presented in each country report.

The research in the Baltic States was coordinated by Vilnius University (Head of Study and Analysis Group assoc. prof. Giedre Purvaneckiene). The research was carried out in Latvia by the University of Latvia (Coordinator prof. Brigita Zepa), in Lithuania by Vilnius University (Coordinator dr. Rūta Žiliukaitė), and in Estonia by Tartu University (Coordinator Ms. Anu Laas).

II.1.1 Women's scientific careers in sciences and HT

A path to science

The most important factor that determines women's choice to study sciences and HT field is a personal ability and interest in a particular science. However, almost equally important are the external factors, namely the personality of a teacher, her/his encouragement to study science, and support of parents. It is to be noted that men-scientists, interviewed in Lithuania, only stressed importance of internal factors (interest, abilities) for their choice of study discipline, while teachers' and parents' influence, which was frequently emphasized by women scientists, was considerably less important for their choice.

Other factors in motivation of women to study sciences and repeating across countries are the popularity of a subject or its novelty and the influence of peers. In Estonia, respondents also pointed out that contributing to society, providing impact to society, was very important for women in the career selection process. Research conducted in Latvia reveals other factors related to study environment, such as a number of women among all students in a certain science field. While in Lithuania a possibility to find a job after graduating from the university as an important factor in taking decision about discipline to study was repeatedly mentioned.

Factors related to the career planning (possibility to climb career ladders, to earn good salary) have a relatively small influence on the women's choices to study science. These factors gain importance later, when the choice of the field of research (or sphere of activity) is made.

Regarding the choice of the field of research, a crucial role is played by lecturers at higher education institutions. Orientation towards research is developed in the study process at the university (workshops, lectures, individual consultations with tutors). The start of research in a position of a student, which consequently leads to the acquisition of a job that is connected to studies is one more factor contributing to preference of a certain scientific sphere (LV:8).

Other factors that determine the choice of the field of research or the sphere of activities for women scientists are a possibility to combine interest in several fields of science or a possibility to combine scientific and educational work.

It is important to emphasize, that the general tendency the data revealed is the choice of the field of research was due more to circumstances that to a great extent were out of women scientists' control. Also, external factors, such as invitation to the institution (mostly by the tutor at the higher education institution), are more important than internal factors.

Scientific achievements and work environment

The data about women scientists' job satisfaction indicate very strong women's motivation to do scientific work. The most frequently mentioned aspects of job satisfaction are: interesting work, creativity, joy of discovery, little routine, continuous learning and challenge related to continuous development of science requiring acquisition of new skills and knowledge, flexible work hours. Women scientists who work in the sphere of education emphasize the importance of student presence for their advancement in science.

No research grants. Data collected in Lithuania show women's lack of awareness about sources of research funding both at the institutional and national levels. The respondents, who do not participate in the work of decision-making bodies of scientific institutions, do not know how funds for research are distributed. The positive evaluation of transparency in the distribution of funds is based not on the knowledge but on trust in colleagues. Contrarily, the data received from men

scientists responses allow to formulate the assumption that men scientists are better informed about sources and procedures of the research funds distribution. Such difference may be caused by the absence of individuals within the informal networks of women scientists, who are aware about the funding processes.

The second way of obtaining financing for research is through different institutions, funds and grants of European Union. On the one hand interviewed scientists pointed out that international research projects have a positive influence on development of science within the countries: they promote international cooperation of scientists and obligate national governments to allocate more funds for science. On the other hand, scientists need to compete without any privileges with scientists from other countries on equal basis. In this respect certain difficulties in obtaining funds from EU institutions occur. By way of example a problem of outdated research technology which makes difficult to science institutions with no funds allocated for the development of infrastructure to become partners in the international projects. Both government and EU funded programs often more willingly support applied, market or practice oriented research and not “purely scientific” research. For this reason scientific institutes often need to undertake applied research to be able to continue “scientific science” and to pay materials, participation in conferences and other expenses, which it requires.

Women scientists point out that poor financing limits the possibilities to participate in international conferences. Because of the small budget scientific institutions cover only a part of expenses related to participation of scientists at such conferences, the other part should be covered by scientists themselves. As it is noted in Latvian report, in this regard bigger differences are not between men and women, but between doctoral students and more experienced researchers. Respondents maintain that at present doctoral students receive broader possibilities to obtain financing for conferences. On the other hand, men scientists’ career research data in Lithuania show that men are better aware than women about variety of sources of financing for participation in international conferences. There is a strong association between participation in international conferences and publications in international journals (very often publications are necessary for getting invited to conferences).

Respondents considered publications to be the main indicator of scientific achievements of the scientist. However, a number of publications as such is only a seeming indicator.

The number of publications in prestigious international journals depends on both subjective and objective factors. Subjective factors determining scientists’ productivity are abilities to generate ideas, to write a lot from the same research material, networking (social capital of a scientist), already established status in the scientific society (it is easier for scientists or teams of scientists that have good reputation to get their articles published). Objective factors that have influence on the number of publications are the state of research equipment (it is difficult to get an article published in international journal when measurements are done with outdated technology), the international relevance of a topic of research, the variations in the amount of time which is required to achieve results in various fields of research. One other objective factor that limits the number of publications in these journals is the requirement to pay to journals a set fee (because of the already limited financing it reduces the possibilities for scientists to receive attention).

Research data in Lithuania show that the criteria of defining scientific input into publications written by a group of scientist are not clearly defined. Currently, publications written by a team of scientists do not always reveal the weight of contribution of each co-author. Some respondents could not explain how the contribution of each co-author may be indicated in publications. Besides, there still exists a practice to include into a list of co-authors scientists who perform an administrative work but who do not contribute to research.

Other scientific achievements evaluation criteria most emphasized by women-scientists are popularization of science and evaluation of quality of educational activities. Both of criteria are not

broadly accepted as indicators of scientific achievements in the scientific community. A number of contracts with business sector, patents, practical implementation of research results, and an impact of research results on the national level are additional indicators added to the list of criteria of scientific achievement evaluation by the respondents.

Finally, it could be mentioned that the scientific system structural reforms at all levels that have been evolving in the Baltic States since 90-ies had some undesirable negative effects on the scientists' careers, i. e.: changing structure of scientific institutions and more than once changing qualification requirements distract scientists from concentration on their research or from planning their career.

Research data reveal that women scientists often deny career as a value when asked to evaluate the importance of career in their life. However, it is important to emphasize that this rejection of the career as a value is often related to the reduction of the meaning of career. It is dissociated from achievements, results, recognition by colleagues, and satisfaction with work – inner components of the career – and associated only with external component – a position, mostly understood as an administrative position, to which women scientists do not aspire. To defining attitudes of women-scientists towards career making in few words it could be said that women do not plan their career but “swim with the stream”. Contrarily to women scientists, men scientists more often accentuate career as a value in their lives: they associate it with scientific growth.

Rejecting career as a value by women scientists could be associated with giving priority to other values, e.g. children, family. Another interpretation of career by women scientists is associating career with sacrifice of personal life (time with friends, family, various leisure activities) and committing oneself solely to work.

External factors also shape attitudes towards career. Women-scientists may give little importance to career as a value in their life due to the negative estimation of the possibilities to achieve a higher position in a scientific institution. Or contrarily, they may be motivated to seek better scientific achievements, higher positions because they are perceived as a crucial factor to keep the job.

Most of the women-scientists work in teams. A team is an important factor for a scientist's success: it may not only decide her/his scientific achievements (the number of publications, participation in the international conferences), but also contribute to her/his job satisfaction.

The majority of interviewed scientists pointed out that division of work in their team is established by the abilities and interests of each person and is not associated with gender. Women scientists in leading positions especially emphasized that they allocate tasks not on the bases of gender, but in accordance with the competence of scientists and their abilities to perform the task. Nevertheless, many women-scientists have mentioned that there are tasks, which are more successful performed by men and tasks, which women can do better. Gender appears to be an important factor in time consuming tasks that require accuracy and patience or ability to perform several tasks simultaneously and tasks related to maintenance of research equipment: women are considered to be more accurate and precise, more patient and able to do several works simultaneously and men are more often associated with tasks, related to technical or electronic issues. However, respondents emphasized that in their sphere of research there were no ‘men’ or ‘woman’ tasks: recurring patterns of work difference for men and women are results not of structural differentiation, but of scientists personal choices.

Regarding the application of double standards in evaluation of men's and women's achievements, the majority of respondents indicated that they do not know such cases in their scientific institution. However, there were respondents who personally had encountered discrimination or heard about such cases. Women-scientists associated application of double standards for men and women with gender stereotypes present in the culture. It is important to emphasize, that these stereotypes are more often attributed to elder generation. The respondents notice that the situation

concerning equality of evaluation standards for men and women has improved as compared to the Soviet period.

Concerning the competition at work, women-scientists pointed out that the competition has positive and negative sides: on the one hand it contributes to personal growth; on the other hand it can also be destructive for the research process because of the need to hide information, not to share resources, etc. In general, many respondents stressed that competition among scientists in their scientific institutions is weak. It can be explained by the lack of bearing of research themes for the business sector, the small size of research teams, and the diversification in research topics of scientists. Although women-scientists point out that competition could have some positive effects, they stress that cooperation is very important in the process of research, because one scientist cannot achieve much.

Work and family

Family was recognized by all respondents in three Baltic countries as the only cause for inequality in achievements (and, sometimes, for inequality in treatment) in science between women and men. Romanian data confirm the same. But, at the same time, the absolute majority of respondents did not have any doubts about the normality of the situation. Almost all women and all men respondents accepted without questioning the situation that child care was only women's responsibility. The only nuance in the explanation of this fact is the opinion difference between Lithuanians and Latvians. Lithuanians were of the opinion that children and family are the responsibilities determined by nature, women's physiology or psychology. Latvians at the same time prescribed situation to gender roles division in the society. They did not believe that any changes could happen in the nearest future. Some of them regarded that it was wrong for a man to stay at home and nurse a child. It is interesting to note, that there are no differences between generations in attitudes towards women's responsibilities of child care. Scarce results from Poland confirm that the majority of family duties, including child care were performed by women researchers much more often than by their spouses, women also took childcare leaves off work. The Romania women researchers recognize that women must work harder to overcome tensions between family and work; men and women-scientists have equal opportunities only in theory; and women show no effort to avoid this unfair treatment.

Some topics on reconciliation of work and family should be highlighted in the discussion due to the typical stories of respondents in three Baltic countries under survey.

The choice. „...*You have to decide if you give birth to children or you do mathematics...*” - it was told to a very gifted girl student, the winner of the whole Soviet Union Mathematics Olympiad, by her supervisor, a very famous mathematician (LT:11).

The question of choice between scientific activities and the family (and, particularly, children) arises in the interviews again and again. But, according to the respondents, this is a personal choice and a woman's own decision. In the opinion of the respondents, women are free to choose between work and family, they choose the intensiveness of their career, decide to postpone childbirth for many years or even to divorce. If women researchers decided to devote themselves to the family this equaled to the end of their scientific careers. It should be noted that all the respondents talked about personal free choices of women. They did not see any structural obstacles.

The supportive network. The importance of network of relatives who assist in reconciliation of work and family duties was stressed by women-scientists of all three Baltic countries. For Latvians the supportive husband, probably also a researcher, who understands the problem and sometimes shares family responsibilities giving possibility to work in shifts is central. Though not neglecting the significance of a supportive husband or a network of relatives, Lithuanian women-scientists rely mainly on their own mothers.

The majority of women respondents when telling their own success stories about balancing work and family confessed that their examples were not typical because they had supportive network of family members. But the analysis of all interviews showed that availability of assistance when children were small was rather typical for those who succeeded. It is likely that those who did not succeed did not have such a network.

There were few respondents who suggested that academic environment was very convenient for balancing work and family. Some were bringing children to workplace, some to meetings or lectures, and some had flexible time schedules of lectures.

The benefit of a child care leave. That the majority of the respondents regarded their cases as not typical was, in fact, rather predictable and these respondents they did not use fully their child-care leaves or were doing research while on this leave. Not using full child-care leave was rather typical. Two reasons were named: 1) a wish not to stay behind, and 2) financial reasons. The importance of latter reason could be confirmed by more Lithuanian survey results, where one more similarity between the generations was observed - the majority of respondents used paid leave only. The only difference between generations was in the length of paid leave: researchers of older generation usually abstained from work 3 months, and those of younger generation up to full one year of the child's age. Latvian women researchers noted that the return after maternity leave was easier if one chose to return any time before the leave ended.

"The Superwomen" Women researchers who were successful quite often named themselves as atypical cases. It seems therefore that to succeed in sciences and technologies one should be atypical, i.e. – "a superwoman". The limitations of research did not allow exploring this superiority, but it seems that apart from some personal traits and skills, especially connected with time planning, this superiority includes also some external circumstances: a supportive network, good health of mother and child, no sick or elderly relatives, etc. But should these "superwomen" be the role models in drafting strategy for increasing numbers of women in sciences?

The losses. But even if the respondents-"the superwomen" stated that they did not encounter overpowering obstacles in balancing the research work and the family, very few of them had no problems. The majority of women researchers who raised children experienced losses in their professional careers: some postponed child birth for many years, some held back their career, and had missed years in publications. Very often they had no possibility to go to conferences, accept scholarships or job offers abroad. And it was not so easy to return back to work after child-care leaves.

In general, there were almost no differences in women-scientists' stories in three Baltic countries concerning combining of work and family obligations. The impression was, however, that Lithuanians expressed the strongest attitudes towards child-care being "women's business".

Summing up the discussion on combining work and family duties, it should be noted that according to the opinion of the respondents the main obstacle in women's scientific careers is reconciliation of work and family, because:

- it is undisputable that only women are responsible for raising children;
- due to the nature, physiology or psychology of women, gender role stereotypes, or simply because it is so;
- it is women's free choice of how to reconcile research and raising children;
- therefore the only acceptable case for women advance in sciences, at the moment, is when they are back from childcare leave.

II.1.2. Participation in decision making bodies of scientific institutions

Administrative positions and scientific careers.

The respondents associate an administrative position with additional load of work that hinders scientific activities. It was suggested that it means a lot of meetings and work without contributing to one's own publications. Worries were also expressed about funding and it is constant serious struggle to get funded. Another problem is to keep the team together and to find a possibility for investments and development. It also means every day inventing the actual playground with the existing amount of money and combining different sources, for example, mixing money of research and teaching. To run all these schemes means a lot of extra work. Interviewed men-scientists also emphasize negative relation between scientific activities and administrative work.

Women-scientists, who do not have any experience of work in a leading position, when asked "Would you agree to take part in the competition for an administrative position at your science institution if you were offered to?" responded mostly negatively. The existing opinion about the impossibility to combine administrative work and scientific research makes women-scientists see the administrative career as an abandonment of research work. For this reason, some scientists are stating strictly that they want to remain in the field of science and research. However, reasons for not taking part in a competition for administrative leadership varies and they are not confined only to the above mentioned association of leading positions with a large amount of additional work that curbs scientific research. First, women-scientists may not seek a leading position due to the lack of confidence in their abilities to perform the administrative work. On the one hand, such doubts may be related to experience and time factors: younger scientists do not reject a possibility that in the future they will be ready to seek a leading position. On the other hand, the decisions may be determined by a subjective perception of one's constant personality traits. Yet another reason for not seeking an administrative position is the lack of interest in administrative work. The third reason indicated by women-scientists for not making effort to take an administrative position, is the understanding of such efforts as meaningless, because there is a small probability that a woman will be appointed to the position. Fourth, women-scientists do not seek a position related to decision-making processes, because such work is not valued adequately, the remuneration for it is considered too small compared to time and energy it requires. It was mentioned that in sciences an administrative position if you have not made it as a scientist is not so great. Nobody identifies such an administrator as a researcher. Fifth, an aspiration to take a leading position maybe suppressed by established practices, when such a position does not mean a real leadership for a team of scientists.

Meanwhile, women-scientists, who would agree to take part in the competition for a leading position in their own scientific institution or somewhere else, consider such positions as "a challenge", a possibility "to establish oneself". Some scientists see administrative positions as a necessity, a post that has to be taken if one wants to make a scientific career.

It is important to emphasize, that both women in leading positions and women in subordinate positions admit that they would like to work in a higher position in research (e.g. as senior researchers, heads of research groups) or pursue an academic career. However, they do not wish to work in an administrative position which would be more related to bureaucratic and managerial procedures than creative research.

A position of leadership

As the most important factors for occupying high positions in scientific institutions the

respondents mention professional skills, informal relationships, and support of colleagues. On the one hand, the adherence of professional skills and formal requirements could be considered as characteristic of a fair competition as a basis for attaining the position. On the other hand, it could be emphasized that, interviewed women-scientists, who won a competition for a leading position, as a rule had significantly higher achievements than other competitors, predominantly men. The respondents repeatedly cited that if women want to achieve the same level position as men, they ought to show considerably higher achievements than men.

In its own right, the recommendations given by the former leader, constant overtaking of leading responsibilities in the work place, support from other members of the research team reveal that it is important that the woman scientist is accepted as a leader in the informal environment. The data show that women-scientists prior to the appointment to the leading position worked a long time in scientific institutions and had a reputation of a good scientist in their institution.

Being in leading positions does not necessarily give to women-scientists a sense of empowerment. Those women-scientists who are in leading positions practically do not talk about controlling resources. Women in leading positions see their work in active research as more important or even preferential to being a leader in terms of finances. They evaluate an influence of administrative work on their research mostly negatively.

Concerning advantages of being in leading position, interviewees mentioned the following: 1) a possibility to contribute to the development of science, 2) the control of financial resources necessary for acquisition of equipment, 3) high-ranking contacts, which increase possibilities to find partners for research projects, 4) access to more information, which helps to receive funding for personal and their institution's research projects. However, disadvantages of administrative position overweight these advantages.

Gender and administrative work

While listing stereotypes about male and woman leaders' characteristics women-scientists also stress the existing equality of opportunities. True, women-scientists describe certain stereotypes as objectively defined, stressing that their social reproduction in certain spheres functions as an obstructive factor not only for achieving administrative positions but also for scientific work in general.

Though objective factors such as work experience and achievements are crucial for attaining leading positions, it is important to emphasize, that the respondents point out that women have to work harder and achieve more than men if want to be recognized.

In the Baltic States the candidates for leading positions due to small critical mass are chosen from comparatively small and closed circle of scientists. For this reason informal relations have an important role in recruiting people for higher positions in scientific institutions; however none of the scientists mentioned either that in this aspect gender is important or that there would exist differences between genders. However, it is possible that there exists an indirect quantitative factor: there is a male majority both in higher positions in scientific institutions and among successful scientists. Since it is usually easier to form relations with people of the same sex, women are in a less favourable situation compared to their male colleagues. Women scientists point out that it is easier for men to climb the career ladder, because there are more men in leading positions, it is „their world“. Forming informal relations is only made less complicated in cases when the woman scientist have an already established status in the science community. Scientists also mention negative examples when informal relations are the cause for situations when subordinates do not see women as good leaders; it is not only men who have objections against women in leadership positions, but also several women-scientists pointed out that they would not like to work in subordination to a woman. It is more difficult for women than for men to achieve

respect of men, especially in sciences where proportion of women is small. Of course, in this situation, at play are not only informal relations, but also prevailing gender stereotypes.

Women's possibilities to attain leading positions are also limited by prevailing gender roles in culture: men can dedicate more time to work, because they have fewer duties at home, related to child-care and home chores.

Such typically 'women's' characteristic as emotionality, sensitivity the respondents interviewees in three Baltic States often estimate positively. Women-scientists admit that women as leaders are more emotional and sensitive but for this reason they are able to defend successfully the interests of their collective through better acceptance and understanding of their subordinates' wishes and interests, taking care of others, keeping warm relations with subordinates. It is important to indicate, that these "positive traits" that are attributed to women are present in the style of leadership of the interviewed women-scientists occupying leading positions. There are cases when women-scientists feel much better in a collective or a work group that is lead by a woman because it is easier for them to form more successful informal relations. Other positive characteristics that are attributed to women leaders are a more efficient organization of work, good time management, and precision. These characteristics are best expressed in a well done work.

II.1.3. Solving the problem of gender inequality in sciences

Recognition of gender inequality in scientific community

In the research women-scientists were asked to evaluate the science system of their country and the obstacles for making scientific career in it. The features of a science system were also evaluated in terms of gender discrimination, the most commonly met obstacles in the scientific careers of women-scientists and men-scientists.

Speaking about science systems in their countries, women in sciences saw various obstacles for the scientific career. Most of them related to the position of the national governments unfavorable for sciences, underfinanced studies, outdated research equipment and technology, low salaries. In the report sent in by Latvia it is repeatedly emphasized that many obstacles are related to age and scientific work experience not the gender of the researcher. This is true also for Lithuania and Estonia. Young scientists have better possibilities than women of elder generation, besides, academia suffers from missing generational link, e.g. there are young scientists that are not ready to take leading positions and old scientists approaching retirement age, however, due to consequences of restructuring of scientific system the middle generation, which would ensure continuity, was lost.

It is important to note, that due to the problem of low salaries in sciences, men more often choose business sector, therefore the sphere of science is left for women. Evaluation of consequences of low salaries in the science system differs among women: some of them see in it increasing possibilities for women to take on positions in science that were early occupied by men; on the other hand, women point out that if remuneration was higher they could hire a nanny to look after children or could afford paying for more flexible child-care institutions which would allow them to dedicate more time for science and become equal competitors for men.

The majority of women-scientists do not acknowledge the existence of discrimination on the basis of gender in sciences, it is said to be an unimportant and artificially created problem. However, some statements in their interviews reveal differences in the gender positions. The main difference in woman and male scientific careers is connected to family. Women-scientists notice that the existing science system does not provide enough possibilities to combine scientific career and family life, majority of them stress the improper child care system and facilities, due to maternity

leave women are withdrawn from science work for a certain period of time and their possibilities to follow the newest scientific developments are limited.

There should be mentioned also some formal aspects of the science system that creates discrimination. Such aspects are related to rules, regulations and decision making processes in the science system. Most of them could be evidenced in the process of position distribution through election or competition. It is noticed that when men dominate the science the decisions they make are favorable for men and women usually do not have the possibilities to hold key positions.

Evidences of women discrimination in a science system are: jokes or direct expressions about women in sciences, the association of women achievements with their appearance and unvalued labour of women-scientists.

Talking about discrimination of women in a science system, men-scientists expressed more emphatic opinion than women-scientists and stressed that there are no cases of women discrimination in their scientific institution and they have never heard about such cases anywhere else.

The stereotypes about male and woman professions existing in the society are mentioned as the main reason for lack of women in sciences and high technologies. Studies in these spheres are complicated and women lack the support to learn these sciences. The respondents in three Baltic countries point out that these stereotypes are already established in school when teachers motivate boys to study exact sciences and technologies, but girls are motivated to study other areas, for example, humanities and social sciences. If women-scientists want to overcome these stereotypes they need a lot of hard work and to prove they are worthy again and again.

Changes in the state education policy are seen as one of the possible solutions by several women-scientists. In their opinion much more attention should be paid to teaching sciences at school because pupils often tend to choose the easy way, i.e. not learning these subjects. It is also important that the children at school are given the opportunity to see and try out the work in sciences. By doing that they could decide if they want to study in one of these areas.

Policy actions for encouraging women's active participation in sciences and HT

The agents of inequality solving should involve all possible levels – the state, society and women-scientists. However there's a lack of a clear understanding who should initiate the inequality solving debates. A part of the women-scientists in the Baltic States gives preference to the state that has to educate the whole society on the equality matters. The state institutions should cooperate with the scientific institutions to help women-scientists and eliminate discrimination. "Alternative councils" were proposed as a possible agent. These councils would give decision making power to scientists (especially women) who are not in the power positions at the moment. These people could be the ones, who could bring improvement in science administration matters.

Another part of the respondents indicate the responsibility of women in science. They should be more active and give publicity to inequality problems. However, the data of the research show that women are afraid solving the problems of discrimination, they are afraid of a feminist label, which has a negative connotation in the society.

It is worth mentioning, that international agents are also seen as important actors in fighting discrimination of women in sciences. Nowadays in the Baltic States European Union policies have an important impact.

The negative attitude of the society towards women-scientists is the result of the lack of information or education. It is proposed to provide more information on women's discrimination, women's movements and organizations, the situation of inequality in sciences and women's achievements. Public discussions about women's roles in sciences are considered as one of the

means in solving the problem of gender inequality. They could also include experience exchange seminars about inter-gender relations with participants from different sciences. It is possible that continuous informing and educating society about gender equality matters could improve the career opportunities for women in sciences and high technologies field. However, most of the respondents were not sure in willingness to participate in public debates about promotion of women in research.

It is worth noticing that women-scientists are afraid of speculations on discrimination and disagree with manipulations on inequality for getting better or higher positions. They fear that less talented women can use the motive of discrimination as a means of getting to higher positions.

Women-scientists were asked to evaluate the measures for encouraging women in sciences and the decision making processes. The main interest was in evaluating the three measures – grants or scholarships for women, quota system and a better support after maternity leaves.

The interesting fact is that women-scientists are quite skeptical about all such measures. The disapproval of these measures is quite strong. It is stated that all attempts are artificial, unnatural and would only misrepresent the situation, the applications of those measures is not a proper way out as they would only increase the inequality and discrimination, and would be negative to the science system as a whole. There is even an opinion that such measures would be an insult for women whose abilities would be devalued because of the gender. Women-scientists think that application of such measures would be negatively valued among men and could even provoke their resistance.

Measures for encouraging a more active participation of women in sciences and in decision-making processes were evaluated more negatively by the interviewed men-scientists than by women-scientists. Men-scientists pointed out that it was not natural; it would be bad if women had privileges compared to men. Measures for encouraging women are justified only in the case if they are temporary and funded not from the common budget but from additional, external fund sources. Discussing measures, men-scientists emphasized once more that these measures are not necessary, because there was no discrimination of women in sciences.

A. Grants and scholarships for the scientific career of women

The introducing of grants was evaluated as a proper measure for encouraging women-scientists but the results to be achieved were valued skeptically. It is doubted that there would be more women in sciences just because of the grants. Some interviewees pointed out that special grants for women would be unreasonable and are not necessary. The main reasons are that the conferences or meetings for women are not solid nor sound and inequality or discrimination should not be the main argument for profiting. Therefore it is required that a better support should be distributed according to the abilities but not the gender. The gender should not be the main criteria for distributing the financial support.

However, special grants for women could be useful in situations when a scientist returns to work after a break but lacks institutional support for doing research or when a scientist is young and still unable to compete with renowned scientists.

In Estonia there exists one very positive gender sensitive measure, which was introduced by Estonian Science Foundation (ETF in Estonian). This is 'My First Grant Scheme' awarding most promising young scholars. 'My First Grant' is a call for project proposals by young researchers up to 35 years of age, from all the fields of scholarship, who have not been supported by the ETF previously, the aim of this scheme is to support good projects by young scholars who would find it hard to compete with renowned scientists, and thus help them to start their academic career, the

scheme was first launched in 2002, and in 2005 23 young scholars received their “first grant”¹. Negative aspect of this grant scheme is that women, who have decided to have a couple of children and stayed at home with them, have lost time and they cannot compete due to the age limit. If there would be taken into account a number of children of an applicant, then the age limit could be adapted.

B. A quota system

Most of the remainder scientists reject the need of a quota system as an artificial measure that is not necessary. Quotas could be accepted if temporarily applied for councils or boards, but not to scientific positions.

Arguments “against”:

The quota system in science would be unfair both to men and women. For women the quota system would be as a burden when they would have to hold certain positions according to quota even if they do not want it. For men the quota system would be unfair if it prevents them from making a scientific career because of their gender. It would be an unequal contest if talented men would lose against the unapt women. The implementation of the quota system would mean dividing people because of their gender instead of their skills. It would hinder the formation of a successful scientist collective.

The quota system is an insult for women. They would feel inferior and diminished as it would be unclear if they got the position because of their abilities or gender quotas. In this regard, women-scientists also mention the attitudes of men that would arise if women received explicit privileges. The existence of such attitudes might put women-scientists into a position where they are tolerated only to receive funding or fulfilling certain norms instead of doing qualitative research work. The result would be discreditation of women-scientists.

Argument “for”:

the quota system is a suitable and applicable measure in the science system. As such the system is successfully applied in the foreign countries it could be implemented in the Baltic States also. It should be noted that it seems that quota system as well as other measures of positive discrimination would be acceptable for Romanian women-scientists.

C. Support after maternity leave

A better support after maternity leaves was the most appreciated measure for encouraging women activity in sciences and decision making bodies.

The support after maternity leaves was favored by all respondents unanimously. Science has its specificity as everything tends to change and is not given for always. Therefore, a woman who breaks her scientific career during the maternity leave even for a short time loses her abilities, skills and she has to catch up with her colleagues-scientists later. Besides, women have more responsibilities in the family and child care so a better support in child care system and better possibilities to take care after children should be the main aspects for consideration.

Women-scientists distinguished several spheres related to family, maternity leave and child care which need a special attention and greater support policies:

- various allowances that would facilitate women return to science after longer intervals such

¹ Source:

<http://cordis.europa.eu/erawatch/index.cfm?fuseaction=org.document&uuid=7D87CAEF-E0C5-B22B-CA67A116634DBD09>

as maternity leave; a better support going to the traineeships or conferences; women should be encouraged to improve their abilities, to engage actively into the work after the maternity leave;

- changing of the procedure of work assessment and attestation: this procedure should be sensitive towards the periods of maternity/paternity leave, that is, the work assessment procedure should be postponed for the period that is equivalent to the break in work;
- the possibility for men to have a paternity leave as a positive example in helping women to combine work and family life; the formation of public opinion in that way that it would be normal for men to take care after children and use the paternity leave;
- improvement of child care services: to expand and improve the work of kindergartens, to organize half-day kindergartens near the scientific institutions or special rooms in the institutions where mothers could leave their children for a short time;
- organising flexible daily work routine for scientists with small children is very important.

D. Proposals for encouraging women in sciences

Women-scientists were asked to voice their proposals for the encouragement of women to participate more actively in sciences or leading positions:

- To provide more information about the opportunities of scientific career (usually women lack information about opportunities in seeking the scientific career), possibilities to go abroad or receive a scholarship but not the motivation, resources or abilities.
- To even the remuneration for men and women as women are paid lower than men. So the first thing to do is to even the remuneration for men and women and then give raise to all salaries in the science system.
- To increase or remove age limits for young scientists taking into account career breaks due to maternity/parental leaves.

For greater gender equality different policies and actions can contribute. Better cooperation between industry (BES) and sciences (HES) can create a stronger basis and give additional value. This cooperation can take place in many spheres beginning with the production processes and internships to researchers.

The service of women in sciences

One of the research interests was to find out the service of women in sciences for the state, society and science itself. Interviews pointed out such aspects:

- Women have many traits that can contribute to the science and society. Women seem to have better abilities for team-work and cooperation.
- Participation of women in sciences is useful as it balances the work-collective. Any group of scientists needs members of both genders.

The respondents were also asked what changes they would point out if women-scientists would constitute one third of the labor force:

- It is very hard to show these abilities and potential in the science that is dominated by men as they are underestimated, devalued or denied. Therefore the increase of women in exact sciences would let to uncover the abilities of women.
- The atmosphere in work would get better. The relationships would be warmer.
- The society would be educated about the participation of women in sciences. The society would see that women have abilities in sciences and possibilities to show their competences, women-scientists would educate their daughters who could later choose their

career in sciences.

- The questions in sciences would be raised anew. Women-scientists view the same things, objects of study differently, they would look at them anew, propose new ideas, accent different aspects. This could make sciences more diverse, there would be more new achievements or findings.

II.1.4. Recommendations for the common strategy in the Baltic States to increase women's participation in sciences and HT

The schools

The reports emphasized the role of schools and teachers for motivation of studying sciences. Though the strategy is not to solve the problems of secondary education (different expectations of teachers towards girls and boys), the strategy should include recommendations for improving the situation at schools:

- Changing the attitudes of teachers via mass media and information in workshops. Children of both genders should meet with the same expectations from their teachers.
- Including the course of gender studies or a similar course in the programs of teacher training-colleges.
- Encouraging girls to take interest in sciences. It could be done in special lectures by scientists for school children or guided tours to scientific institutions.
- More information has to be given in secondary schools about career and achievement possibilities in various sciences. The people who carry responsibility for this would be expected to stress the fact that possibilities to work in sciences are not gender-dependent.
- Organizing "Open days" or periodic practice sessions in scientific institutions especially for school age children to promote interests and to increase their knowledge about work in sciences.

The science system

The strategy should deal with the general science policy and obstacles it creates for seeking scientific career.

- substantially increasing financing for sciences and renewing outdated technical base;
- substantially increasing salaries;
- setting stable qualification requirements;
- increasing value of educational activities, work with students;
- increasing value of science popularization activities.

Concerning gender dimension, a very good motivation for women-scientists could be achieved via giving positive examples, e.g., publication of women-scientists' research results, awarding prizes and others.

A special attention should be paid to awarding research grants at the state level. This is related to the institutions whose functions include elaborating granting procedure and awarding grants. It would be advisable to create an independent system of control, for example, in the form of alternative councils.

It is necessary to have public discussions about women's role in sciences. Women have many traits that can contribute to sciences and society. Women seem to have better abilities for team

work and cooperation. These could include experience exchange seminars about inter-gender relations with participants from different sciences.

For greater gender equality different policies and actions can contribute. Better cooperation between industry (BES) and science (HES) can create a stronger basis and give additional value. This cooperation can find its ways in so many areas beginning from production process and internships for researchers.

Sex segregated data should be gathered and systematic analysis of gender gaps should be done.

The education of women-scientists

Seeking to encourage a more active participation of women in sciences, the strategy should include education via informational seminars of women-scientists in these areas:

- Organizational aspects of scientific research (funding, employment procedures, etc.);
- Development of leadership traits (a sense of empowerment of being in leading positions);
- Gender inequality and causes (social and cultural) that underlie them.

The scientific institutions

We recommend discussing these policy actions for encouraging women in sciences:

1. Quota system in public committees, commissions, related to decision-making processes in science (however, it is important to stress that quota system would be in contradiction to wishes and needs of most women-scientists and could result in the increase of prejudices).
2. Measures for ensuring transparency of employment procedures.
3. Special measures for parents (both, men- and women-scientists) after maternity/paternity leave
 - i. Grants, courses, scholarships;
 - ii. Not to count the period of maternity/paternity leave into evaluation period of scientific work;
 - iii. Flexible work hours, accessible childcare.
4. Gender sensitive career counselors and mentors who could encourage more woman students to choose and have successful career in sciences. Career counselors need special training and more information in order to assist women in identifying and achieving their vocational and career goals.

The society

The strategy should include the recommendations for measures for the whole society:

- a. accessibility and more flexible day care system;
- b. forming society attitudes towards the parental leave;
- c. educating society on gender inequality and gender issues;
- d. large-scale public science promotions to ensure widest possible possibilities to choose career paths correspond to interests and skills.

II.2. LITHUANIA: Country Report

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Introduction

Statistical data on women in sciences are scarce in Lithuania. Department of Statistics to the Government of the Republic of Lithuania provides data on employment in research and development by fields of science, by university/higher education institution students, by fields of study, however these data are not sufficient to evaluate situation in the Lithuania in regard of gender issues in sciences.

Available statistical data (see Table II.2.1) show that percentage of women employed in research and development differs in various fields of science. Low percentage of women with scientific degrees and academic titles is in technical sciences and physical sciences, meanwhile in natural sciences and medical sciences women comprise a little more than half of employees.

Table II.2.1. Employment in R&D by field of science, 2005

	Techno-logical sciences	Physical sciences	Natural sciences	Medical sciences
Researchers with scientific degree and academic title	650	732	390	435
of which women	125	215	205	234
percentage of women	19	29	53	54
Other researchers	646	532	190	379
of which women	256	265	130	235
percentage of women	40	50	68	62
Technicians and equivalent staff	305	146	151	179
of which women	161	59	116	157
percentage of women	53	40	77	88

Source: *Research Activities 2005*, Department of Statistics to the Government of the Republic of Lithuania, p. 17

Comparing percentage of women students, studying at universities by field of study it could be noted that percentage of women students is especially low in computing and engineering, while in mathematics and natural sciences the woman make up majority of students both at Bachelor and Master degree programs (see Table II.2.2). In physical science there are 43 % of woman students studying bachelor programmes and 55 % studying master programmes. In general, in all fields of studies the percentage of women increases at graduate level. During the last few years a percentage of women students seeking Doctoral degrees in the fields of engineering and physical sciences slightly increased. In 2005 women comprised half (51 %) of Doctoral students in physical sciences and 37 % of Doctoral students in engineering.

Table II.2.2. Percentage of women students at universities by field of studies

	2003-2004	2004-2005	2005-2006
Bachelor and professional programmes			
Natural sciences	66,5	67,5	66,9
Physical sciences	43,1	42,3	42,9

Mathematics and statistics	59,3	60,3	59,9
Computing	21,0	20,1	18,2
Engineering	18,2	17,1	15,1
Master programmes			
Natural sciences	67,7	69,7	59,7
Physical sciences	55,1	44,8	51,0
Mathematics and statistics	66,4	73,5	64,9
Computing	24,4	21,5	18,8
Engineering	35,4	25,6	24,6
Doctoral programmes			
Physical sciences	48,8	48,4	50,7
Engineering	34,7	33,9	37,8

Source: *Education 2004 and Education 2005*. Department of Statistics to the Government of the Republic of Lithuania

According to the data provided by Helsinki Group on Women in Sciences in 2000, in Lithuania a number of women decrease on each level of academic advancement (see Table II.2.3). For example, in the field of Physics, characterized by a very small percentage of women-scientists (11 %), ratio of women and men with doctoral degrees is 1 to 8, analogous ratio for habilitated doctors is 1 to 44; the percentage of men and women-scientists that are awarded the title of Associated Professor does not differ in this field of science, however there are no women awarded a title of Professor in Physics, while 15 per cent of men-scientists in the field has this title. Although the more up to date data are not available, there could be found no signs that would allow making assumption about the improvement of the situation in this regard.

Table II.2.3. The percentage of women in Lithuanian universities and research institutes (principal researchers (PR), senior researchers (SR), researchers (R))

	Universities				
	Professors	Associated Professors	Lecturers	Assistants	Total
Physics	0	18	14	64	18
Mathematics	0	22	44	50	29
Chemistry	0	24	46	89	30
	Research institutes				
	PR	SR	R	Assistant	Total
Physics	5	15	68	18	20
Mathematics	6	21	26	0	19
Chemistry	0	57	67	87	53

Source: National reports on the situation of women in science in Baltic States, Helsinki Group on women and science, December 2000: *Lithuanian report by Danguole Areskiene, Virginija Eudukiene, Ausra Gribauskiene, Giedre Purvaneckiene, Meilute Taljunaite and Alina Zvinkliene*, <http://www.cordis.lu/improving/women/reports.htm>

Structural barriers in scientific carrier of women noticed G.Purvaneckiene², when analyzing statistical data she noted: “It is easier for women to make an academic degree than to be hired for a

² Purvaneckiene G. Education of Women in Lithuania. European Manual of Continuing Education. –Luchterhand, 20/09/2000, P. 1-18.

responsive position: there are more women among holders of PhD degree (which entitles them to apply for Associate Professor's position) than among Associate Professors. Similarly, there are more women among habilitated doctors than among Professors". But anyway research on women in sciences is scarce in Lithuania, and there is almost nothing on women in exact sciences and technologies.

In order to explore gender-related issues in sciences and high technologies (HT) in Lithuania, the qualitative research by a team of scientists of Faculty of Philosophy of Vilnius University has been conducted. 23 in-depth interviews with women and 7 in-depth interviews with men in sciences and high technology field were performed (Table II.2.4). The in-depth interviews with men were used to reveal the differences in the career and attitudes of men and women.

The fieldwork took place from 1st of May 2006 to 30th of August 2006.

Table II.2.4. Sample description

Resp. No.	Field of work (Science)	Institution	Position	Age	Marital status, number of children
Women-scientists					
1.	Physics	Semiconductor Physics Institute	chief researcher	31-40	single
2.	Physics	Institute of Theoretical Physics and Astronomy of Vilnius University	researcher	31-40	divorced, 1 child
3.	Information technologies	Faculty of Mathematics and Informatics, Vilnius University	lecturer	31-40	divorced, 1 child
4.	Physics	Faculty of Physics, Vilnius University	researcher	51-60	married, 2 children
5.	Chemistry	Faculty of Chemistry, Vilnius University	senior researcher	41-50	single
6.	Mathematics	Faculty of Mathematics and Informatics, Vilnius University	lecturer	31-40	single
7.	Chemistry	Faculty of Chemistry, Vilnius University	researcher	41-50	single, 1 child
8.	Information technologies	Institute of Mathematics and Informatics	junior researcher	31-40	married, 2 children
9.	Biochemistry	State Research Institute of Biochemistry	doctorate student	21-30	single

Resp. No.	Field of work (Science)	Institution	Position	Age	Marital status, number of children
10.	Chemistry	Institute of Chemistry	researcher	over 60	married, 1 child
11.	Mathematics	Faculty of Mathematics and Informatics, Vilnius University	associated professor	41-50	married, 2 children
12.	Biochemistry	Faculty of Natural Sciences, Vilnius University	researcher	51-60	widow, 1 child
13.	Biochemistry	State Research Institute of Biochemistry	Chief administrator researcher	over 60	single
14.	Chemistry	Institute of Chemistry	researcher	21-30	single
15.	Astronomy	Institute of Theoretical Physics and Astronomy of Vilnius University	researcher	31-40	married
16.	Physics	Faculty of Physics, Vilnius university	lecturer	31-40	single
17.	Astronomy	Institute of Physics	doctorate student	21-30	single
18.	Mathematics	Institute of Mathematics and Informatics	senior researcher	41-50	married, 2 children
Women-scientists in senior positions					
19.	Physics	Semiconductor Physics Institute	chief researcher, head of department	51-60	married, 2 children
20.	Astronomy	Institute of Theoretical Physics and Astronomy of Vilnius University	chief researcher, director of institute	41-50	married, 1 child
21.	Chemistry	Faculty of Chemistry, Vilnius University	associated professor/ (ex-) vice-dean	51-60	married, 2 children
22.	Biochemistry	Faculty of Natural Sciences, Vilnius University	professor, head of department	51-60	married, 1 child
23.	Mathematics	Institute of Mathematics and	chief researcher, head	51-60	married, 5 children

Resp. No.	Field of work (Science)	Institution	Position	Age	Marital status, number of children
		Informatics	of department		
Men- scientists					
1.	Chemistry	Faculty of Chemistry, Vilnius University	professor, head of department	51-60	married, 2 children
2.	Chemistry	Institute of Chemistry	professor, head of department	51-60	married, 2 children
3.	Mathematics	Faculty of Mathematics and Informatics, Vilnius University	professor	over 60	married, 2 children
4.	Physics	Semiconductor Physics Institute	senior researcher	51-60	married, 2 children
5.	Biochemistry	Institute of Biochemistry	assistant	41-50	married, 1 child
6.	Information technologies	Institute of Mathematics and Informatics	doctorate student	21-30	single
7.	Mathematics	Faculty of Mathematics and Informatics, Vilnius University	associated professor	41-50	married, 1 child

Method of data analysis was qualitative content analysis.

II.2.1 Scientific careers of women in sciences and HT

A path to science

Motivation for studying sciences and HT

The majority of respondents chose sciences because of a strong inner motivation. However, external factors, that made the motivation stronger or weaker, had a considerable influence as well. **The main factor** choosing the field of study was **capability** of respondents for sciences. However, in their responses many interviewees avoided to emphasize their ‘capability’, but preferred talking about their **inclination** for sciences in general. Respondents also mentioned the **attractiveness of a subject** of study, their **interest** in it:

At school I was interested [in physics]. I was good in all subjects, though, at school [...] But physics was especially interesting for me [...] Why does moon shine? Why colors are what they are? Why do we see one thing in one way another in a different way? These sorts of questions were very interesting for me. That is why I chose to study physics (Physics, lecturer, age 31-40)

The second factor to be mentioned is **an teachers’ influence**. Almost all interviewees stress the role of a teacher of sciences at school as the factor that determined their choice of field of study at a higher education institution. The personality of the teacher, his/her work style, methods of teaching, assignment of supplementary tasks for pupils, who were interested in a subject, had a pivotal influence on formation of interest in sciences, which determined later choice of the field of study.

Respondents more often emphasized positive traits of their teachers at school. Their recollections about them were expressed using such epithets as “excellent”, “wonderful”, “fantastic”, etc. However, some interviewees talked not only about their own (mostly positive) experiences at school, but also discussed some more general, negative aspects related to the influence of teachers. Their responses reveal obstacles existing in secondary education system that weakens motivation of girls to study sciences.

Teachers may have stereotypical attitudes to the girls’ and boys’ abilities in sciences. The different attitudes towards girls are experienced in teaching practices, when some elements of the teaching program are conceived by teachers as “boyish”, while interest of girls in these elements is regarded as superficial, temporary or abnormal.

I experienced it myself. ... When I started to study physics I had to learn how to assemble electric schemes or how to reassemble or repair electric devices. I did not learn this at school. We were taught only knitting, cooking or something like this. Why were not we allowed choosing at school? I think, that school restricts choice by enforcing ways of doing something, and if you do that differently, then this is considered as abnormal, a subject for treatment. (Physics, lecturer, age 31-40)

When defining differences teachers may be inclined to emphasize “weaknesses” and ignore “strengths” (character traits conducive for learning, style of learning, etc.):

Maybe girls are worse at solving theoretic problems, requiring to make generalizations etc. However, they are better in performing practical tasks [...] I enjoyed observing as they experimented with the temperature of boiling water (Physics, researcher, age 31-40)

Women-scientists, who have experience of work at schools, encountered an opinion of other teachers that “girls do not need sciences”, or “*it is not worth to invest time and energy into girls [preparing them for Pupil Olympiads in Sciences], it is better to work with boys, since they are more gifted*” (Physics, researcher, age 31-40)

Meanwhile, the results of research show that **participation in Olympiads** was an important factor for motivation to study sciences:

For me it was difficult to choose between Mathematics and Lithuanian language, but during the last year at school, I won the first place in the Olympiad of Mathematics, while in the Olympiad of Lithuanian I was awarded only the third place (Mathematics, senior research fellow, age 41-50)

It was easier to choose to study sciences for those women-scientists, who thought that they did not have abilities for social sciences or humanities or did not like them: “*I chose to study information technologies. At that time it was called applied mathematics ...I was good at sciences at school and I hated to write literature essays*” (IT, lecturer, age 31-40).

However, more often it was difficult to choose not between sciences and social sciences or humanities, but among fields of sciences – mathematics, physics or chemistry. Those women, who chose to study mathematics, described it as the most “exact”, “clear”, “logical” science. On the other hand, those who chose other fields of study, for example, chemistry, described mathematics as the most “strict” science, or said, that in mathematics there is nothing that can be “touched” with a hand, it does not have “form” or “scent”.

The third factor significant for the decision to study sciences is **the influence of parents**. Some parents encouraged the interest of girls in sciences, worked with them additionally, and helped to cope with home-work in sciences:

My parents were chemists...I had to know chemistry better than other children at school. When you understand everything, it seems that the subject is very interesting...My parents did not say anything to me. It's up to you. But they took me often to the laboratory and I enjoyed it a lot, it was interesting... (Chemistry, chief researcher, age over 60)

Women-scientists stressed that parents' attitudes related to attribution of sciences to one or another gender often hinders girls from choosing to study sciences:

We start suppressing the interest of girls in sciences at the very early age [...] From the very beginning there is an attitude that a girl should not play with a car. If you go to visit family with small children, you buy a doll for the girl and a car for the boy and do not even consider a possibility that the girl may enjoy playing with the car (Physics, researcher, age 31-40)

The fourth factor, which was mentioned by interviewees, **is friends**: “We were four friends who agreed to study together” (Chemistry, chief research fellow, age over 60).

The fifth factor is **popularity of the subject or its novelty**:

In 1987 ...there was a lot of talk those days that there would be a high demand for IT specialists...Computers were something new, unseen. The novelty attracted ... (Mathematics, lecturer, age 31-40).

Finally, some women-scientists choosing field of study also took into consideration a **possibility to find a job after graduation**.

I wanted to study biophysics. But there was no work for biophysicists at that time. I am a pragmatic person. I took into consideration what I would do after finishing studies

(Physics, lecturer, age 51-60)

During Soviet period an important aspect for choice was an appointment to job, possibility to stay in Vilnius after graduating from university:

There were still appointments to jobs at that time. I kept in mind this. There was a talk, that there would be almost a hundred appointments to Vilnius for those who will graduate from mathematics and will work with computers. This played a decisive role (Mathematics, lecturer, age 31-40)

Summarizing it could be indicated that the choice to study sciences was determined not by a single factor, but by several factors. No choice of respondents could be described as accidental. The choice was made taking into consideration interests, abilities, inclinations for sciences rather than by way of exclusion of other choices (subjects of study). External educational factors were especially important: influence of teachers, participation in scientific Olympiads and summer schools or workshops for young scientists). Family influence is significant as well: encouragement to study sciences, help in studying science subjects at schools.

Research results show that factors of planning career had a relatively small influence on the choice to study the subject. The possibility to find a job after graduation was more important for the choice to study science than climbing career ladder or good salary. The latter factors became important later, when choice of specialization or field of research was made.

In responses to the questions about factors that determined the choice to study sciences at the higher education institutions men-scientists stressed subjective factors – their interest, success in science. The external factors – influence of teachers and parents (often mentioned by women-respondents) – according to the data were considerably less important for the choice of men.

Factors that determined the choice of current field of research

A part of the respondents indicated that after they chose the field of research, they felt that finally they could do what they really like. This interest in the topic of research was much more specific than the interest in the subject of study at the higher education institutions. If choice of the field of study was determined to a great extent by romantic or idealized motives, the choice of the field of research was more guided by understanding, that the path of scientists requires a lot of efforts and commitment.

One of the factors, that determined the choice of the research field, was **a possibility to discover or create something new**:

Everyday you come to work and do not know how the experiment will end...When you measure something, you can find something. At the beginning you know nothing..."
(Physics, chief researcher, age 31-40)

Organic chemistry had a different effect on me. It gave me a sort of feeling of being the creator ...This feeling is special. Only if you had it once, you may know what it is like.
(Chemistry, associated professor, age 51-60)

The desire to do research, create something, seek to discover something new in many cases was developed within the study process at the universities. At the higher education institutions professors, lecturers (their personality, good knowledge of subject, ability to evoke an interest of students in the subject, to encourage their creativity) had the same influence on women's motivation to make a scientific career as teachers did for the motivation to study sciences at school.

Some interdisciplinary fields of research attracted women by **a possibility to combine interests in several fields of science**:

Maybe a goof position of the field, allowing to combine sciences and humanities, or to put it more precisely, information technologies and education science (Information technologies, junior researcher, age 31-40)

A part of respondents chose the field of research or sphere of work taking into consideration **a possibility to combine scientific research and education activities**. Some respondents mentioned that they encountered with stereotypical attitudes, that an occupation of pedagogue “better fits” women, who choose sciences, than purely scientific research work. However, even in the sphere of education some respondents mentioned that they encountered the discrimination on the bases of gender:

When I was at school, I encountered such situations...I had my first teaching practice at school as a student and my supervisor was a man physicist. All trainees except me were men. Before starting the lessons, I was told by the supervisor that physics is not a science for women, e.g. in this science women cannot do anything better than men. He changed his opinion by the end of our practice, but anyway it was very unpleasant. (Physics, researcher, age 31-40)

Another factor that influenced the choice of the field of research was **labor market** – a vacancy in the institution or proposed field of research in the institutions.

In many cases, respondents **were invited** to the science institution by lecturers, professors, who taught them at the university, or friends. An exceptionally important role at the stage of choosing the topic of research was played by a tutor, who supervised work of the doctoral dissertation.

It happened by chance. During the third year at the university I was assigned a tutor for a course paper. I wrote it very well and the tutor involved me into his research projects ...Later I continued to work there (Informatics, lecturer, 31-40)

Usually women were invited by their tutors to doctoral studies. The cases when women-scientists chose themselves a topic of doctoral dissertation and the tutor are rare.

During Soviet period, possibilities to choose the field of work at least formally were determined by achievements of students. Those women, who graduated with high grades, had more possibilities to choose the field of research which was promising and well-paid. However, women-scientists of older generation pointed out that not always women had a real possibility to choose: they mention cases when women were refused the position at science or higher education institutions because of stereotypes that women do not “fit” scientific work.

Research results of the career of men-scientists show that the choice of the research field by men was determined by the same factors as those of women: achievements at the university, relations with professors. Men-scientists stressed a particular importance of tutors in the choice of research field. As it was put by one of the respondent, “for young men it is difficult to choose a field of research, they have only a possibility to choose a tutor, and only then a research field, however, in the beginning the research field is determined by the tutor” (Chemistry, professor, age 51-60).

It is important to stress, that general tendency, which is revealed by data, is that the choice of the field of research was more determined by “circumstances” that to a great extent were not under control by women-scientists or men-scientists. External factors – an invitation to the institution – were more important than internal factors.

Scientific achievements and work environment

Job satisfaction

The data about satisfaction of women-scientists with job **reveal a very strong motivation of women for scientific work**. There are five most common conditions of the satisfaction with the job:

- Interesting work: “the world stops existing for those, who immerge in science. It is difficult to express this [...] it is a sort of light ecstasy” (Biochemistry, professor, age 51-60);
- Creative work, a joy of discovery, invention: “when you create a new material which does not exist but you already have it in your hands, you are overwhelmed with such a feeling, which cannot be compared to anything else” (Chemistry, assoc. professor, age 51-60); “you don’t use a template, but experiment, think” (Astronomy, researcher, age 31-40);
- Perfection and improvement of the skills and acquisition of new knowledge, little routine;
- Achieved results of work, recognition of these results in scientific community;
- Flexible work hours, allowing balancing family responsibilities and work.

The indicated conditions are important sources for satisfaction with the job for women in all fields of science. Other factors of satisfaction may depend on a science, position, age. For example, in astronomy one of the conditions of job satisfaction is interesting work environment, e.g. place and time of work (mountains, work at night). Women-scientists, who work at the institutions of higher education, indicate that they like work with students. Young scientists, who are at the initial stage of their career, appreciate such conditions as good salary, a friendly and young team, a promising field of research, a possibility of internship at science institutions abroad.

When asked about conditions which they do not like in their current job, women-scientists emphasized that if they were not satisfied with their job, they would not stay in science. **Thus, factors contributing to satisfaction with job outweigh factors that hinder satisfaction.** The most often mentioned factors causing dissatisfaction are insufficient financing of research, outdated technology and low salaries: “Work of a lecturer is not a paid work [...]. Science is only for children of rich people or wives of rich men” (Econometrics, assoc. professor, age 41-50). Women-scientists who perform administrative functions mentioned two “unpleasant” features of their job: first, dealing with complaints of employees, second, administrative work takes a lot of time and hinders scientific research. Women-scientists, working in higher education institutions, stressed that work with students and other educational activities are not taken into consideration enough when evaluating achievements of scientists.

The data of qualitative research on career of men-scientists reveal that creative work is the main condition of satisfaction with the job not only for women, but also for men. However, differently from women-interviewees men-scientists also mentioned such aspects, related to satisfaction with their current job, as responsibility and independence. A factor for dissatisfaction indicated by men – health hazard conditions of work.

Scientific achievements

A. Questioning the validity of indicators of scientific achievements

The data about scientific achievements of women-scientists were collected by asking respondents questions about the sources of funds for their scientific research, their participation in international research projects, international conferences, publications. Data revealed several factors that have a crucial influence on the career of women, though they are not directly related to gender inequality problem in sciences.

First, women-scientists value positive transparency of the distribution of funds for research activities in their scientific institutions. However, the research data show a lack of awareness of women about sources of funding of research both at institutional and national levels. Respondents, who do not participate in decision-making bodies of science institutions, do not know how funds for research are distributed. Positive evaluation of transparency of the distribution of funds is based not on the knowledge but on trust in colleagues, who are in leading positions.

Contrarily, the data received in the qualitative research of men-scientists careers allow formulating the assumption that men-scientists are better informed about sources and procedures of the distribution of funds for research. Such a difference may be caused by absence of persons, who are aware about the funding processes, in the informal networks of women-scientists.

Two aspects related to distribution of funds within science institutions that were stressed by respondents should be mentioned. First, funds for research are very small:

University receives such a small amount of money for research, that there is no meaning of being corrupt. [Distribution] is well discussed. There is a huge disproportion between possibilities to push science forward and received funds for it [...] State assignments for university are unrealistic. (Chemistry, assoc. professor, age 51-60)

Second, the practice of distributing research funds according to a number of publications of a research team does not always correspond to the importance of research and depends on the size of the team.

The evaluation of distribution of research funds at the higher levels of the science system is not as positive as on the level of scientific institutions. There are some doubts regarding transparency of the process:

There were some excesses this year. It was almost openly declared that this year funds should be given for a project of scientists returning from USA or somewhere else. That it is necessary to keep them here by giving them some project. I don't know how much this is transparent; there are three institutes and heads of the institutes are in the same commission. Almost all administration of one of the institutes participates in the commission of distribution of funds. Well...but there is a different aspect of this, there are few people who might do this [...] those who distribute cannot be at the same time those who will implement. It is difficult to be transparent in Lithuania, where there are few similar institutions. (Biochemistry, doctoral student, age 21-30)

It is said, that now distribution of [funds] is transparent, but maybe...It can't be said, that funds are distributed only for oneself. However, there is a tendency to fund the same old research fields. My research field only currently has been prioritized and started to receive funding. But before, it was not important, what you do and what you have, what publications ... (Biochemistry, chief researcher, age over 60)

The possibilities of women-scientists to take part in international research projects differ and opinions of respondents about this vary as well. A part of the interviewees thinks that the participation in the international research projects is a result of personal input, initiative, and efforts. Others tend to stress objective factors that may hinder participation in such projects. One of the factors, repeatedly stressed by chemists, is outdated technology. The new research equipment is a precondition for participation in the international projects. If this condition is not realized, a team of scientists cannot become a partner, because “does not have tools for doing work”.

Men-scientists emphasized importance of personal contacts, networks for participation in the international projects:

I am persuaded that personal contacts are the best. When e-mail messages are sent, very often they are not replied. That is why, face-to-face communication in conferences is necessary” (Chemistry, professor, age 51-60)

Scientific institutions of Lithuania support participation of scientists in the international conferences. Conferences may be an important factor motivating to work: “If I don’t have a conference, I do not finish my research, but if there is a conference, I do my best and finish research” (Astronomy, chief researcher, age 41-50).

The main obstacle for participation in the international conferences is the lack of funding. Due to small budget scientific institutions cover only a part of expenses related to participation of scientists in such conferences. Participation in the international conferences is related to participation in the international research projects. Funds for participation in the conferences are withdrawn from “saved money” of the international research projects. If there are no such international projects, possibilities to take part in international conferences are restricted to a great extent, because the larger part of expenses should be covered by scientists herself/himself. While the young women-scientists unanimously evaluated possibilities to find grants for participation in the international conferences very positively, opinion of older scientists varied: some of them thought that participation in the conferences depends only on the personal efforts of scientist, others stressed objective obstacles for participation – outdated research equipment that decrease possibilities to achieve significant research results.

Men-scientists, that took part in the research, were better informed than women-scientists about various sources of funds for participation in the international conferences: they mentioned not only the funds received from their scientific institution, but also, the financial support of business sector for scientists.

Publications of a scientist are considered by interviewees to be the main indicator of scientific achievements. However, a number of publications as such is not a sufficient indicator for the evaluation of achievements. An important aspect is a quality of publication, which is defined according to such criteria as index of citation, nature of citation (critics or recognition of research results of the scientist), and where it is published.

In the interviews with men-scientists there was pointed out that the index of citation not always show the value of publication – a part of international journals have a very narrow specialization, a number of their readers may be small, however the quality of publications could be very high.

According to the women-respondents, a number of publications depends both on subjective and objective factors. There were mentioned such subjective factors:

- Ability of a scientist to generate ideas.
- Ability of a scientist to write a lot from the same research material:

using the same research material is possible to write one comprehensive article or to write three articles to three journals of different profile. Then you will have more publications, however, you will not become a better scientist due to this (Biochemistry, researcher, age 51-60).

- Networks:

I had a possibility to learn this [importance of networks, relations] when I was an editor of one international publication. We had a conference in Vilnius and afterwards the participants of the conference sent their articles to me. I had to prepare a special volume of the journal from these articles. I was very astonished when later publishers excluded from the volume very good articles from, for example, Belarus or Lithuania, and published a penny-a-line of the person who had been famous already in the field. Thus, relations are very important... (Biochemistry, professor, age 51-60).

The main objective factor determining a number of publications in international journals is outdated research equipment. Scientists often found themselves in a situation when their measurements are done using technology which has long been considered in Western countries outdated. The other objective factor is international relevance of a topic of research. Third, variations in amount of time which is required to achieve results in various fields of research:

Those scientists who work in the sphere of services, how we name it. They have good equipment. They do their science and provide services for various teams of researchers [...] and they are included into the lists of authors of publications. They have a lot of publications, but they are not better scientists than others...(Chemistry, researcher, age over 60).

Publications in sciences are written frequently by groups of scientists. Who writes the article – a single scientist or a group of scientists – depends on the field of research. As a rule, collective publications are written by scientists who work not in theoretical, but in experimental, applied research field. The perception of an evaluation of the contribution of co-authors differs among respondents. A part of respondents says that they use “an established system” when the main author of the publication is written the first in the list of authors. Others indicate that a weight of contribution of each co-author is not taken into consideration. It could be important to stress, that such practice is not considered as vicious, it is thought that the evaluation of contribution of each co-author in writing the publication may be important only for those “who seek recognition”. Women-scientists, who were interviewed in the research, also disagree on the evaluation of practice to include into the lists of co-authors scientists, who perform administrative functions (heads of departments), however, contribute little to research. A part of respondents says that such practice does not exist in their research team: “such fashion disappeared long ago”. Others indicate that this practice is common. These different viewpoints on the issue are found within the same scientific institution: it is a feature of some but not of other teams of research. The argument “against” such practice presented by interviewees is that scientists, who perform administrative work, do receive a salary for this work, thus it is unfair to include them into the lists of co-authors if they have not contributed to research:

I work a year on one topic, it was a long project, and then unexpectedly two names appeared [next to mine in the article]. When I asked how it could be, my “co-author” told me: “if you don’t like this, I can delete your name”. After this, I have not done anything in cooperation with them: no research, no articles. I think this is unfair. (Mathematics, senior researcher, age 41-50)

Arguments “for”:

1. A scientist, who performs administrative functions, though does not do experimental work herself/himself, contribute to research by offering an idea, consulting researchers, providing comments on the article;
2. A scientist-“administrator” makes a huge work to ensure work conditions necessary for research activity:

If [administrator] is a scientist then she/he is a tragic personality [...] If we apply such strict criteria that if he/she has not directly participated in conducting research and writing the article then he/she must not be included into the list of co-authors, than in the end of five-year term, she/he would have to leave the science institution because of insufficient achievements. I think this is ingratitude and injustice, because frequently it is administrators who find funds for research (Biochemistry, professor, age 51-60).

According to women-scientists, when evaluating achievements of scientists there should be taken

into consideration not only publications, but also the following indicators: a number of (international) research projects, funds received by the science institution from the projects, participation in the international conferences. Other indicators, important for evaluation of scientist, mentioned by interviewees depend on the field of research or place of work. Scientists in astronomy, where cooperation with business sector is limited, more emphasizes what is given to activities of popularization of science. Scientists, who work in the field of applied research (physicists, biochemists, chemists, IT scientists), indicate other criteria of evaluation: a number of contracts with business sector, a number of patents, practical implementation of research results. Scientists, who work in higher education institutions, stress importance of evaluating educational activities. Insufficient evaluation of the quality of educational work was mentioned repeatedly in the interviews:

Eighty per cent of work is not evaluated at all [...] neither quality of lecturing nor preparation of material for students. Such aspects, which are very important for me, like seeking that students would enjoy lectures, that they would like to attend lectures, that it would be interesting for them, that they would be satisfied with the course...are not taken into account at all when my work is evaluated [...] only publications (IT, lecturer, age 31-40).

At the end, it is important to stress one more aspect that is important for the career of scientists in Lithuania. One of the main factors hindering career of scientists in Lithuania is unstable qualification requirements. During several years they radically changed three times. This does not allow scientists to plan their career: when they meet one set of requirements they are suddenly changed and the scientists seeking higher positions have to start their work a new:

I was a lecturer [...]. Until 2001 a scientist had to prepare a teaching material in order to become an associated professor. I started to write textbook, however I finished it in 2002. By that time the regulations changed. There was introduced requirement to have three publications in prestigious journals [journals approved by the Council of Sciences]. ...When I wrote the articles, of course, I wanted them to be good articles, not any [...], now I think, that I was wrong, I had to write anything, much more important thing was to have the articles as quickly as possible, but at that time I thought, that new regulations would not be changed quickly. It took me some time to write the articles. Last year my forth article was published. It takes time for the publishers to publish the articles. I submitted the article to the publisher in spring and it was published only in December. Thus one of my articles was published in September, one in December and one in August. Then qualification requirements for Associated Professor were changed. My publications became worthless, because they were published not in the type of journals required by new regulations (IT, lecturer, age 31-40).

B. Women-scientists' attitudes towards career

Scientific achievements and career are thought to be two sides of the same coin. If a scientist achieves a lot (has a lot of publications in international journals with high citation index, participates in international conferences, international projects, her/his research results are recognized and valued in a science community, she/he reads lectures, is a tutor for a number of students) her/his career gradually should go up. The data of the research show, that women-scientists associate the position of scientists on the career ladder with this "objective causality". The qualitative research does not allow finding out whether careers of scientists in Lithuania correspond to their scientific achievements. However, the qualitative research provides a possibility to take a look at the meaning of career for women-scientists, to find out whether the

career is a value that has an influence on their work. In the research women-scientists were asked “How important is it for you to make a career?”

The data reveals that women-scientists often deny the career as a value. The respondents indicate that they did not plan their career: their career worked out without deliberate efforts “to advance on the career ladder”, they reached their positions by doing everyday work and accumulating work results. Such course of the career of women-scientists could be described as “swimming downstream”. This attitude is found not only among older generation scientists, some of whom have leading positions in scientific institutions, but also among young scientists:

I do not put a lot of effort into this [...] I mean, when I chose the subject I did not think that I want to become some doctor or something else [...] I didn't have such ambitions [...] It was interesting, and then, simply I went downstream [...] It is not important for me to seek something higher. I like the way it is. My work is interesting to me [...] Of course, if it happened, I would have nothing against it [...] but I do not actively seek advancement (Physics, lecturer, 31-40)

I have never thought whether I made any career or not. Everyday I simply did what I had to do. [...] I never planned to become an associated professor or something like this...It is not like me. I just did my best to cope with tasks of the day (Chemistry, associated professor, age 51-60).

The denial of a career as a value could be associated with giving priority to other values – children, family. A career is understood as incompatible with taking care of family, at least in the period when children are small. Another interpretation of a career by women-scientists is associating it with sacrificing personal life (spending time with friends, family, various leisure activities) and committing oneself completely to work.

Besides, making career is defined as masculine value:

No, no [to climb the career ladder is not important to me] It is more important for me to receive satisfaction from work. I think that this is a feature of women. Men, as much as I know them, more value career (Biochemistry, professor, age 51-60)

It is important to emphasize that attitudes of women-scientists to the career as a value are not unambiguous. This ambiguity is revealed by respondents' answers to other questions of interviewers, where career though not considered as a value is associated with higher incomes, which can motivate women to seek a higher position or where denying career as a value the importance of recognition of colleagues is emphasized. It allows assuming that rejection of career as a value is often related to the reduction of the meaning of career: it is dissociated by women-scientists from its internal component (achievements, results, satisfaction with work, recognition by colleagues) and associated only with the external component – positions, mostly understood as an administrative position, which is not aspired to by women-scientists. In few words, rejecting career as a value, women give less importance to external component, but value internal component of their career.

However, rejection of the career as a value could be related to perceived absence of possibilities for women-scientists to get a higher position: “[Career] is not very important [...]. I wouldn't say that it is not important. Let's say that climbing up in my case is not very realistic...” (Biochemistry, researcher, 51-60).

Those women-scientist who say that career is important to them, have a broader notion of it – it is not only a position, but also results and recognition of the results by the scientific community:

I think that it is important for everyone to make a career. It is evaluation of the scientist's work [...] Of course, a scientist feels moral satisfaction when plans experiment, expects

some results [...] you may work without getting a result a year, but you go on and finally get what you want. It gives a huge moral satisfaction. But when this satisfaction is expressed also in a different form, this is even better (Physics, researcher, age 51-60).

Contrarily to women-scientists, men-scientists stress more often career as a value in their life. Career is associated by men-scientists with development as a scientist: *"If you are a scientist, you must seek to become better, improve your skills and knowledge all the time"* (Chemistry, professor, age 51-60)

The role of a team in scientific career

A. Work place atmosphere

The majority of scientists that works in sciences and high technologies works not individually but in teams, cooperating with other scientists. The data of qualitative research show that a lack of harmony, agreement in a team of researchers is a serious obstacle for career of women-scientists. Participation in international research projects as well as participation in international conferences and a number of publications are determined to a great extent by a size of research team and relations among members of the team:

When there is [...] no strong team it makes significant difference at work. When there is nobody with who to share tasks of research [...] it is much more difficult to work [...] Alone you cannot achieve a lot [...] (Physics, researcher, age 51-60)

Scientific research requires a team. Now when funding depends on a number of students, university looks for ways to save money [...] and as a result, each of us works individually, being responsible for one's own subject and trying to go forward by himself/herself. Nowadays serious scientific activity is restricted [...] There is a vicious circle: for research you need to have a contract, but without team you cannot get any contract, to make a team you need money, money you can get from research contracts. Once we had a team, however it dissipated, scientists left to business sector, now we need to form a new team. How could we do this [without money]? (IT, lecturer, age 31-40)

Even a small coherent work group or individual work in a group with friendly atmosphere, when there is no other scientists that work in the same research theme, is considered as not favorable for scientific activity:

My team consists only of two members. We do different works. [My colleague] is more a technician [...] and I do more theoretical work. In this respect it is difficult for me because I don't have anyone with whom to consult or discuss (Astronomy, researcher, age 31-40)

A good atmosphere at work may be one of the factors contributing to satisfaction with job and motivating to stay in the scientific institution:

I think that if an atmosphere was bad [...] I would not work in the institute. The salary is not high enough to torture oneself [...] If I go to work, at least I should be satisfied with it [...] If there is no satisfaction with work, then there is no meaning to sacrifice oneself (Physics, senior researcher, age 31-40)

Of course, normal interpersonal relations are very important. If you felt hostility of others and it was unpleasant to work, than you would not work. We have very good relations [...] (Chemistry, assoc. professor, age 41-50)

The majority of respondents evaluate positively work atmosphere. Women-scientists say that they

have not encountered cases of unfair competition among colleagues, usage of “*dirty technologies [...] gossip, falsification of facts*” in their scientific institutions.

In general, competition among scientists is weak in science institutions of Lithuania. It is explained by the lack of relevance of research themes for business sector, a small size of research teams, the difference in research topics of scientists and work conditions.

Response category	Quotations
Irrelevance of research topics for business sector	<i>I do not feel [competition] [...] Maybe in foreign countries [...] research subject is more related to business sector, big money, which would automatically require secrecy of research [...] In our country everything is in such state..., there is no place for competitiveness (Physics, lecturer, age 31-40)</i>
Size of a research team, separate topics	<i>Well [laughs] maybe a little [...] who will do better, who will finish the first. However [competition] is weak, because each of us has a separate topic, field of research [...] too little people to compete (Chemistry, researcher, age 41-50)</i>
Work conditions	<i>Sometimes we had to work in such extreme conditions that we needed to save lives of our colleagues [...] Sometimes it happened. It made us close friends. We still meet to celebrate New Year, birthdays together [...] I even dear to say that we have closer relations than relatives do. You meet relatives only occasionally, while you know that your colleague would risk his/her life to save yours. There is no such things “Oh, if she drew, there would be one rival less”...No (Chemistry, assoc. professor, age 51-60)</i>

Weak competition does not provide bases to evaluate who are main competitors – men, women or men with women. However, it is worth to mention some aspects which were pointed out by interviewees on the subject:

First, it is noted, that men like to compete (in a playful way) more often than women: “*who has a better publications in a better journal, who has more publications, whose publications are more cited*” (Chemistry, associated professor, 41-50). This aspect was also mentioned by men-scientists, who were interviewed in the research: “everyone wants to be better than others”.

Second, due to small proportion of women in physics women-scientists feel that men-scientists do not consider them to be “*serious competitors*” (Physics, researcher, age 41-50).

Third, it was stressed that it is difficult for men to compete with women: “*they don’t like to allow women showing themselves*” (Astronomy, chief researcher, age 41-50).

Cooperation among scientists varies in work groups. In some groups scientists choose one common aspect for the whole group of research and make research on this aspect from the beginning to the end without cooperation with colleagues. Other groups are more characterized by “organic solidarity”, e.g. tasks are distributed among members of the team in such a way that they need a strong cooperation among themselves, they discuss the process of research regularly, exchange their knowledge and skills, etc. Data of the research show that when group of scientist’s

functions as one team, where members discuss interim and final work results, exchange knowledge, it ensures more favorable conditions for scientific activity of scientists. This is true also for fields of research where individual activity of scientists prevails.

B. Allocation of work tasks in the team

Analysis of the data of qualitative research about allocation of work tasks in team and influence of gender on it, allowed placing responses of interviewees into two groups. A part of respondents say that the gender is not an important factor in allocation of work tasks in their team. Tasks are allocated *“according to abilities, education and business”* (Astronomy, researcher, age 31-40). The respondents who are in leading positions stress that they allocate tasks not on the basis of gender, but according to the competence of scientists, his/her abilities to perform the task or to learn to perform it: *“everything depends on a person, his/her head and his/her hands”* (Physics, chief researcher, age 51-60).

Other respondents point out that performance of some works is related to gender. However, discussing this aspect it is important to differentiate between scientific activity and informal communication of scientists at work place.

In regard of scientific activity, gender appears to be an important factor in time consuming tasks that require accuracy and patience and tasks related to maintenance of research equipment:

Response category	Quotations
Accuracy, patience	<p><i>“There are no woman works [...] Women just have more patience and seek to finish everything what they do and if they fail, they need to know why”</i> (Physics, chief researcher, age 31-40)</p> <p><i>“In chemistry some works are unpleasant [...] There are some very difficult analyses. You cannot know in advance whether you will succeed [...] I don’t like them, but do (laughs) They require a lot of accuracy and concentration. The boss says “do this work, because you will do it precisely “</i> (Chemistry, researcher, age over 60)</p> <p><i>“As a rule women are allocated works that require accuracy (laughs) and men get tasks with unknown ending. But now I think things are changing, now everyone has to do tasks that are long, unpleasant, requiring accuracy ...”</i> (Biochemistry, doctoral student, age 21-30)</p>
Maintenance of research equipment	<p><i>“Maybe men are more predisposed to work with technique [...] maybe this is more masculine work. Women do not like it very much. At least women in our institute. On the other hand, I think, that if a woman was a specialist in this sphere, she would do the work no worse than a man. Abilities of women are not different”</i> (Astronomy, researcher, age 31-40)</p>

Other division of works on the basis of gender is not directly related to scientific activity: it is maintenance of order at work place, organization of parties, moving heavy equipment.

Response category	Quotations
Maintenance of order, organization of parties, etc.	<p><i>“When dust should be cleaned from the windowsills – then we are women, when generator should be carried or polishing, drilling works done – then there are no women only physicists (Physics, researcher, age 51-60)</i></p> <p><i>“When something like a party is organized then women more often organize it than men” (Astronomy, researcher, age 31-40)</i></p>
Moving heavy equipment	<p><i>“Can you see boxes full of bottles filled with water, water tanks? We often get tired from carrying them [...] We invite our men to help us (laughs). We find a solution (Chemistry, assoc. professor, age 51-60)</i></p>

The men scientists, that took part in the research, pointed out that allocation of tasks is not based on gender of scientists. However, gender may be important when heavy physical work should be done, “to carry something”.

The respondents do not associate the ability to generate ideas with gender: according to respondents both men and women can be equally good in idea generating. Usually, the main idea generators are heads of research teams: *“There is a head that thinks what to do; others are more involved into implementation” (Astronomy, researcher, age 31-40).*

C. Evaluation of contribution of each scientist to the team work

Analyzing the data about evaluation of the contribution of each scientist to team work and equality of the evaluation standards for men and women, six themes were identified in the responses of interviewees.

First, **evaluation of work results of the team as a unit** prevails in some scientific institutions. The contribution of each member of the team is not evaluated. This circumstance may be considered as a condition favorable for free-riding, the difference lies in the efforts of the team members to contribute to the research:

An environment [in the institute] is in some sense socialistic. Some scientists cannot work very hard but they will receive the same salary as the rest (Physics, lecturer, age 31-40).

Second, **the evaluation of the contribution of each member of the research team and public discussion of it in the meetings at work places are not a common practice at science institutions**. This may be explained by a small size of the team, when everyone knows what and how much does each member of the team. The results of work are discussed only in the annual meetings. In these meetings scientists from administration of the institution take part. The evaluation of each scientist is based on common “objective” criteria, the number of publications, participation in the conferences, international projects. Salary depends on these criteria, qualification and positions at the institutions.

There is no such evaluation. You simply do your work. If you contribute to research you are included into the list of authors of report or article. Even if your contribution is not large you are included into the list of co-authors of the article anyway. Your name is in the article. (Chemistry, researcher, age over 61)

Third, women-scientists stress that they **do not know cases of application of double standards**

for men and women at their scientific institutions. However, some aspects in the responses of the interviewees allow talking about the existence of such inequality of standards:

“I have been offered a part time position from this September. A young man, who is returning from USA, is offered a full time work. I would agree to work full time, but they say, ‘let’s see how you will do’ [...] I was offered to read lectures only after I defended doctoral dissertation, but in our institution there are men who do not have a scientific degree and who teach students at master programs. I don’t imagine, that I would be allowed to read lectures without a degree” (Mathematics, lecturer, age 31-40)

Fourth, **a perception of unfair treatment at the science institution cannot be attributed - exceptionally to gender factor.** It makes difficult to recognize cases of the discrimination on the basis of gender, admitting that not personal factors but objective conditions may determine a course of events:

“Each five years there is an attestation of scientists. They see in your report what you have done, how many articles you have written, how many points you have, etc. They say: you have a position of research fellow and, of course, according to your work results, you are worth a higher position. However, the department does not have money for it. Thus we cannot give you a position of a senior research fellow. That is how it ends. After five years, the situation is the same...” (Physics, research fellow, age, 51-60)

Fifth, **older women-scientists mention that the situation concerning equality of evaluation standards for men and women has improved compared to the Soviet period:**

We used to laugh: “If a woman wants to achieve the same position as men she will need to have two or three times higher merits than men”. This was true, but, I think, that now the situation is changing” (Biochemistry, researcher, age 51-60)

Sixth, **women-scientists who have experienced an unfair evaluation of their achievements avoid talking about this with the administration of the scientific institution because they are afraid to loose their job.**

“If you try to look for justice, you may loose your work. When you are fifty yeas old it is very difficult to find a new job” (Physics, researcher, age 51-60).

The concept of an excellent scientist

The women-scientists, who took part in the research, had a very different understanding of “an excellent scientist” in terms of traits, position, and work habits. Only part of characteristics repeated more than once. An “excellent scientist” is who:

- regularly publicizes results of one’s research, has a larger number of publications;
- is persistent, not giving up easily;
- well-read, erudite;
- likes one’s work;
- is hard-working;
- is accurate;
- is creative, has a lot of ideas;
- is gifted;
- participates in educational activities, prepare young generation of scientists;
- has one’s research team, is able to organize work of the team;
- is able to reason logically;

- respects other people;
- is able to balance family life and career;
- is respected in the scientific community.

Other features of an excellent scientist mentioned only once by respondents are:

- able to receive grants, funds for one's research;
- able to concentrate attention;
- attentive;
- not restricting oneself only to one field of research;
- cooperates with other scientists;
- able to compete;
- ambitious;
- communicative;
- committed to work;
- able to earn for life from scientific work.

A part of respondents does not associate an "excellent scientist" with characteristics that may be crucial for making career – "objective" scientific achievements (number of publications, participation in conferences, taking part in the international research projects, etc.) and positions, which would provide a possibility to guide research activities of a team of scientists. Such value-orientations of women-scientists weaken their motivation to seek higher positions both related to the scientific career and participation in decision-making bodies.

Work and family

The choice

„...You have to decide if you give birth to children or do mathematics...” - it was told to a very gifted girl student, the winner of the whole Soviet Union Mathematics Olympiad, by her supervisor, a very famous mathematician (Mathematics, assoc. professor, age 41-50).

The question of choosing between scientific activities and the family (and particularly – children) arises in interviews again and again: *“It is a choice. It is difficult for women when family and children appear in their life. To balance this is very difficult. It requires a lot of efforts. It requires a lot of work, it is always in the mind, brains must work and work on it”* (Chemistry, assoc. professor, age 51-60). According to the opinion of the respondents, women do free choices between work and family, they choose the intensiveness of their career, they decide to postpone childbirth for many years or even to divorce (*“...She chose the science and had divorced”* (Astronomy, doctoral student, 27). *“...Or those women who all their life – of my generation – were looking after children, home, and all the time remained on the position of senior laboratory assistant. This was their own will. It was enough to them. Their husbands made careers”* (Chemistry, assoc. professor, age 51-60) – the choice of women who started but did not make career in science differently from our respondents was described in such a way.

It should be noted that all the respondents talked about personal free choices of women. They did not see any structural obstacles.

Responsibly for child-care

Not all respondents have experience of family life and child-care: 8 from 23 interviewees are

single, 1 single mother, and 1 married without children. Thus, almost a half of respondents does not have a personal experience of breaks or slow downs in the career related to maternity leave or child-care. However, the majority of the respondents are of the opinion that child-care is one of the most important reasons why women are behind men in making scientific career: “... *because a man did not give birth. But a woman, she ... it automatically comes, that she is behind in professional sphere*” (Astronomy, doctoral student, age 21-30), “... *[a man] may be [could] allocate more time for himself, for his scientific work. A woman will have not, she will take care of children, family, etc.*” (Physics, lecturer, age 31-30). Two respondents also pointed out that they had some slow downs in their career due to taking care of their old or sick parents.

How successful women-scientists are in balancing child-care and work? Experience of the interviewees varies. The majority of respondents indicate that it was difficult; however the degree of difficulty depends on availability of help from parents (grand-parents of the child) and the support of husband regarding child-care duties. One interviewee, who is a mother of five children and a head of the department at work, had no difficulty in balancing family life and career. Some respondents indicate that scientific career is favorable for balancing work and child-care. Before discussing balancing family-life and child care in more detail, it is very important to emphasize that almost in all interviews (in both gender samples of respondents) the responsibility for child-care was attributed exceptionally to women.

The responsibility for children and family are determined by nature, women’s physiology or psychology:

“... [women’s] nature itself says that it will be more difficult anyway. If there are family plans <> at once it means that several years falls out” (Physics, lecturer, age 31-40);

“The whole problem is that women have to run home after work and do their work there: to cook dinner, to listen to other family members. Such is nature” (Physics, researcher, 31-40);

“The physiology of a woman is such – to give birth to children, to take care” (Astronomy, doctoral student, age 31-40); *“I think that all this is in a woman’s head, woman’s psychology. The difference of psychology between women and men”* (Astronomy, researcher, 31-40).

Respondents are talking about three corners of home which are held by a woman and are vaguely dreaming about some assistance from men’s side. But they don’t believe it could happen in the nearest future:

If life changed in such a way that men would take one half of duties of child-care in a family [...] However, at the moment the situation is different. I am afraid to be wrong in numbers, but, I guess, in 80 percent of families a woman is the one [responsible for child-care] ...is the holder of three corners (Chemistry, researcher, age over 60).

The respondents recognize that a possibility for men to take parental leave does exist, and they also point out, that not only a lack of desire but even more public opinion prevents men from taking part in child-care:

Now men have a right for paternity leave. However, they are not used to it: How could he leave work? How could he stay with a child at home? [...] There should be some public opinion (Chemistry, researcher, age over 60);

A paternity leave is an object of mocking [...] if two scientists marry, it is obvious, that the woman will take leave for child-care (Biochemistry, doctoral student, age 21-30).

It is interesting to note that there are no differences between generations in attitudes towards women's responsibilities in child care.

Responsibility in child-care

A. Help in child care.

The majority of women respondents when telling their own success stories about balancing work and family, confessed that their example is not typical, because "...[I am] *such a happy woman who has somebody to leave the child with*" (Physics, researcher, 31-40) or "... *but for my mother everything went different way*" (Astronomy, chief researcher, 41-50), "*mother took care of the child when I had duty tours in Germany...*" (IT, lecturer, 31-40). But the analysis of all interviews shows that this was rather typical that assistance of somebody was available when children were small. Sometimes it could be a husband or other relatives, but mainly the mothers of women researchers.

There were few respondents who stressed that the academic environment is very convenient for balancing work and family. Someone was bringing children to workplace, someone even to meetings or lectures, someone was able to make flexible time schedule of lectures.

B. The use of maternity leave.

The majority of respondents regarded their cases are not typical also because they did not use fully their maternity leave or worked being on this leave: "... *not typical case. I used this maternity leave. Stayed with the child and translated a book*" (Biochemistry, professor, 51-60). But it appeared also, that not using full maternity leave was rather typical. The only one respondent stayed all 3 possible years at home, but she gave birth to twins. Here we can observe one more similarity between the generations - the majority used paid leave only. The only difference between generations is that researchers of older generation usually used only 3 months, and of younger generation – longer (the paid leave is now up to a child is 1 year of age) and used different options, e.g., worked not full-time.

But anyway, those women who succeeded in balancing scientific activities and maternity could be called "superwomen", and unfortunately could not be taken as role models in drafting strategy for increasing numbers of women in sciences.

C. The loses

The interviewees - "superwomen" did not have overpowering obstacles in balancing the research work and the family. But only one told that she did not have any problems and raised five children (Mathematics, chief researcher, age 51-60). But the majority of women respondents who raised children suffered loses in their professional careers: one respondent postponed the childbearing for eight years (Astronomy, chief researcher, age 41-50), it was extremely difficult to be back from the maternity leave to another one (Mathematics, assoc. professor, 41-50), a slowdown of career (Biochemistry, researcher, age 51-60), a gap in publications (Chemistry, researcher, age over 60). Very often they had no possibility to go to conferences, accept scholarships or job offers abroad (Physics, researcher, age 31-40; Physics, researcher, age 51-60; Chemistry, researcher, age 41-50; Chemistry, assoc. professor, age 51-60; Mathematics, assoc. professor, age 41-50).

Even those women researchers who did not have children noticed that "*family*" is the main obstacle for women in making scientific career because "... *during 3 years you can distance yourself from science. Anyway, during 3 years everything moves forward very fast. And when you have to overtake, I don't know how to succeed*" (Astronomy, researcher, 31-40).

Interim conclusions (summary)

The majority of women-scientists, who were interviewed, had a strong and clear motivation to study sciences at higher education institutions. The main factors that determined their choice of the subject were interest in science, abilities, inclination for sciences, the influence of teachers, participation in scientific Olympiads and summer schools or workshops for young scientists, the influence of the family. Research results show that factors of planning career had a relatively small influence on the choice to study the subject. The possibility to find a job after graduation was more important for the choice to study sciences than climbing a career ladder or good salary. The latter factors became important later, when the choice of specialization or field of research was made.

The data about job satisfaction of women-scientists reveal a very strong motivation of women for scientific work. Though scientists do not give prominence to negative aspects of their current job, these aspects may have a crucial influence on motivation of the scientists to stay in the science system. The data from interviews with young women-scientists show that despite the typical satisfaction with work conditions, these scientists are not certain whether they will stay in sciences. It would be difficult to keep young scientists in the science system only by advantages of scientific activity – interesting, creative work, providing possibility for self-realization.

Scientific achievements of women-scientists are hindered by problems which plague the whole science system of Lithuania – a lack of funds for research and outdated technology. Currently participation of scientists in the international research projects is the dominant factor in their scientific activity. It determines not only the field and topics of research but also the possibilities of scientists to take part in the international conferences, have the publications in international journals. As a matter of fact, it would be difficult to talk about research activity in the country that would be “independent” of foreign donors. Weak traditions of philanthropy in Lithuanian do not create basis for financial support of business sector to research. Business enterprises make only short-term contracts with scientific institutions. There is a strong orientation towards achievement of results in short-term. If results are not achieved quickly due to the nature of a science, this causes dissatisfaction by contractors from business. It aggravates the dialogue between scientific institutions and business sector.

The data of research revealed also a lack of awareness of women-scientist about sources of funding for research both at institutional and national levels. Contrarily, data received in the qualitative research of the career of men-scientists allow formulating assumption that men-scientists are better informed about sources and procedures of the distribution of funds for research.

Evaluating a number of publications in international journals women-scientists indicated the following shortcomings of the indicator: 1) amount of time required to get results varies in the fields of research; 2) the international relevance of topics of research is not equal; 3) the variety of themes of research is not taken into consideration.

The criteria of defining input of scientists into publications are not clearly defined. Currently, publications written by a team of scientists not always reveal the weight of contribution of each co-author. Some respondents could not explain how the contribution of each co-author may be indicated in publications. Besides, a practice to include into a list of co-authors scientists who perform an administrative work but who do not contribute to research still exists in Lithuania.

Activities related to popularization of sciences are not widely recognized as an indicator of achievements of scientists in the science community. Discussing evaluation criteria of scientific activity very few respondents mentioned these activities. However, these activities are very important for promoting interest of young people in sciences, shaping attitudes of population to sciences and their contribution to quality of life.

The research showed that one of the factors hindering career of scientists in Lithuania is unstable

qualification requirements. Changing requirements do not allow women to plan their career. When they satisfy one set of requirements the regulations may be changed and women-scientists will have to start anew.

The data of the research reveals that women-scientists often deny career as a value when asked to evaluate the importance of career in their life. However, it is important to emphasize that this rejection of the career as a value is often related to the reduction of a meaning of career. It is dissociated from achievements, results, recognition by colleagues, and satisfaction with work – inner components of the career – and associated only with external component – positions, mostly understood as an administrative position, which is not aspired to by women-scientists. In few words, rejecting career as a value, women reject the external component, but value the inner component of the career.

This tendency is confirmed also by the concept of “an excellent scientist” that women-scientists have. Women-scientists do not associate “an excellent scientist” with characteristics that may be crucial for making career – “objective” scientific achievements (number of publications, participation in conferences, taking part in the international research projects, etc.) and positions, which would provide possibility to guide research of a team of scientists. Such value-orientations of women weaken their motivation to seek leading positions both related to the scientific career and participation in decision-making bodies.

An atmosphere in the research team or group of work is an important factor that has an influence on achievements of women-scientists. The results of the research allow making an assumption that when a group of scientists becomes a unified team, where members discuss interim and final work results, exchange knowledge, it ensures more favorable conditions for scientific activity of scientists.

According to women-scientists an allocation of tasks in research teams does not depend on gender. However, some statements of the interviewees reveal division between “woman” and “male” work that are more or less directly related to research of scientists and application of double standards for men and women: 1) women are more often assigned tasks that are time consuming and require accuracy and patience; 2) women have to achieve more than men in order to be recognized. A subjective perception of unfair treatment at the scientific institution cannot be attributed exceptionally to the gender factor. It makes difficult to recognize cases of discrimination on the basis of gender, admitting that not personal factors but objective conditions may determine a course of events.

Evaluation of contributions of each scientist to work results of research team is not a rare phenomenon. Salaries of scientists depend on their position, qualification, a number of publications, and participation in international conferences. Evaluation of scientists does not show their contributions to the work of the team.

According to the opinion of the respondents, the main obstacle in women’s scientific career is reconciliation of work and family, because:

- it goes without saying that only women are responsible for raising children;
- due to the nature, physiology or psychology of women or simply because as it is;
- and it is a free choice of a woman how to reconcile research and raising children;
- therefore the only acceptable case of promotion of women in sciences is at the moment when they are back from maternity leave.

II.2.2. Participation in decision making bodies of scientific institutions

Administrative position and scientific career

The majority of respondents evaluated negatively relation between an administrative position and scientific research. The respondents associate an administrative position with additional load of work that hinders scientific activities:

"[...] I don't think that they [administrative and scientific work] are related, unless negatively. I have colleagues, who have become vice-deans, and their scientific career went down, because administrative work takes a lot of time and you have to show the exceptional abilities" (Chemistry, assoc. professor, age 41-50)

Such an attitude more often was expressed by older than younger women-scientists. It is also worth mentioning, that men-scientists also emphasize negative relation between scientific work and administrative work.

Women-scientists, who do not have an experience of work in a leading position, when asked "Would you agree to take part in the competition for an administrative position at your scientific institution if you were offered to?" responded mostly negatively. However, reasons for not taking part in such a competition varies and they are not confined only to the above mentioned association of leading positions with a large amount of additional work that restricts scientific research.

First, women-scientists may not seek a leading position due to **the lack of the confidence in their abilities to perform the administrative work**. This factor may be associated with notion of a „good leader“, emphasizing such features of leadership as an ability to generate ideas, creation of favorable atmosphere in the research team, being eloquent, communicative, empathic, fair, respected by colleagues, able to perform each task of the research by herself/himself, which would ensure a good understanding of a whole process of work and possibilities of members of the research team to accomplish them within given time. Women-scientists think that they do not meet such criteria of a good leader. On the one hand, such doubts may be related to experience and time factors: younger scientists do not reject a possibility that in the future they will be ready to seek a leading position. On the other hand, it may be determined by a subjective perception of one's constant personality traits. In the interviews with older women-scientists there was emphasized a lack of abilities to organize work of others, doubts that they will manage „to make other scientists work“, „to put pressure on others“, they don't feel „trained for this work“.

Other reason for not seeking an administrative position is **the lack of interest in administrative work**. Women-scientists, who expressed this attitude, think that administrative position must be sought only if somebody „likes such work“, but do this merely for a „position“ is not worth of efforts.

The third reason of indifference to a leading position is an association of it with “chasing for honour”. As one of respondents says, *“I think, that, those who want to be a leader [head of department, etc.], seek some honour related to it. I don't need this sort of honour” (Astronomer, researcher, age 31-40)*.

The forth reason indicated by women-scientists for not putting efforts to take an administrative position, is the **understanding of such efforts as meaningless, because there is a small probability that a woman will be appointed to the position**. This factor is especially important in the fields of science where proportion of women is small, for example, Physics:

No, this would never happen. I even don't try to think about such possibility [...] It is difficult to compete with men. [...] If I was a teacher at the secondary school I would try. But at the university...No...I would like to do this kind of job, however [in this science institution] where there are few women with scientific degrees (laughs) among a hundred of men...(Physics, researcher, age 51-60).

Fifth, women-scientists do not seek a position, related to decision-making processes, because such work **is not valued enough, the rewards for it are considered too small compared to time and energy it requires**. As one of the respondents put: *"It takes a lot of time and does not contribute to the career anything [...] If the work is given then it should be rewarded, but if it is not valued at all...who needs it?"* (IT, lecturer, age 31-40).

Sixth, **an aspiration to take a leading position maybe suppressed by the established practice, when such a position does not mean a real leadership for a team of scientists**, but only means „more paperwork“ than for the rest members of the team:

If our department could be my research team, I would agree to be the head of the department. But in reality the department consists of groups and the head of the department is a leader only formally. [This position] makes no real difference except that the head receives ten or fifteen percent premium pay and has to collect annual reports of all scientists working in the department. [...] In our department we all work separately (Biochemistry, senior researcher, age over 60).

Women-scientists, who do not intend to take part in a competition for an administrative position in their own institution, do not reject a possibility to try themselves in a position of leadership in other institutions. Women-scientists indicate that they are satisfied with their current job, which diminishes their motivation to seek an administrative position somewhere else.

Meanwhile, women-scientists, who would agree to take part in the competition for a leading position in their own scientific institution or somewhere else, consider such positions as **a „challenge“, a possibility “to proof oneself”**:

Yes, I would agree [to take part in the competition], because it would provide more possibilities [...]. The higher position you have, the more possibilities to form research group, find premises, acquire equipment you get. This is important“ (IT, researcher, age 31-40).

Being in a position of leadership

An appointment

Interviews with women in leading positions (heads of departments or larger divisions of science institutions) reveal several factors that have influence on the appointment of women-scientists to leading positions.

First, **support of colleagues**. Women-scientists were encouraged by other scientists from their institution to take a leading position. However, considering the support of colleagues as constant, the level of personal initiative may vary from a complete lack of personal interest in such a position (when it is taken only because colleagues ask to do this) to a strong personal motivation to be in the leading position.

“There is a competition for the position of the head of the department every five years [...]

It is public, announced in a newspaper. The Council of the Institute makes the elections – they may select you or not [...]. Before new elections I organize meetings [of department] and ask if they want me to be the head for the department or maybe someone of them would like to take the position.”

“I looked for candidates to [the leading position] myself. In our institution there were scientists who were very respected by colleagues but did not want to take the position [...] I applied to the position since there was nobody else whom I trust as a leader. I don’t want anyone worse than me (laughs).”

“If my colleagues hadn’t asked me, I would not have agreed [to become the head of the department] I agreed in the moment of weakness and I still regret....”

The second factor that has an influence on achieving a leading position is a **long time of work in the scientific institution in which appointment has taken place**. Prior to the appointment, women-scientists had already acquired a reputation of a good scientist in their institution. In sciences where there are few women, appointments of women-scientists to the leading position is an object of astonishment for scientists who do not know the leader personally. However, the gender of a leader is not important when women-scientists are well known for scientists.

Third, **women, who won a competition for a leading position, had significantly higher achievements than other competitors, which predominantly were men**: *“I can always defend myself and, maybe, I have more knowledge than men”*.

Forth, **women-scientists were appointed to a leading position because there was no contest for it** – they were the only candidates for this position: *“Nobody wants the position [of the head of the department]”*.

A sense of empowerment or lack of it

Being in the leading positions does not necessarily give to women-scientists a sense of empowerment. Women in leading positions see the work in active research as more important and evaluate an influence of administrative work on their research mostly negatively.

Concerning positive aspects, women in the leading positions mentioned the following: a possibility to contribute to the development of science, control of financial resources necessary for acquisition of equipment, high-rank contacts which increase possibilities to find partners for research projects.

“As for the scientists [the administrative position] means more additional work [...] However, a leader may help you in your research or be an obstacle for it. Thus, I decided that there would be less obstacles for research if I take leadership myself [...] I would have better possibilities to develop my science ...”

Gender and administrative work

Three aspects of the influence of gender on filling leading positions could be discussed: 1) equality of the opportunities for men and women to achieve leading positions in scientific institutions; 2) men-scientists’ attitudes to women in leading positions; 3) traits attributed to women, which make them better or worse leaders than men.

Equality of the opportunities for men and women to achieve leading positions in scientific institutions

Women-scientists stress the equality of opportunities for men and women for being appointed to leading positions in their scientific institution. A fact, that the leading positions are mainly filled by men-scientists, is explained by women-scientists as follows:

- a. There are too little women which are qualified for these positions in the institution. Those women who meet qualification standards do not seek an administrative position, “*our women do not strive [to take a leading position]*”:

Or, for example, women of my generation – they took care of their children, home and stayed in the position of assistant. They didn't want anything else. Their husbands made career. They were satisfied with work of an assistant. (Chemistry, assoc. professor, age 51-60).

- b. The prevalence of men in leading positions is related to „natural disproportion“ of men and women in the field of science. This attitude reflects low awareness of women-scientists about the situation of women in science.
- c. Women are not interested in such positions; they lack initiative to seek the leading positions. Discrimination is not perceived as “a social problem”, but is associated with a personality factor: “*if they want [to be discriminated], they are*” (Physics, chief researcher, age 51-60).

Maybe women allow [being discriminated]. Their achievements should show that they are able to be leaders. If they prove this, there can't be any obstacles. Men would see that women are good at work. It is hard to say...It depends on a person, how she presents herself. (Chemistry, researcher, age 21-30).

However, although women-scientists indicate that they do not know cases of discrimination on the basis of gender in their institution, some aspects of their responses to questions of interviewers allow talking about the existence of such discrimination.

First, women-scientists mention that **women have to work harder and achieve more than men if they want to be recognized**. If they achieve only the same results as men, „it does not count“, „disappear in the mass“. Women who seek leading positions encounter with higher competition: “competition would be easier if I was a man” (astronomy, chief researcher, age 41-50). This is especially salient in the fields of science where proportion of women is very small.

Second, it is repeatedly stressed in the interviews, that **men can dedicate more time to work, because they have fewer duties at home, related to child-care and home chores**:

Men have fewer responsibilities [at home]. They may stay at work as long as they want. They even don't want to go to retirement. (Chemistry, researcher, age over 60).

Third, women-scientists indicate that **it is easier for men to climb the career ladder, because there are more men in leading positions, it is „their world“**. The quotation from an interview illustrates this:

As the head of the department, for a couple years I have been in a situation, when I was the only woman in the commission. A one cad man once joined the commission. He constantly was talking „Listen, men. Men, men, men“. He was used to be in environments where there were only men [...]. We come to some meeting, for example, three heads of departments-men and me – one woman. The hand for a woman will be extended only after shaking hands of all men in the room [...] They are not used to talk to women as an equal“ (Biochemistry,

professor, age 51-60).

In this context, some women-scientists emphasized the importance of informal relations to participation in decision-making bodies.

In informal communication he shows for his chief [...] what a good fellow he is, with a good sense of humor, well-read, etc. When time comes to offer some candidate to vacancy, the chief will offer him (Biochemistry, professor, age 51-60).

The importance of informal relations was also stressed by men-scientists, who were interviewed.

Yes, I spend time with [the head of the department]: hobby, sports ...which also gives possibility to discuss work issues, work relations, etc. When a man [not a woman] is the chief, maybe it provides more possibilities for such conversations. Anyway, the most important thing is his competence [not gender] (Physics, senior research fellow, age 51-60).

However, the absolute majority of women-scientists who participated in the research, believe that informal relations do not play a crucial role in the career of either men or women – the „objective“ factors, namely, publications, participation in conferences, and other qualification indicators, determine it.

Men-scientists' attitudes to women in leading positions

One of the obstacles for women-scientists to seek leading positions could be attitudes of men-scientists to women as unable to be good leaders. In the words of one interviewee,

„It seems that men think that women cannot take leading positions [...]. Due to this [attitude], a part of women does not seek such positions, because they know, that they will encounter with this problem, and the other part of women, who seeks leading positions, must be very self-confident and sure, that they exceed the qualification requirements several times“ (Physics, chief researcher, age 31-40).

Respondents, who do not have experience of being in leading positions, think that such attitudes determine that men obey only to men-leaders: “*what kind of man would allow himself to work under leadership of woman?*” (Physics, researcher, age 51-60). It is more difficult for women than for men to achieve respect of men, especially in sciences where the proportion of women is small. This attitude is also salient in choices of tutors by men students: “*when their leader is a woman, it seems for them somehow unmanly*” (Biochemistry, professor, age 51-60).

Women-scientists not always associate this attitude with gender models and gender stereotypes prevailing in the society. Some of the respondents define it as a „problem of individuals“, but not a “social problem”:

The perception of women as less gifted than men is a problem of some individuals. There are men for whom leadership of men is very important. [...] Let's say, that there are men, who think that women are suitable to work only under the supervision of men, they see women only as assistants. It doesn't matter if she is in the council or not, they will not vote for her. If there were two candidates to vacancy, one man and another woman, and men was three times less qualified than woman, they would vote for the man anyway and would find million reasons why a man is better than a woman. I was in such situation myself. (Physics, chief researcher, age 31-40).

Women-scientists who are in leading positions point out that gender of the leader is not important for the scientists in their institution.

Women and men leaders

The opinion of the respondents about why women would be better or worse leaders than men varied greatly. A part of interviewees thinks that gender does not have influence on the characteristics of leaders; they depend on the personality traits.

Other respondents indicate that gender is important, however, some of them emphasize positive traits of women, others negative traits.

Response category	Categories of answers
Characteristics of women that are considered to have advantage in leading positions	More efficient organization of work, ability to save time Precision Sensitiveness, taking care of others, which helps to keep warm relations with subordinates Disposition towards compromises, avoidance of conflicts
Characteristics of women that are considered to have disadvantage in leading positions	Emotionality Difficulties in winning respect Sensitiveness, inability to apply sanctions for subordinates Finicky Family responsibilities

It is important to indicate, that “positive traits” that are attributed to women are present in the style of leadership of the interviewed women-scientists occupying leading positions:

I prefer informal communication at work... It helps people to feel more comfortable. They can relax and work without stress. It is better for me this way” (Chemistry, assoc. professor, age 51-60).

“Allocation of tasks is a collective decision. We do this democratically. The atmosphere in the collective is warm. I do not supervise strictly” (Biochemistry, professor, age 51-60).

Different attitude was expressed by men in the leading position:

I think that in sciences there is little place for democracy. There is a leader and if he is the leader he has to allocate tasks. Although discussions are always possible (Chemistry, professor, age 51-60).

Interim conclusions (summary)

Women-scientists do not want to seek leading positions mostly due to the negative evaluation of the consequences of the administrative work to their scientific career: it takes a lot of time and is little rewarded. The leading position is not conceived by women-scientists as a source of power to control recourses (financial, human, etc.) important for scientific research. Such an attitude is characteristic not only for women who do not have experience of being in leading positions, but also for those scientists, who are in such positions.

Other reasons that limit women’s interest in leading positions are: the lack of the confidence in

their abilities to perform the administrative work; the lack of interest in the administrative work; the association of a leading position with chasing for honour. In sciences where the proportion of women is small the motivation of women to seek participation in the decision making bodies is undermined by negative evaluation of the possibility to be appointed to the leading position. Meanwhile, women-scientists who would agree to take part in the competition for a leading position consider such positions as a challenge, a possibility to try oneself in a new field, improve skills.

The factors that have influence on the appointment of women-scientists to leading positions are: 1) the support of colleagues; 2) a long time of work in the scientific institution in which appointment has taken place; 3) have significantly higher achievements than other competitors, who predominantly were men.

The results of the research reveal that gender is an important factor for career of women in respect of their participation in decision-making bodies. First, women seeking leading positions must have higher achievements than men. Second, gender stereotypes and gender roles prevailing in the society are also important factors hindering participation of women in decision making bodies. Attitudes of women towards influence of gender on the careers of women-scientists show low awareness of women of social problems in sciences and the causes of such problems.

II.2.3 Solving the problem of gender inequality in sciences

Recognition of gender inequality problem in scientific community

Obstacles in the science system for making scientific career

Women-scientists were asked to evaluate our science system and the obstacles for making scientific career in it. The features of the science system were also evaluated in terms of gender discrimination for the scientific career that are more commonly observed by women-scientists than men-scientists.

Speaking about our science system, women in exact sciences saw many obstacles for the scientific career. Most of them are related to the position of the state and society towards science:

Bad education system and poor education of children in schools. *"We do not orient" (Physics, researcher, age 31-40), "they come and they study here what they ought to know already" (Biochemistry, professor, age 51-60).*

The state does not pay much attention to sciences. *"There is very little attention towards sciences from the state institutions" (Physics, researcher, age 51-60).*

Society has very strong stereotypes about feminine and masculine jobs. And "there is imposed that this job is for girls, that job is for boys" *(Physics, lecturer, age 31-40).*

Defective laws concerning the science system. *"There is no... clear legislative system" (Mathematics, senior researcher, 51-60).*

However, the main problem in the science system is underfinanced studies and old material base. It is more important for those scientists whose work results are based on laboratorial experiments, various measurements or work with materials. Because of the bad working conditions, low remuneration in the science system, the system loses young scientists, who choose jobs in other spheres (usually business) or to abroad where pay is much higher.

Insufficient finances, low salary, the rating of the profession falls, bad staff comes (Astronomy, chief researcher, 41-50);

We do not have materials, so we economize on everything. When they can use materials freely, we economize (Biochemistry, senior researcher, age over 61).

Insufficient finances are best seen in the spheres of accessing new literature or data bases. Women-scientists point out, that old material base more often means impossibility to get access to the newest scientific information than old equipment or shortage of agents.

The obstacles for the scientific career, that can be applicable only to women scientist, are also noted. They are all related to women's roles dominant in our society the roles of a good mother and a wife. This aspect has been highlighted in the previous chapters. Women-scientists notice that the existing science system does not provide enough possibilities to combine scientific career and family life, the majority of them stress the improper child care system and facilities.

Women have more responsibilities in our society and in the family she has more responsibilities than a man (Physics, researcher, age 51-60);

Maybe now there is no good system that motivates to come back to work short after maternity leave (Biochemistry, doctoral student, age 21-30).

It is worth noticing that the problem of child care system is distinguished as a problem for career making despite of the respondents age, family status or field of study.

Women-scientists think that young women have better conditions and more possibilities of making their scientific career. Women think that after fifty your scientific career is over (Biochemistry, researcher, age 51-60) and in some cases it is more suitable for young women than men. In the conditions of underfinanced sciences, traditional attitudes towards responsibilities in family, when men more often choose business sector or work abroad, therefore the sphere of sciences is left for women.

Such situation raises the dissatisfaction among women, as they see the loss of men in sciences as a problem. They think that the science system is faulty as it lost men. There will be no science if the conditions for men will be bad (IT, senior researcher, age 41-50). As traditionally the dominant work force in hard sciences was men, there is a fear that sciences will lose its soundness or will be devalued by the society.

Analysis of the opinion of men-scientists about the obstacles in the science system for making scientific careers, show that men do not see any serious obstacles that would hinder their careers. Discussing obstacles for the scientific career that are more common for women-scientists than men-scientists, interviewed men-scientists pointed out to *“differences of woman and male roles in the society”* (male, Chemistry_2, professor, age 51-60), *“different preferences of men and women”* (male, Mathematics, assoc. prof. 41-50), *“differences in access of possibilities for men and women”* (male, Chemistry_1, professor, age 51-60). According to the data, it could be said that men-scientists think that the science system provides equal opportunities for men and women, however, different roles of men and women in family that prevail in the society, weak orientation of women towards higher income, different access to possibilities slow down and hinder careers of women-scientists.

Reasons why women do not choose career in sciences

Women-scientists were asked *“Why so few women choose sciences and scientific career?”* The answers to this question mainly show the domination of psychological or biological aspects that are natural differences between men and women.

Respondents think that abilities for sciences are inborn and more typical for boys than girls. Girls are supposed to be *slower in thinking or more shy* (Physics, researcher, age 31-40), *lacking logical mind* (Physics, chief researcher, age 51-60), *more fit for philology* (Chemistry, assoc. professor, age 41-50). So it is believed that women are naturally less keen on sciences.

However, women-scientists also indicate other causes that are not related to natural or biological differences between men and women. These are:

The work in sciences is very hard. Irrespective of the field of study, women-scientists state, that work in sciences is very hard and wasting. It requires much struggle (*“you have to invest much struggle, work, brain”* (Chemistry, assoc. professor, 51-60), *time* (*“our profession requires much time”* (Biochemistry, researcher, age 51-60) and be totally devoted to it. Still women have many responsibilities in the family and society, so they decide to devote themselves to sciences rarely.

The decision depends on school experience. The disinclination for sciences is being shaped in schools (*“everything depends on school <...> in school it depends on teachers”* (Physics, chief researcher, age 31- 40). The respondents believe that schools create the attitude that girls are not suitable for sciences; they are not encouraged nor even discouraged to choose sciences. It is worth noticing that such opinion is more typical for women in physics. This could be explained by the fact that physics is considered to be the most masculine and the hardest field even among women-scientists (*“Physics, for example, is really a hard science”* (Chemistry, researcher, age over 60).

Women are satisfied with lower achievements than men. Women vacate sciences earlier and are satisfied with lower positions than men (*“women get slacked earlier. Like, I don’t know, get tired of learning or something”* (Biochemistry, doctoral student, age 21-30). This feature is also linked

to the natural differences between men and women. *“Women have more responsibilities and less time for sciences, so they lag behind men-scientists. They are also less militant, ambitious”* (Astronomy, researcher, age 31-40), society expects less from women than men (*“maybe society demands less – she’s a woman, so it is enough for her”* (Biochemistry, doctoral student, age 21-30)).

Negative attitude towards women in sciences from the society. Women-scientists notice that the general opinion in the society is that a science is not a place for woman (*“society has an opinion that science is not women’s business”* (Biochemistry, doctoral student, age 21-30)). So there is a pressure from the society that deters women from seeking a career in sciences (*“it means there is a pressure from the surroundings”* (Mathematics, assoc. professor, age 41-50)). That is why girls who are keen on sciences choose more feminine jobs like law, economy, etc.

Talking about the reasons why women do not choose careers in sciences several exceptional opinions could be noted. Nearly all of them are typical for mathematicians.

Sciences are dangerous or poisonous. This opinion is directly related to chemistry and laboratorial experiments held in it. People have to work in dangerous conditions with toxic materials that should be especially important for young women. Women evaluate risks for their children and do not choose such fields or jobs (*“I still think that only a man should be a chemist. It is poisonous”* (Biochemistry, professor, age 51-60)).

Women are not encouraged. Girls who study exact sciences are not encouraged choosing a scientific career. Even the most talented girls are usually ignored and not encouraged to seek something more in science. (*“Talented girls are not encouraged seeking a scientific career”* (Mathematics, lecturer, age 31-40)).

The title “exact sciences”, “physics”, “mathematics”, etc., deters girls from choosing this field of study. The problem is that those fields of study have a bad image in the eyes of society. Usually people think that those sciences are too tough, unexciting, boring and girls are afraid of choosing them. (*“That title <...> it maybe deters girls”* (IT, lecturer, age 31-40)).

There is a lack of women in exact sciences as it was always dominated by men. Men were the greatest personalities in all spheres for ages so respondents make assumptions that women are not gifted. Yet women do not raise a point that in history women were forbidden to hold certain positions or to participate in certain public activities. (*“In all times <...> men were the greatest personalities. In all times and all spheres – art as well as exact sciences”* (IT, junior researcher, age 31-40)).

Women do not choose exact sciences as they want a sapid life. Such life is associated with free time, spent with family and children. While men scientists distance themselves from such things and work in isolation. *“Women, however want to go out after all with children as well as family, their life is more sapid I’d say”* (Mathematics, chief researcher, age 51-60)).

The interviewed men-scientists emphasize natural, biological, gender differences between men and women in their answers to the question “Why so few women choose sciences and scientific careers?”. In this regard, their attitudes are similar to the attitudes of women respondents. However, it is worth mentioning that *“younger men- scientists attribute low representation of women in sciences not to biological differences but to the stereotypes prevailing in the society”* (male, Informatics, doctoral student, age 21-30), *“traditional social order, attitudes in sciences”* (male, Mathematics, assoc. professor, age 41-50).

Discrimination of women in the science system

Some aspects of discrimination of women in sciences were mentioned above in the chapters about equality of work assessment standards for women and men, possibilities to hold key positions by

men and women. Women-scientists were asked to evaluate if women are discriminated in the science system, in order to reveal the extent and means of discrimination in sciences.

Women-scientists agree that discrimination in the science system is the problem of personalities, but not the system or field of study as a whole. It is stressed that all acts of discrimination are related to certain, well known persons in the institution and it is *a problem of individuals, but not a global problem* (Physics, chief researcher, age 51-60). Such cases are quite rare, but still *there are, for example, one or other scientist, who thinks that if she is a woman, she can't be a good scientist* (Astronomy, researcher, age 31-40).

On the other hand, there are some formal aspects of the science system that create discrimination. Such aspects are related to rules, regulations and decision making processes in the science system. Most of them could be evidenced in the process of position distribution through election or competition. It is noticed that when men dominate sciences the decisions they make are favorable for men and women usually do not have possibilities to hold key positions.

In the competition there is very hard thing for me, as from two equal candidates, when one of them is a woman and the other is a man, a man will always be the winner (Physics, researcher, age 31-40);

They think of various reasons why they do not accept you now, later, when you come for the second time, somebody has taken the place and, of course, it is not a girl but a boy (Physics, lecturer, age 31-40).

Solidarity and unity are more inherent for men as a group than women according to the respondents. Women are not united and do not help each other, also some acts of discrimination can be noticed in their groups (*It is strange, but sometimes there is more competition among women* (Biochemistry, researcher, age 51-60)). On the other hand, men more often hold higher positions as they are more mobile, that is, they are not constrained by family as *he won't have a situation that your child is sick and you can't depart somewhere* (Biochemistry, professor, age 51-60). Women do not have the possibilities to hold key positions and have no starting positions or possibilities to rise.

One form of discrimination is the unfair work assessment system. The problem lies in the fact that only a part of a scientist's work is taken into account. Usually, the aspects of work that are more typical for women (such as relations, communication, quality of communication with students, quality of lectures) are not taken into consideration. While aspects of work that are more important for men (publications, achievements, breakthroughs) are the main criteria for assessing the work of a scientist.

Nearly all of the respondents state that they have never experienced discrimination in the science system directly. They have never been discriminated, haven't heard about such cases in their institutions or the science system as a whole. However, the discrimination in the science system could be traced in the informal or indirect expressions during the interviews.

First of all, there are expressions that indicate that women have to be more "militant", "struggle", "get used to jokes", and "have a thick skin" if they want to be ranked and acknowledged equal to men in sciences. Second, it is emphasized that women are not discriminated in the "real science", but, such science is rare. It is concluded that among scientists *who just do their job* women are discriminated one way or another (*When two grey scientists are in competition, the situation of a man is better because of the tradition*. Mathematics, chief researcher, age 51-60). Third, discrimination could be traced in the expressions that women are usually headed by men. It is stated that men help women-scientists to make a career, to go abroad, etc, as if women needed help, support from the outside (usually men) and cannot make a scientific career on her own.

Women, they make their careers normally. And they are headed by those young, energetic, pleasant professors, who have connections, careers, help [women], go abroad, do

something (Chemistry, assoc. professor, 51-60)

Those women-scientists, who have experienced discrimination in the science system, pointed such cases of discrimination:

Women-scientists are evaluated according to their beauty. In this case, a beautiful woman is considered to be a bad scientist and an unhandsome woman both bad scientists and ugly woman (*If you are an ugly scientist, so you are an ugly scientist. If you are beautiful scientist, you are a goose. (Biochemistry, doctoral student, age 21-30)*).

The achievements of a woman are shown as lowest requirements for a man. There is an opinion that a man should manage things that can be made (or was made) by a woman. So it is said for men *if she managed to do this <...> you [man] can do it also. She overcame this, so you will overcome this too. (Astronomy, doctoral student, 21-30)*.

Women are considered to be assistants for men, but not partners equal to them. Men who have such opinion usually think that women are satisfied with lower positions in sciences as they are supposed to help men *do real science* and make important research. *There are men who think that women are just auxiliary or operating personnel (Physics, chief researcher, age 31- 40)*.

Women in exact sciences have to stand jokes and sneering from men colleagues. Such sayings, although in the form of a joke, are considered to be insulting and intolerable by women-scientists. For example, *"I would give her a nine as her skirt was much shorter" (Physics, researcher, age 51-60)*, *"Our university doesn't need women" (Mathematics, assoc. professor, age 41-50)*, *"You are a woman, you have to hold your place, that quiet, nice place, not to fight" (Biochemistry, researcher, age 51-60)*.

Talking about discrimination of women in the science system, men-scientists expressed more emphatic opinion than women-scientists and stressed that there are no cases of women discrimination in their scientific institution and they have never heard about such cases anywhere else. Only one of the interviewees pointed out, that discrimination of women exists in science "for the time" (male, informatics, doctoral student, age 21-30).

Public discussions about discrimination of women in sciences

One of the topics in the research was the question of public discussions about discrimination of women in sciences. Women-scientists were asked to evaluate if there were any public discussions on discrimination in their institutions.

There are no public discussions on women discrimination in scientific institutions. If there are any discussions about discrimination they are very rare or exceptional. Such cases are directly related to the foreign experience (*a woman who worked for a long time abroad, there was such a discussion, that is, the round table among women at our place. (Biochemistry, researcher, age 51-60)*) or disputes of specific cases of discrimination (*when there is voting women have less chances to win than a man <...> so we really talk about such discrimination. (Biochemistry, professor, age 51-60)*). However, problems of discrimination are not discussed in public.

The answers about public discussions on women discrimination in scientific institutions could be grouped into several categories:

The problem of women discrimination has not been discussed in the scientific institution yet. *"To date this was not discussed in public. It has not been talked about at all" (Physics, researcher, age 51-60)*

The public discussions about discrimination of women in sciences has not been heard or known by the respondents. *"I haven't heard about this" (Mathematics, assoc. professor, age 41-50)*

The public discussions about discrimination of women are conceived as feministic activity and, therefore, negative by the respondents. *"I do not discuss on that matter and I do not engage in*

feministic activities anyhow” (Astronomy, chief researcher, age 41-50)

The discrimination of women in sciences is presented as a joke, but is not taken for granted or discussed seriously. *“As the press writes much about this, and all, sometimes we make jokes of it” (Mathematics, chief researcher, age 51-60)*

The problems of women discrimination in sciences are not discussed and every woman has to deal with the actual acts of discrimination on her own, individually. *“I told him to stop making jokes as my personal life is my own business. And it fell silent somehow” (R21, Astronomy, 27)*

It is worth noticing that women in leading positions are more skeptical about public discussions on discrimination of women. They either deny the necessity of such discussions or do not attach importance and make little of these discussions.

Policy actions for encouraging women’s active participation of in sciences and HT

The agents of inequality solving in science

Women-scientists were asked *“Who should solve the problems of gender inequality in sciences?”* There was also an interest to find out whether women are united enough as a group and could trust each other in discrimination solving matters and would not switch sides under pressure.

It can be noticed that there is no solid opinion about agents of inequality solving between men and women. Three main trends could be drawn on the ways of inequality solving:

The problem should be solved on all levels at once. Women themselves, the science institution and the state should be the agents of inequality solving. *“The problem should be solved on all levels” (Physics, researcher, age 31-40).*

The solution line should proceed from the bottom to the top. The main argument to this opinion is that the solution should be proposed by women themselves. They should be the first to declare the problem of inequality or discrimination and should be more active, organize special groups, committees, raise this question in public. The active movement of women in sciences should affect the institution and its position and only then the state. *“If they won’t be on a move themselves, so nobody will do anything for us. And then the movements started, I think, something should be done on the level of the governments as well” (Physics, researcher, age 51-60)*

The solution line should proceed from the top to the bottom. The state should be in active position and it should solve the problems of women discrimination in sciences. This should be done by regulating the law system (adjusting it to the requirements of European Union), strengthening family values, fostering respect for women. The state should invoke the mass media for shaping the public opinion of the society. *“Maybe those attitudes start from the state. The equality or inequality of men and women. Form the state, form the authority it starts. But later it gets down” (IT, junior researcher, age 31-40)*

It is worth noticing that women-scientists are afraid of speculations on discrimination and disagree with manipulations on inequality for getting better or higher positions. They fear that less talented women can use the motive of discrimination as a means of getting higher positions.

The question is slippery <...> I wouldn’t want speculations on this problem, then a much weaker woman would get a job just as she is a woman. (Mathematics, lecturer, age 31-40).

On the other hand, it is noticed that women are afraid solving the problems of discrimination. As *“they think that maybe it will be worse for them from this” (IT, junior researcher, age 31-40), they are called “feministic” (Physics, researcher, age 51-60),* women usually do not let those problems

creep into daylight.

It is pointed out that the negative attitude of the society towards women-scientists is the result of the lack of information or education. It is proposed to provide more information on women discrimination, women movements and organizations, the situation of inequality in sciences and achievements of women.

The opinions of women-scientists differ talking about the unity of women as a group in discrimination solving matters. The answers could be divided into two main groups:

Women are united as a group and can trust each other. It can be applied especially to those situations when women join each other in discrimination solving matters. *"If only those women who are concerned with something and want to change something would team up, so, I think, of course, they could trust each other"* (Biochemistry, doctoral student, age 21-30)

Women are not united and can easily switch sides and choose the side of men. Women can trust each other only in the existence of a really strong friendship (*"you can trust only those friends whom you know very well"* (Chemistry, researcher, age over 60). Besides, women can discriminate or be in conflict with each other, and agreement is simply impossible (*"it happens that a woman discriminates a woman"* Physics, lecturer, age 31-40)

According to men-scientists, the problem of gender inequality should be solved on the level of the state. At the same time, men respondents expressed attitude that it is impossible to achieve equality between men and women, because *"only women could give birth"* (male, Mathematics, professor, over 60). Nevertheless, *the state must guarantee equal opportunities for men and women to make career in sciences* (male, Informatics, doctoral student, age 21-30)

Evaluation of measures for encouraging women in sciences

Women-scientists were asked to evaluate the measures for encouraging women in sciences and the decision making processes. The main interest was in evaluating the three measures – grants or scholarships for women, the quota system and a better support after maternity leave.

The interesting fact is that women-scientists are quite skeptical about all such measures. The approval is expressed on certain conditions (*"if that discrimination was real all the measures were necessary"* IT, junior researcher, age 31-40, *"if they are active but something obstructs them so all this would help"*, R17, Chemistry, 29, *"I would really be afraid, as well, what does it mean quota? <...> and besides who is going to set these quotas?"* (Biochemistry, professor, age 51-60), *"I am not against all measures if they need this themselves"* (Mathematics, chief researcher, age 51-60).

Meantime the disapproval of the measures is quite strong. It is stated that all attempts are artificial, unnatural and would only misrepresent the situation (*"This would be the unnatural encouragement"* (Astronomy, researcher, age 31-40), the applications of those measures is not a proper way out as the measures would only increase the inequality and discrimination (*"I think that this is just the harm for men <...> just the formation on inequality"* IT, junior researcher, age 31-40) and would be negative to the science system as a whole (*"I don't think that it would benefit the science system as a whole"* (Chemistry, assoc. professor, age 41-50)). There is even an opinion that such measures would be an insult for women whose abilities would be devalued because of the gender.

"I can't imagine how to realize this, that it wouldn't be an insult for women themselves" (IT, senior researcher, age 41-50)

Women-scientists think that application of such measures would be negatively valued among men and could even raise their resistance (*"I think, as it is said, they will get furious"* (Physics, chief researcher, age 31- 40). However, women also have plenty of arguments why such negative

opinion of men should not be tolerated.

Men have fewer responsibilities in our society so they can pursue their scientific careers without any retardation. As women have more responsibilities in the family and raising children they deserve a better support in work. *"Women really[...] just as they have to give birth to children and raise them. They do such job that men don't. Just for that they can be given something"* (Chemistry, researcher, age over 60). While men could say that such measures discriminate them only if they were equal contributors in the family duties.

Men have also the right to a better support if they take care after children during the paternity leave. The idea is that a support should be given to the parent who is going on the leave (maternity or paternity) and who has more duties in the family. If a father goes on the paternity leave and takes care after children, then he should be the one to get a support (*"Here I don't see any discrimination. Please, after paternity leave also the same it has to be postponed"*) (Physics, researcher, age 51-60). However, it is noticed that such situations that men themselves would want to be on the paternity leave and have more duties in the family are quite rare.

As measures of encouraging women are oriented towards promoting equality and equal conditions, men do not have the right to complain. It is very hard to achieve quality, so men should not complain if the measures are really supposed to promote equality.

A better support after the maternity leave was the most appreciated measure for encouraging women's activity in sciences and decision making bodies while the quota system was the most controversially rated measure.

Measures for encouraging more active participation of women in sciences and in decision-making processes were evaluated more negatively by interviewed men-scientists than by women-scientists. Men-scientists point out that it is not natural (male, chemistry_1, professor, age 51-60), it would be bad if women had better possibilities than men (male, informatics, doctoral student, age 21-30). Means for encouraging women are justified only in a case if they are temporary and funded not from common budget but from additional, external fund sources (male, chemistry_2, professor, age 51-60). Discussing means, men-scientists emphasized once more that these measures are not necessary, because there is no discrimination of women in science.

A. Grants and scholarships for the scientific careers of women

The introduction of grants was evaluated as a proper measure for encouraging women-scientists but the results achieved are valued skeptically.

"For women, well maybe it would be good, but I don't think that, I don't think that in the universities, if there would be announced about that, say some kind of foundation special for supporting women, that there were more physicists, I don't think that..." (Physics, chief researcher, age 31- 40)

Most of the respondents stated that in the existence of such grants they would try to get one (*"If it was like that, so I would take it at once with pleasure"*) (Mathematics, assoc. professor, age 41-50). However, it is doubted that women would be better scientists or there would be more women in sciences just because of the grants (*"But will it make women more scientists, I don't know"*) (Mathematics, assoc. professor, age 41-50)). The grant system would encourage women to participate in sciences more actively (*"if there were grants just for women, sure, the contests would emerge, the participation would be greater"*) (Chemistry, researcher, age over 60), but women who would enter sciences through the grant system are rated negatively by the respondents. Women-scientists are afraid of speculations when the grant would be main criteria for starting sciences (*"they maybe will calculate, that it is more worth for me to go to the exact sciences as there I will be paid a bigger scholarship"*) (Astronomy, researcher, age 31-40)).

There is also an opinion that grants would be unreasonable and are not necessary. The main

reasons are that the conferences or meetings for women are not solid or sound and inequality or discrimination should not be the main argument for profiting.

“Those grants are nonsense. So what that you stand up in the conference and start telling that here, my husband is beating me or here, I was called so in the institute. So you’ll be called somehow in the street, whom are you going to complain to then?” (Physics, chief researcher, age 51-60)

Therefore it is required that a better support should be distributed according to the abilities but not the gender. The gender should not be the main criteria for distributing the financial support.

B. Quota system

The quota system as a measure for encouraging women to be more active in exact sciences; it was evaluated contrarily. One part of the respondents approved the idea of the quota system and was actively supporting it; however, the other part categorically denied the quota system as a means of solving inequality in sciences.

- The answers about the quota system could be grouped as follows:
- The quota system is a suitable and applicable measure in the science system. As such the measure is successfully applied in the foreign countries it could be implemented in Lithuania also. “Of cause, quotas are a good thing. There in Scandinavia, Sweden <...> the program is implemented that more women would come to sciences. That is good.” (Astronomy, doctoral student, 21-30).
- The quota system in sciences would be unfair both to men and women. For women the quota system would be a burden when they would have to hold certain positions according to quotas even if they do not want it (“to do insistently so that women would go into sciences if they really do not want to, that would be the torture of women” (Physics, researcher, age 31-40). On the other hand, it is not doubted that there would be not enough women as it will be required by quotas (“Whatever the contest would be. There would be not enough of them” (Biochemistry, doctoral student, age 21-30). For men the quota system would be unfair if it prevents them from making a scientific career because of the gender. It would be an unequal contest if talented men would lose against the unapt women. “If the man can perform that work better than the woman but according to the quota the woman gets the job, I see no good in that” (IT, junior researcher, age 31-40).
- The quota system is an insult for women. They should feel inferior and diminished as it would be unclear if they got the position because of their abilities or gender quotas. “I’m against quotas. <...> For me it would be an insult if someone looked at me that I’m a woman and I get for this additionally. Maybe it is good, but psychologically it won’t be good” (IT, senior researcher, age 41-50)
- The quota system should be applied in the politics, business sector, but not in the science system. In sciences the quota system could be applied only to the administrative positions. (“When there is not one gender trade, committee or something else it is different” (Physics, chief researcher, age 31- 40). However, there is a problem again as if women didn’t want to hold the leading positions and they are forced to do so because of the quotas or if there are no suitable women for such positions, the quota system won’t work. “I agree the quota system should be implemented in politics. I agree that there has to be the special programmes for promoting business among women <...> but I absolutely can’t understand what special programmes could be for <...> women-scientists” (Mathematics, assoc. professor, age 41-50).
- The quota system is effective only in the initiative stage of the problem solving and can be

applied only temporarily. “The quota system is also a good thing leastwise in the initiative, initiative stage till, till the ice is broken” (Physics, researcher, age 51-60).

C. The support after maternity leave

The support after the maternity leave was favored by all respondents unanimously. Science has its specificity; everything tends to change; it is dynamic. Therefore a woman who breaks her scientific career during the maternity leave even for a short period loses her abilities, skills and she has to catch up with her colleagues-scientists later. Besides, women have more responsibilities in the family and child care so the better support in child care system and better possibilities to take care after children should be the main aspects.

Women-scientists distinguished several spheres related to family, maternity leave and child care which need special attention and greater support policies. These policies or measures can be grouped into two major clusters – related to the society as a whole and related to the scientific work.

The measures, related to the society as a whole are, first, improvement of the child care services. It is proposed to expand and improve the work of kindergartens. It is important *“that there would be a kindergarten where you could bring your child, leave him to the nurse and know that he would be safe”* (Physics, researcher, age 31-40). It is even proposed to organize half-day kindergartens near the scientific institutions or special rooms in the institutions where mothers could leave their children for a short time. However, the kindergartens themselves would not change the situation as the salaries in the science system are very low and women are not able to pay for the kindergarten or hire a nanny *“It is a need to improve that sphere, that more services were provided in this sphere <...> but for this people have to earn enough that they were able to pay for these services”* (Astronomy, chief researcher, age 41-50).

The second measure is the financial support for the young families *“Really material support would be for young, especially families”* (Chemistry, assoc. professor, 51-60). It should be implemented by the state, supporting young families and ensuring that they would not leave the country for better remuneration abroad.

Third, the formation of public opinion in that way that it would be normal for men to take care of children and use a paternity leave.

On the other hand, the measure related to the science system and scientific careers would be as follows:

First, the procedure of work assessment and attestation should be changed. This procedure should be sensitive towards the period of maternity leave, that is, the work assessment procedure should be postponed for the period that is equivalent to the break at work. It has to be noted that the same procedures should be implied to men after the paternity leave as well.

“Five years have passed and a contest <...> if you were on the maternity leave for one year or three years, so three years have dropped out. <...> let's say, for the person after the maternity leave, well, at least some five years to let work and show what he is able” (Physics, researcher, age 51-60).

Second, a better support for going on the traineeships or conferences. Women should be encouraged to improve their abilities, to involve actively into the work after the maternity leave. *“She has to have the priority getting support for going to the conferences or other traineeships if she has the possibility to leave a child somewhere”* (Biochemistry, professor, age 51-60).

Third, the creation of possibilities to combine family life and work. A woman should be encouraged and allowed to work during the maternity leave or to come back to work earlier. However, now in Lithuania *“there is no somewhat good system that encouraged you to come back*

earlier form the maternity leave" (Biochemistry, doctoral student, age 21-30). After the maternity leave women should be allowed to work shorter hours or other ways (e.g. At home), without losing the pay.

D. Discussions as an alternative to the measures for encouraging women

One of the research interests was to find out if women-scientists favor the discussions about equality of men and women in sciences, if they are ready to participate in such discussions and what is their opinion about the outcomes of such discussions.

It is concluded that women do not favor the temporal measures for encouraging women in sciences. Those measures are considered to be unnatural, artificial, or radical. A more moderate way of inequality solving through the discussions would give better results. *"It's necessary to talk, of course. And now about those purposive means, I don't think, that they should be"* (Biochemistry, professor, age 51-60).

On the other hand, women who encountered the real acts of discrimination are negative towards these discussions. They think that discussions are not worthy, value them with contempt and relate it to feminism (Physics, lecturer, age 31-40).

It is stressed that all discussions have to be public, address to and change the opinion not only of men but the society as a whole (*"everything has to be public, not just set from above"* Chemistry, researcher, 41-50). Women state that with the change of the society's opinions about sciences, women, women-scientists and women in exact sciences the possibilities of women and behavior of men would change also.

Although the discussions are considered to be the proper measure for solving discrimination yet only a small part of women-scientists would agree to participate in them. The main arguments for disagreement are:

- Fear – "I would be afraid of that anger, that I'm displeased with something" (Mathematics, lecturer, age 31-40). The most feared things are negative reaction, increased discrimination and inequality. In some of the answers the aspect of fear is not expressed but the probability of negative reactions is also stressed. In this situation the participation in public discussions is avoided as long as it is possible.
- Poor knowledge of the problem – "I don't feel that I have looked into this question" (Physics, researcher, age 51-60). Women do not agree to participate in discussions as they do not know the problem enough or do not have proper arguments. Yet, if there were more information about discrimination and inequality, the idea of participation is accepted.
- Absence of discrimination – "I don't see the problem. There is nothing to discuss here" (IT, junior researcher, age 31-40). The possibility of participation in discussions is unventilated as inequality of women in sciences is not seen as a problem. It is thought that there is no inequality, so discussions are unnecessary and pointless.

Women who agree to participate in discussions are not strongly decided. Instability of opinion could be noticed in the doubt (*"maybe I would agree"* (Mathematics, lecturer, age 31-40).) and other conditions for the participation (*"I could if I saw a problem"* (Biochemistry, doctoral student, age 21-30), *"if there were a concrete talk every time"* (Biochemistry, researcher, age 51-60)). It is also noted that respondents would not go into unpleasant discussions (*"I wouldn't go into such unpleasant discussions"* Chemistry, researcher, 41-50) and would avoid extreme measures, would not sacrifice for others (*"To sacrifice for some kind of put-upon person <...> I wouldn't take such steps"* (Biochemistry, professor, age 51-60).

E. The proposals for encouraging women in sciences

Women-scientists were asked to voice their proposals for the encouragement of women to

participate more actively in sciences or leading positions.

All proposals were grouped into several clusters and five different ways of encouraging women in sciences were separated:

1. To start from school. There should be no orientation to masculine and feminine jobs or works in schools. The same orientation should be diminished in the society as well. As a result, children would choose their “real” interests, the interest of girls in sciences, technologies or exact sciences would not be suppressed, more women would be educated as leaders. *“It has to begin from the start, that is not to suppress the interest of girls in technical things. <...> Leadership is always suppressed in girls, if it wasn’t suppressed, maybe there would be more women leaders”* (Physics, researcher, age 31-40).
2. To improve possibilities to combine family life and work. Women acknowledge that a family *“reduces a woman’s chances of becoming a scientist when she has to raise a child”* (IT, junior researcher, age 31-40). Family creation and nurturing of children are the main obstacles for the scientific career and requires the most attention.
3. Only those women should be encouraged who already have motivation to seek a career – *“Those women have to be encouraged who have their own motive, maybe lack safety, maybe they need to be encouraged, supported”* (Mathematics, lecturer, age 31-40). Whereas those who choose family life and do not want to seek the administrative positions do not need the encouragement. The encouragement of motivated women should manifest in financial and material support and improvement of work conditions (*“to help to be a better scientist, then she needs help in finding books, she needs help in finding opportunities”*) (Mathematics, assoc. professor, age 41-50). It is stressed that such encouragement as *“to help people to be a better scientist”* is essential to Lithuania and its science system.
4. To provide more information about the opportunities of scientific career – *“It needs to educate more, to explain more”* (Biochemistry, senior researcher, age over 60). Usually women lack information about opportunities in seeking a scientific career, possibilities to go abroad or receive a scholarship but not the motivation, recourses or abilities. That is why women need to get more information about such opportunities of the scientific career.
5. To even the pay for men and women. As women’s salaries are lower than those of men, *“so work of women is evaluated less, as I understand”* (Biochemistry, doctoral student, age 21-30). So the first thing to do is to even the pay for men and women and then start raising pay in the science system since now *“the salaries are really small”* (Chemistry, researcher, age over 60).

Attitudes of men-scientists towards encouragement of more active participation of women in sciences varied. Some interviewees stressed, that women should be more encouraged to study sciences (male, chemistry_1, professor, age 51-60), others denied necessity of it (male, chemistry_2, professor, age 51-60). It was also pointed out that women should be better informed about possibilities of making careers in sciences (male, informatics, doctoral student, age 21-30). In general, men-scientists expressed similar attitudes towards encouragement of women in sciences as interviewed women-scientists.

F. The encouragement of girls to study exact sciences

Women-scientists were asked if they approve of the encouragement of girls to study exact sciences and seek scientific careers.

Admittedly, women-scientists are very skeptical towards the encouragement of girls to study exact sciences. It is proposed that exact sciences should be chosen only by those, who: A) have the abilities in exact sciences; B) are self-determined to study exact sciences; C) are interested in sciences and scientific careers.

Three main opinions about the encouragement of girls can be singled out:

1. There is no need for the encouragement if girls do not want to study exact sciences – *“if they do not want, so we don't need to force that more girls should come to science”* (Physics, chief researcher, age 31- 40). The able and self-determined girls would choose exact sciences themselves. While girls who are not able for the exact sciences should not be encouraged as it does harm to the quality of sciences and lowers the rating of women in sciences.
2. There is no need for the encouragement as the person has to decide what she wants in life herself – *“I'm always for the idea that a person should choose that sphere where he/she would be able, which is close to his/her heart and which would bring him/her most pleasure”* (Physics, researcher, age 51-60). This is applied both to the choice of the field of study and to seeking the scientific career. As far as it is the individual and personal decision, no one has the right to interfere it.
3. Everyone has to be encouraged – *“Both boys and girls have to be encouraged <...> and without waiting or leaving for tomorrow”* (Chemistry, assoc, professor, 51-60). As the science system looses the young talented persons (both girls and boys), less and less people choose scientific careers, the encouragement should be directed towards everyone despite their gender. The encouragement to choose exact sciences should also be implemented because of a weak specialization in the science system. There is a situation that students choose only few popular professions, while others remain half empty. *“Generally people have to be encouraged to specialize a bit, as economy and law are not the only sciences”* (Biochemistry, doctoral student, age 21-30)..

There were several exceptional opinions about the encouragement of girls to study exact sciences and choose the scientific career.

- Girls have to be assured and encouraged but not stimulated (Biochemistry, professor, age 51-60). This means to teach to be more active, aggressive, to stand for their opinion, to fight for their positions.
- Girls have to be introduced to sciences but not encouraged – *“it's better to present the possibilities, well, what it is, what is the future, where you could work after studies in exact sciences”* (Mathematics, lecturer, age 31-40). As many young people do not realize what the real science or a scientist is and what they usually do they should be interested in sciences generally (but not the study field itself).
- Boys have to be encouraged – *“We somehow maybe need to encourage boys as the situation here is also not quite easy”* (Biochemistry, researcher, age 51-60). Women who work in chemistry notice the low activity of boys and propose to encourage boys particularly, not girls.

The service of women in exact sciences

One of the research interests was to find out the service of women in exact sciences for the state, society and science itself. The respondents were also asked what changes they would point out if women-scientists would constitute one third of the labor force.

The participation of women in science is beneficial as it reveals the abilities and potential of women – *“for the society it is that women show that they can do everything as well”* (Chemistry, researcher, age over 60). It is very hard to show these abilities and potential in sciences that are dominated by men as women are underestimated, devalued or deprived. Therefore the increase of women number in exact sciences would let uncover the abilities of women.

It is admitted that participation of women in sciences is beneficial as it balances the work of the collective, as the *“best variant is the team, which is composed of man and woman”* (Physics,

researcher, age 31-40), the participation of women in sciences is the guarantee for equilibrium – *“mixed collectives would be the best”* (Biochemistry, researcher, age 51-60).

Still, women-scientists are very conservative in judging the idea that women could constitute one third of the labor force in sciences. A part of the respondents stated that this was hardly believable (*“I hardly believe in such things”* (Mathematics, assoc. professor, age 41-50) and thought of it skeptically. The question whether women want to be so active and seek career in exact sciences was also raised (*“But will women want, that is the question. Fine, we may thirty percent, but will women want?”* (IT, senior researcher, age 41-50).

It is worth noticing, that majority of the changes emphasized by the respondents are *emotional* or *aesthetical* in their nature. If sciences attract more women-scientists such key changes are foreseen:

- The atmosphere in work would get better. The relationships would be warmer (Chemistry, researcher, 41-50), friendlier (Mathematics, assoc. professor, age 41-50), the atmosphere would be healthier (IT, junior researcher, age 31-40), the communication would be less formal (Astronomy, researcher, age 31-40). Because of the changes in work atmosphere the quality of work and results would improve.
- Women would decorate the sciences. It is an opinion that women are necessary and useful in sciences *“as all flowers are important in the bouquet”* (Mathematics, chief researcher, age 51-60). The sciences would be decorated by women like flowers – *“men decorate the collective of women, women decorate the collective of men”* (IT, junior researcher, age 31-40).
- Men-scientists would be more gentlemanly. *“Maybe men-scientists would pull their socks up (laughing). As there are such openly collapsing ones”* (Biochemistry, doctoral student, age 21-30). They would take care about their looks, would change their behavior, tame their emotions – *“when they argue there and you come in, they begin to talk normally, but behind the doors you heard that there’s everything there”* (IT, lecturer, age 31-40), *“he even dropped smoking when I came here, as I don’t smoke, so he got tired walking to the corridor”* (Astronomy, researcher, age 31-40).
- There would be more orderliness. The work would be organized better and quicker, there *“would be more order there”* (Physics, chief researcher, age 31-40), the offices would be more tidy – *“I came to this office to [scientist X], so there was such, well, a mess, a total mess”* (Astronomy, researcher, age 31-40).

Such answers show the expressive thinking of women-scientists – the main accents were relationships, communication, atmosphere, tidiness, that is, the spheres of feelings and emotions. So, the assumption could be made that for women-scientists these aspects of work are very important for them and the quality of scientific work strongly depends on them. Yet, women-scientists acknowledge, that too much emotion at work is also faulty – *“such unnecessary how to say, speeches always are. Never will tell you what is wrong, but will do in all other ways, will go to the fourth persons”* (Physics, researcher, age 31-40).

Still, women-scientists also show an *instrumental* way of thinking, which stresses the accomplishment of exact assignments, performance in work tasks and changes in problem solving procedures. Such answers are more common to mathematicians than women in other fields of study. It is also worth noticing that such remarks are uncommon but more diverse:

1. The quality of lectures would improve. A woman is more related to pedagogical work as she is considered to be a better lecturer than a man so an increase of women in exact sciences would give the improvement of lectures and raise in quality of studies – *“the quality of lectureship would get better, maybe it would be better for the students”* (IT, lecturer, age 31-40).

- The society would be educated about the participation of women in sciences. The society would see that women have abilities in sciences and possibilities to show their competence, women-scientists would educate their daughters who could later choose career in sciences. *"If there would be more women and they had children, girls, maybe women could encourage their children, girls, by their example. Well, maybe the thinking of the society has to be changed"* (Mathematics, lecturer, age 31-40).
- The questions in sciences would be raised anew. Women-scientists view the same things, objects of study differently, they would look at them anew, propose new ideas, accent different aspects. This could make the science more diverse, there would be more new achievements or findings. *"if there were a bit more women so maybe they could see all problems differently, obviously, purely just as god gave them more potential to see details"* (Mathematics, assoc. professor, age 41-50).

The discriminatory attitudes in the answers of the respondents could be distinguished also speaking about the benefit of women participation in sciences. Such attitudes could be traced in the answers that *"there should be women, but men should dominate this sphere"* (Biochemistry, professor, age 51-60) or that sciences are *"more fit for men"* (IT, senior researcher, age 41-50) than women. That is why more participation of women in exact sciences is not valued and even denied.

According to men-scientists, more active participation of women in sciences would hardly change anything. Interviewed men-scientists pointed out such aspects: "women better fit to do accurate measurement" (male, mathematics, professor, over 60), which could increase quality of work in research fields where such accuracy is required; women would contribute to diversity in sciences (male, Informatics, doctoral student, age 21-30); women could better realize themselves (Mathematics, assoc. professor, age 41-50). It is worth pointing out, that attitudes of older men-scientists reveal evaluation of women as inferior to men, more suitable for works requiring accuracy, in the role of an assistant, while younger men-scientists speak about equality, possibilities of women to realize their potential, contribution of women to science.

Interim conclusions (summary)

The science system creates obstacles for the scientific career. Most of them are related to bad attitude towards sciences or scientists from the state and society which results in the lean sponsorship. Underfinanced science system aggravates scientific research, possibilities to get the newest scientific literature or competitive abilities of the scientists. The possibilities of seeking scientific career in the science system are not equal for men and women. As women have much more duties in our society, the science system should pay more attention to the integration of new ways for child care.

Two opposing opinions about women in exact sciences could be drawn. The first implicates the difference of inborn abilities in exact sciences between men and women. That is, women are keen on humanities, while men are more interested in hard sciences. So a small number of women in hard sciences is a natural phenomenon. The second opinion states the construction of interest in sciences of women and men at school. Teachers imply that girls should be interested in one area(usually humanities) and boys should be interested in different areas(usually exact sciences), so children construct different abilities in those spheres according to their sex. If the construction of abilities at school will be stopped or controlled, children could choose what they really want and the number of girls in exact sciences would increase.

Women don't choose the career in exact sciences because of the hard work, negative attitudes towards women in exact sciences from the society, and the need to spend more time with the

family or children. The expectations of women-scientists in our society are much lower than those of men, and women are not stimulated to seek scientific careers. A bad image of hard sciences in society is also highlighted. They are supposed to be theoretical, “tough” and uninteresting.

Women are discriminated in the science system. However, the experience of discrimination is not pronounced and could be traced only latently in the interviews.

The discrimination in the science system should be associated with indefinite legislative system and vague decision-making processes when decisions are made in groups composed of men. The unfair labour assessment system which is more favourable to men scientist (some aspects of scientific labour aren’t taken into account – lectures, their quality, supervising students, relations with students) is also highlighted.

Discrimination in the science system is treated as a problem of personalities, but not the science system as a whole. The discriminatory actions or attitudes are associated to the few men-scientists who are well known for their stand in the scientific institution.

The evidence of women discrimination in the science system are jokes or direct expressions about women in sciences, the association of women achievements with their appearance and unvalued labour of women-scientists.

The agents of inequality solving should involve all possible levels the state, society and women-scientists. However, there’s a lack of clear understanding who should initiate the inequality solving debates. A part of the respondents gives preference to the state that has to educate the whole society on the equality matters. Another part of the respondents indicate the responsibility of women in sciences who should be more active and give publicity to inequality problems.

The inequality in sciences and negative reaction towards problem solving attempts (comparing to radical feminism) are related to the low information level about these problems. Women in sciences propose to educate society about inequality in sciences and feminism through the mass media.

There are two opposing opinions about solidarity of women-scientists. The first maintains the solidarity of women-scientists and reliability in inequality solving processes. The respondents believe that women should be more active in creating organizations that deal with discrimination in sciences. The second opinion states the division of women and their unreliability in the problem solving activities. It is believed that women can easily switch sides in the face of difficulties or danger and favour the position of men. Taking this into account the agent of inequality solving should be external – the state.

The problem of women discrimination in sciences is not debated publicly. The debates on these problems are exceptional, usually then women confront real problems and obstacles or have round tables with scientists abroad. Mostly the questions of women discrimination are not raised, inequality problems in sciences are presented as jokes and real situations of discrimination are dealt with individually by women themselves. Women in leading positions have a more skeptical opinion about public debates on discrimination of women in sciences then other respondents.

The implementation of policy actions which encourage women-scientists to make career in sciences or seek administrative positions in the science system is treated skeptically. There is a quite strong disapproval of such policy actions, while approval is with reservation. The main conditions for the approval of such actions are – if the discrimination is real, if it is a need for those actions, if women are active enough, if it is only an aspiration, but not the rule and etc. The disapproval is motivated by the negative outcomes to the science system, the increase in discrimination or inequality, unnatural nature of such policy actions and even insulting women or threat for their self-respect.

The most favourable policy actions are associated with better support after maternity leave, while the quota system met with contradictory opinions.

The scientists support such policy actions as grants for woman scientists, but they question the

efficiency of such actions. They argue that grants can be useful and used only for women that participate in the science system already, but not for increasing the number of women to the hard sciences. The latter way could raise more problems than advantages. The most fearful disadvantage would be the increase of inequality and discrimination of women in sciences. They believe that grants or scholarship should be taken by the best candidates according to the results but not to the gender.

Scientists have two contradictory opinions about the quota system. The first supports the idea about the quota system as a relevant policy action in sciences. However, it is agreed that this system can be applied only to the administrative positions – Councils, Boards and etc. The quota system should also be temporal, transitional or a starting-point in policy actions. The second opinion denies the quota system as a means of encouraging women-scientists to make career or seek administrative positions in sciences. It is understood as unfair for men as well as women. It will be involuntary for women as they will be forced to hold certain positions despite their unwillingness. From the position of men it will be unfair as they will be unable to hold positions despite eligibility.

Scientists agree that a better support after maternity leave is the best policy actions and should be implied in the science system. Women need more support as they have a break in their career and have to rebuild their abilities. However, the policy should be associated with the child care, but not gender – it should be the same for men after the paternity leave.

The support after maternity or paternity leave should manifest in such spheres. First, the system of labour evaluation or attestation should be changed, taking into account the time in the maternity leave. Second, women should be encouraged to return to work, to have special courses, ability training, etc. Third, young families should receive a better financial support. Fourth, child care facilities should improve, they should be near or in the scientific institutions.

Discussions about inequality or discrimination are supported more than the implementation of policy actions which encourage women in sciences. However, the scientists who have felt strong discrimination in their work careers support policy actions better than discussions.

Women are not ready to participate in debates about inequality in sciences. They are usually afraid of negative reactions from men as well as from women, they are not sure about their knowledge on inequality and don't see the discrimination problem in sciences. Women, who agree to participate in debates, are not strongly self-determined.

Women-scientists do not support the idea of stimulating girls to study hard sciences. The main criteria for choosing hard sciences should be interest and abilities. Girls should be informed about studies and possibilities, nature of work but should not be stimulated.

The participation of women in sciences is seen as very beneficial in several aspects. First, it reveals the abilities and uses the potential of women. Second, it balances the work of a collective – working in a mixed collective is best. It must be noted, that women-scientists indicate mostly emotional and aesthetical changes if women compose one third of labour force in sciences. Most of them are associated with creating the atmosphere, relations, communication, and tidiness. Also, women could improve lectures and relations with students, educate the society about women in sciences, and raise new questions in sciences. However, the idea of one third of women in exact sciences seems unreal and even impossible. The question is raised whether women want and are able to participate more actively in sciences and especially in hard sciences.

II.2.4. Women discrimination in sciences from the perspective of management and organizational ethics.

The research conducted within the framework of BASNET definitely confirm that women discrimination in science exists. The respondents witness various forms of discrimination. Yet, the facts of the survey participants' discrimination are interpreted ambiguously.

The majority of the respondents are unaware of the definition of discrimination, they don't even identify it even when definitely note that another criteria of employers assessment prevail instead of qualification and competence.

Discrimination is often reduced to evidently aggressive behaviour, to obvious drawbacks for some person to perform his work; that is why these respondents deny existence of discrimination. However, this only relates to the unawareness of the criteria of discrimination phenomena and inability to see its indications. A part of respondents that initially denied discrimination when trying to articulate/to consider definite cases during interviews gradually came to recognition of the very fact of the existing of discrimination. It is obvious that raising a question, narration (confiding) of some cases help to realise a problem. However, it mainly happens to the women, who have undergone discrimination. Often women "invent" for themselves that the resentment they experienced in their scientific careers before familiarizing with the definition of discrimination. *"Q: Do women experience discrimination at work? A: Yes, they do. Q: Where can you find its evidences? A: In unequal assessment and unequal working conditions" (Physics, researcher, age 51-60); ... "Only if equal conditions are reachable...As I said earlier it would be too difficult to establish equal conditions" (Physics, lecturer, age 31-40); "Women have less chances to get through than men" (Biochemistry, professor, age 51-60).*

The respondents by their answers to some questions demonstrate narrowness (tunnel vision) of their approach to this phenomenon, when they fail to grasp the very fact of inequality (unfair assessment, lack of universal criteria), even when the latter was definitely established. There are people considering inequality of men and women as a norm, or as "subjective" opinions, but not as a fact of the norm/standard (law) violation. There is a situation when formally adopted norms (discrimination banning laws) have not become valid yet.

The BASNET research confirm the hypotheses that women discrimination in sciences is banned only de jure, yet it exist de facto. Respondents maintain that formally (documentally, publicly) there is no discrimination, while in academic structures it really takes place. It exists in spite of the fact that universities are subject to the laws of the country and signed both specific documents and common for all organizations acts (e.g. ILO International Labour Standards, EC Labour Law, UN Conventions on Human Rights etc), which forbid discrimination *de jure*. At this point we face the problem that academic structures are not the organizations of integrity. Obtained facts confirm: their statements (official declarations of values, publicly undertaken obligation, and formally signed documents) contrast with their real deeds: unchanged managerial models, faulty practices. Required modern organisational processes and procedures have not been introduced yet or properly observed. In practice academic structures ignore some of their declared values.

Though a part of respondents mentioned that "people compete with each other by their work results and the level of professionalism", they still often admit that it is true "only formally", while, in fact, women are firstly assessed by gender and not by the results of their work performance. That is why men always take priority. The majority of respondents (even those who deny women discrimination in sciences) emphasize that women must work hard to be at least marked for it: *"under the public opinion which is taking place now [women] must really work extra" (Physics, researcher, age 31-40). "In a contest for a vacancy...between a man and a woman, even if the candidates are absolutely equal, it is a man who always wins" (Astronomy,*

chief researcher, age 41-50). *“As to me, I faced it many times. Indeed, it would be easier to compete if I were a man. The resistance to my [candidature] is sometimes more acute due to the fact that I am a woman (Mathematics, lecturer, 31-40). However, sometimes women themselves support deeply-rooted stereotypes saying that “men should dominate in this field” (Biochemistry, professor, age 51-60); “this occupation is more suitable for men” (IT, senior researcher, age 41-50).*

In the questionnaires respondents described several cases about how the dual standards were applied to men and women how women failed to hold definite position in the organisation by objective criteria, while a man can take up the same post even if it violates these criteria/requirements established for all. A part of respondents maintain that *dual standards definitely exist (Mathematics, lecturer, 31-40)*, that *“women’s labour is underrated” (Biochemistry, doctoral student, age 21-30)*, that *the results of job performance comparing to that of men’s are degraded a priori (astronomy, doctoral student, age 21-30)*, that holding definite position on the career ladder is directly sex-dependant, that in the collective of scientists men always gain advantages: *“Well [in my office] I was offered to work only part-time from September, while a guy, young scholar, which is coming back from America, was offered to work full-time. I do not know if it only for a year or for five years, though I would agree even for a year. All depends on bosses that meanwhile offer me only half a year part-time employment. Formerly I was offered to work instructress only after I have defended my Ph.D. thesis, while today there are men that work [here] as lecturers having no Ph.D. Yes, there are some men like my colleague that teach to undergraduate students having no Ph.D. I cannot imagine that somebody could let me instruct students having no my Ph.D.”. (Mathematics, lecturer, 31-40).*

Though such grievances are rather subjective, nevertheless their pronouncement is stipulated by definite fact, i.e. by violation of objective criteria and the principle of universalism. Due to deep-rooted derogation of subjective opinions (perception) determines the situation when some respondents feel uncertainty witnessing facts of discrimination and are excited as if they have no evidences or a discrimination is only is only their personal concern and a single trouble: *“Only non-officially. I had no experience of testifying against [discrimination]. Besides I am not going have such evidence as well as I am not sure if it is permissible in general (Mathematics, lecturer, 31-40).* Deep-rooted negative attitude to such testimonies due to their subjectivity is not reasoned, since: a) they are measurable/auditable, the “is-ought” (rule-norm-standard) differences (gap between “is-ought”) may be evaluated taking into account how much legislation and obligations/values undertaken by the organisation as well as the principles of effective conduct have been broken; feelings of an individual (the perception of a person whether people treated him fairly, honestly) at his workplace gradually gain more and more importance for the sake of necessity to the employer to realise human rights (humanism) to use prospective human resources, to increase effectiveness of work and competitiveness.

When the discrimination as a problem is nevertheless comprehended, its wider social context with appropriate a) causes and b) social economic consequences remains still invisible. Furthermore, more comprehensive economic consequences, constituted of calculation of expenses in the long run, covering various segments of society functioning. Any comprehension that women discrimination affects human and social capital is not seen in the attitudes of respondents. Furthermore, discrimination is not related somehow to labour productivity, people (both suffering from discrimination and just observing it) motivation for work, profundity of [their] obligations and loyalty to the organisation. However, some respondents described cases when the discrimination of woman-scientist had negative consequences for a definite field of science or scientific collective.

The BASNET survey confirms generally envisaged problem of elder women in science. They seem to experience double discrimination – sex-based discrimination is supplemented by age-

based discrimination. *"Our system constitutes situation when the scientific career is possible only for young women"* (Mathematics, assoc. professor, age 41-50, mathematics, 58); *"after 50 there is an end to a career"* (Biochemistry, researcher, age 51-60). That is why women have to be satisfied with lesser achievements; it is not due to the lack of aspirations, but because of non-effectiveness of their pursuits, lack of possibilities to climb the career ladder within 20-30 years. From the managerial perspective the absence of a "career ladder" is resulted in obvious obstacle for a scientific progress. *"Women maybe somehow sooner grow lazy. I am not sure, but they seem to get tired with studies or something like this"* (Biochemistry, doctoral student, age 21-30). There remain questions if they get tired working and pursuing to be up to the mark in the profession or get tired to fight, to be smart, do not want to feel unsafe over "mockeries" or similar discrimination or even circumstances of mobbing. Maybe they hold it senseless to stand for oneself in the system in which gender is more important characteristic in competition than the results of somebody's work. Such a situation with elder women often becomes demotivation factor for younger women to pursue the career in science; it undermines any wish to come into relationships that rather suppose struggle "against fellow-workers" than struggle for "better job performance, better results". To be involved into such a struggle possibly means to demean herself – to push colleagues aside, to walk all over them, to "repulse", "to step over their heads". For a woman it would also mean to be so aggressive that nobody would dare to raise an objection. Women's consciousness is often determined by real situation peculiar by the domination of men in the given system and women's conformity with it justifying it by phantom of allegedly too high requirements for herself, and necessity to *"occupy unpretentious pretty position"* (Biochemistry, researcher, age 51-60). From the human resource perspective such a situation inflicts losses upon organisation. Meanwhile *the labour of these women could be more effective: older women have no troubles to look after children, they have definite experience gained and system knowledge, have demonstrated (or not) their abilities. That is why it would be functionally and fairly (especially with regard to those who has already proved they professional abilities) to support them, provide with merited grants, whatever possibility to ameliorate* (mathematics, assoc. professor, age 41-50, chemistry, assoc. professor, age 51-60). It is also expedient to form possibilities for women like for the other employees to take the top positions, and it should be done instrumentally by the methods of a modern organisation management with the aim to create incentives (to motivate) for effective work. The latter is almost absent in Lithuania science management. Besides, the existing system made these possibilities inaccessible for elder women both locally and internationally. This idea was mentioned in the answers of respondent,

So when a woman is facing discrimination it seems to be her personal affair to solve this problem. It is valid in practice and is confirmed by research data: *"it is the problem of an individual, but not a sort of a global one"* (physics, chief researcher, age 51-60). *"...I said them to cease mockeries. My private life is my concern"* (astronomy, doctoral student, age 21-30). The main point in the replies of respondents is that if a woman is discriminated it is *only her individual problem*. It is not comprehended as a problem of a university dishonesty and as a disgrace to a profession when a job performance of a scientist is assessed by his/her sex, but not by objective achievements. The research results witnesses that there are no effective/competent managerial structure and procedures in organizations (*"where/to whom one should complain"* (physics, chief researcher, age 51-60) and unawareness that the problems are to be solved on meso level (in Universities, in professions) as well as that the solution of a problem is not only the "matter of a woman herself" (micro level) or the matter of a state (macro level). There must be a complex approach. First of all, it is not the problem of an individual. The respondents seemed not to be acquainted with the view that responsibility for ethical practice is not only the concern of separate persons, but the corporate responsibility of organization (academic institution). It creates the work environment that motivates its staff to behave ethically or *vice versa*. If every academic institution pursues to form

(inside) the environment of “zero tolerance” to injustice, discrimination, i.e. to violation of declared values, then it should reconstruct their decision-making shifting its approach from personal, individual into structural functional one, i.e. from random and confused acts to regularities, from separate precedents to *systematic approach* to definite phenomena. The phenomenon of discrimination will remain as long as the comprehension of this view and its purposeful implementation in practice is lacking. When the new approach comes into practice it naturally forms job assessment according to its results, by the quality of work performance, i.e. by the abilities of a person to generate ideas, to analyse, provide required product or otherwise to conduct perfectly the work of a professional. At the same time there forms not only comprehension of a prescriptive norm, but also a descriptive pressure that makes these norms valid. Thus justice is implemented in practice and it enforces the preventive measures against discrimination.

We can maintain that a part of the respondents who claims that legal factors to eliminate discrimination are established and concludes that discrimination formally does not exist, although in reality forms of its manifestation are identified, speak of **the normative, prescriptive discourse** as the **factual, descriptive one**. Their reasoning sequence runs as follows: discrimination does not exist because all employees have to be assessed by results, *formally* assessment criteria are the same for all, and thus, inequality cannot occur. At this point we identify the inability of the respondents to perceive the distinction between the prescriptive and descriptive discourses, between values and facts. Meanwhile there arise questions whether the individuals do not reflect this distinction, particularly as the specificity of their education and field of work (i.e. exact sciences) does not raise the issue, which is left beyond their awareness and self-consciousness; whether they set up desired for a reality as they think that only such answers are appropriate to a decent person; or whether they consider the elimination of discrimination merely as idle talks, “fiddle-faddle”, beautiful rhetoric which does not raise the necessity to relate it to reality. These questions are prompted by several questionnaires, for example: “*I think they do not experience [discrimination]. In my opinion, in our field at least formal conditions seem to be equal. Well I admit if later you get a superior ” [bent to discrimination] (chemistry, assoc. professor, age 41-50)*. Yet the same woman respondent adds that a male colleague “can take the liberty of saying at coffee *well, those women...* [which has a connotation of a scornful conclusion about their capabilities]” and that “it is a common situation in the society that one can say so *well...* [followed by a disdainful intonation]”, so “this could **in fact** be discrimination” which is “probably a greater threat to a woman” (ibid.)... So if “at least formal conditions are equal”, i.e. if discrimination does not exist in documents, official speeches, does it mean that it does not exist in reality? Or is it not important? Not *so* important? Is justice declared on the paper and realized in the workplace the same? Is integrity, honesty not important? Are such considerations determined by the culture, which elevates justice, fairness (and other values) to the metaphysical domain, idealistic “spirituality” and confuses them in an individual’s moral awareness that they cannot be identified in reality, in definite (measured by engineering means) phenomena?

When respondents do not see discrimination of women in sciences (or the given respondent does not face it in their surroundings) they reason own comprehension of *status quo* by the following argument: “*...to my mind they are not discriminated. Anyway the evaluation is based on the performance results*” (male, chemistry, professor, age 51-60). Such respondents hold an attitude that the opposite case is unfair. Thus, disregarding the respondents’ attitudes to discrimination itself, having detected its logical axis (which is not often termed as discrimination) they speak out an unambiguous conviction: **it is not fair, and fairness has to be established**. Faced with the absence of integrity honest scientists usually are determined to eliminate it. Yet not all of them. The others reconcile themselves with the fact that equality of women is only a declaration, just words but not reality. How does then the question of personal integrity is answered? None of these

respondents would admit or think that they are dishonest. But the issue under discussion, i.e. gap between values and facts, words and deeds can be scanned and audited in engineering manner, and honesty (integrity) can also be “anatomically prepared”, analyzed? Today the so-called methods of “informing the conscience” are relied upon to construct and measure integrity/honesty in the contexts where it is lacking. This method is objectively needed in science to solve the problem of discrimination. Yet discrimination is not a topic of a single domain; it is directly related to the assessment of scientific works, achievements, rewarding, career possibilities and other systemic issues. They concern *every individual* employed in science. Therefore, the issue of discrimination makes every actor in the sphere consider both organizational and *personal integrity*...

Although the respondents claim that decisions are made collegially, and **one person cannot decide for all, these claims do not change the real situation**. “*Elections [to the leading positions] are organized, vacancies are publicly announced and there was a case when a woman ran for the head of the department and one could think that all were for her but later they voted against her. And in the end a person even not from the university was appointed to the position*” (Physics, researcher, age 51-60). There was more than one respondent who claimed that voting and other means of self-regulation do not prevent discrimination, and people in the academic circles, like that of the other structures of the post-totalitarian society, vote “as they are required to”. Voting results depend on the pressure from the administration or the dictate of entrenched habits or stereotypes. “*Certainly. Say, the faculty board, there is not a single woman in it and the faculty board votes [for candidates]. So despite that you can speak to everyone [a board member] in an informal atmosphere and at that point he says yes, you suit the position and everything is adorable and very well and we are for your candidacy. But when the moment of voting comes ... one can never know who they vote for and later on it occurs that you did not get a single vote*” (Physics, researcher, age 51-60). The lack of organizational transparency and integrity is obvious. Yet at the same time the respondent’s words point to **the system which makes some persons to be a toadies/conformists while the others have to become hypocrites**. In other words, when organizational values (e.g. integrity/ honesty, justice, responsibility, transparency) are not institutionalized in the processes individuals are made to be not integral, double-faced and compromise their principles, dignity, conscience for a higher step on the career ladder, which results in the loss of self-identity and a negligent, non-civic attitude to the work-related matters. These characteristics are particularly distinct in public sector organizations (and scientific ones inclusive). They can be clearly contradistinguished from industrial ones which need values in practice to withstand competition under the market conditions.

If the **principle of universizability** were implemented on a **systemic level** in practical actions, organizational procedures or, in other words, if the assessment of all organization’s members depended not on individual’s (subjective) will (“somewhat voting”) but on objective facts (performance results), such voters would not need to act dishonestly, hypocritically and women would not need to compromise their dignity, get involved into ambiguous situations (“*speak to everyone [a board member] in an informal atmosphere*” (Physics, researcher, age 51-60). Such a situation trains both parties to use Machiavellian methods in other contexts of social life and reject the possibilities of social self-regulation (social scientists identify such a “normative ailment” in post-communist societies³). In this way, indecency (not abstract spirituality but lack of **definite**

³ Ungvari-Zrinyi, I. (2001). Moralinės kultūros tendencijos postkomunistinėse visuomenėse [Moral culture in post-communist countries] // Vasiljevičienė, N. (ed.) *Dalykinė etika: pasaulinės tendencijos ir postsocialistinių šalių aktualijos*. [Business ethics: world tendencies and actualities in postsocialist countries]. Kaunas: VUKHF, p. 229-269. ISBN 9955030941.

values, their ignorance in particular spheres of social life) is sustained and continually reproduced by disorderly spheres (not duly settled by objective criteria on system level) of practice. It should be noticed as well that it is impossible to solve the problem in one domain of science while the rest of the system is not in order; therefore, elimination of discrimination in exact sciences would be more efficient if problem was solved at the level of all system.

Thus, women establish, that their careers rather depend on the opinion/attitudes/stereotypes of the group of definite subjects (*"how the Board puts it to the vote"*; *"those men always support men"*), but not on the factual results of her work. Discrimination flourishes when subjectivity i.e. fact of **systemic establishment of stereotypes** is fastened on institutional level, when *"somewhat...voting"*, *"somewhat...board"* (Physics, researcher, age 51-60) turns the scale in her career, rather than the results of work or [previous] achievements possibly accumulated due to hard work during the whole professional life. So in such circumstances not only the destiny of an individual depends not so much upon his diligent or the level of his professionalism as upon how *"somebody is going to vote there"*, but the one who watch the course of events, inclines to choose the appropriate way of behaviour. As a result young women avoid scientific careers and the elder women as not interested to be involved in these battles give up their ambitions ... *"become lazy, get tired"* (Biochemistry, doctoral student, age 21-30). Thus the target-oriented community/-organisation/profession turns out to be in the circumstances that prevents, undermine its motivation/pursue to high results of job performance, effectiveness and competitiveness. These methodological fundamentals of management are rather elementary, yet in Lithuania they are not commonly grasped both due to social cultural factors and the backwardness of managerial science in the country not to mention practice. The opinions of definite "subjects", individuals or groups of them, *"voting [in support of individual interest leading to appropriate conflicts]"* still dominates in many organisations instead of establishment of objectivised order (public interest), based on the discourse-based rules, norms laws, preliminary accepted by all participants of the practice. Generally in Lithuania the adequate comprehension of modern business life is lacking. Yet a lot of well-educated people fail to realise that structural functional order with its determined norms and rules as well as the high level of professionalism (it includes strong dimension of social responsibility and the imperative of public interest) are required from each participant of a system. If definite societies don't implement functional organisational systems for self-regulation and fail to comprehend that they leave people fighting with each other, then the society at large loose huge resources through casualties inflicted on public health and appropriately on the healthcare budget. The issue of discrimination is partly caused by that *"men do not consider women as competitors"* (Physics, researcher, age 51-60). They cannot endure whatever women who are professionally superior and express their attitudes by sneering, derogatively emphasizing femininity [the English language does not have a word which denotes a woman as a creature with excessive emotionality and narrow interests – e.g. reserved to family matters, shopping and gossiping; the noun "Weib" and the adjective "weiblich" in the German language are semantically closer to the term], isolating them by negative comments about their achievements). They *"are just unwilling to let women express themselves"* (Astronomy, chief researcher, age 41-50). Therefore, women who have higher aspirations and ambitions, who are more advanced in their professional field and are aware of their worth experience much stronger discrimination. When they dare show self-reliance (*"...if something more than usual, something more [superior] is shown, then of course it starts..."* (Physics, researcher, age 51-60), they meet abusive epithets, they are treated as abnormal (disadvantaged, doomed, "feminists" etc.). Since a "normal" woman behaves herself – she is "modest, beautiful". Such women in science are needed, their environment "is not aggressive", they are "allowed to work", *"if they are not scientific-achievement-driven, but just work-oriented, they are more suitable because they are more thorough, have more patience"* (male, chemistry, professor, 41-50). Therefore, they can compensate men's inabilities and perform operating tasks

but not scientific-creative work: “woman looks like a pure attendant, operating personnel and that’s all” (physics, senior researcher, age 31-40). “Science is a man’s prerogative” and women are not partners but helpers. “If you want to be appreciated in such a male collective, first you have to prove that you’re not an elephant” (physics, chief researcher, age 51-60). Unreasoned and unreflected woman characteristics are found in many questionnaires. In some of them, due to stereotypical bipolarity of the consciousness, thoroughness is contrasted to creativity, capabilities to generate ideas: the person can either be creative or hard-working, as if conjugation of the two were impossible, as if hard working and diligence did not form the basis for knowledge and experience, creativity and generation of ideas. In this way, positive woman characteristics such as diligence and thoroughness are presented as negative ones. “Woman, she cannot be a good scientist” (Astronomy, researcher, age 31-40); “...so **what can women [disdainfully] do here**” (Physics, researcher, age 51-60); “I’ve had a chance to meet some scientists of the older generation who have preserved a conviction of yore that a woman’s place is a family and so on and that she in principle cannot be a good scientist” (male, IT, doctoral student, age 21-30). Women try not to pay attention to that, and compensate the injustice by saying silently “what one can expect from a fool”, saving their resources and potential to other matters and getting only partly involved in team-working, which cannot but have impact on work efficiency and organizational capacity.

Some considerations by the respondents are symptomatic in several respects, for example, R: “If they [women] are discriminated and do not try to solve the issue, it can be that they are afraid to suffer from that. Because...” I: “That is, they are afraid of...?” R: “Yes, they are afraid. They fear the consequences.” I: “And what can that be, what consequences, what do you think?” R: Well, that can be... (think) just... directly lay off, find a reason to do that or create conditions so that the person herself would quit” (IT, junior researcher, 31-40). Women are afraid of consequences, they fear mobbing. The respondent does not use the term but the phenomenon itself is described: “to create conditions so that the person herself would quit”. That is, to apply psychological pressure (the literature on mobbing uses periphrasis for the term – psychological terror at the workplace). Based on the EU’s standards of workplace health and safety, such actions are considered violations which are controlled by the departments of occupational health and safety at the state level, for which employees in the EU states can sue mobbers and which are prevented by the departments of work health and safety, personnel, audit (it depends on an organization) at the organizational level. The function to monitor the workplace to prevent occurrence of mobbing is also ascribed to the ethics or corporate social responsibility (CSR) officer or integrity manager. Some organizations (particularly in the German-speaking Europe) even have an anti-mobbing office. In the absence of such structures, which is the case in Lithuania, the way out is to keep silence out of fear... In the case of discrimination there is no instance that would notice the problem and judge by objective data. “... and who would you complain to?” (physics, chief researcher, age 51-60). There is no one to report to, to ask for help, thus, the wisest decision is to accept the situation, keep silence and “not to spoil one’s health”. In the given situation with the prevalent vertical hierarchical system in most Lithuanian universities a person (both a man and a woman, although aggression against women is stronger) is left without an instance (departments/offices which perform their functions impartially) to which they could report the facts of discrimination or/and which could detect such facts on the basis of definite criteria themselves and eliminate them. Therefore, if respective university offices or/and departments (e.g. the ones of personnel, internal audit and even those responsible for scientific achievements) worked by the models of contemporary management, there would not be the reasons to complain or report.

So women do not complain not because they are not discriminated... Observing the reality they abstain from such fights (“do not formulate such requirements to themselves” (Astronomy, chief researcher, age 41-50); “from psychological viewpoint, bellicosity, ambitions are less

characteristic" to them (Astronomy, researcher, age 31-40)). However, different situations can also be found: "Yet sometimes a counterargument from women, and from most women-scientists at our institute, is their particularly high competence. *I know several very good women specialists in computer science who often and easily wipe the eye to the men who think like this [underestimate women] (male, IT, doctoral student, age 21-30).* If the environment were changing, women in other (all) departments would formulate such **requirements**. Yet considering the actual circumstances they realize that in most cases raising the requirements to respect their competence and achievements would be an unbearable burden. They see that in the absence of a clear organizational order, definite criteria and mechanisms "black technologies" can be used against them. It should be particularly considered that some woman respondents narrate about various speculations, underhand dealings, deceitful facts used to ensure a man's victory. The evidence of such phenomena can be read in most questionnaires, yet in some these methods are not clearly called as "dirty" or shady. For example, a method used against a woman colleague who is more professionally advanced (*"one cannot tell why, perhaps from envy that he did not defend a degree himself"*) was *unreasonable, emotional and aggressive assessment of her students (Mathematics, lecturer, age 31-40).* There are cases in which men use methods of unfair competition. *"They invent reasons for which they cannot hire you now; later, when you come next time, you find out that someone already took the position and, of course, the person is not a woman but a man. So such things are real" (Physics, lecturer, age 21-30).* *"Well, in short, competition exists. Yet it's bad when somewhat dirty technologies are used".* I: **"What kind can they be? How would you describe such technologies?"** R: *"Well, for example, gossips or twisted facts are presented when considering some issue, there are such instances as well" (Astronomy, chief researcher, age 41-50).* Thus, it is not worth "sweating out" in a situation like the following: *"when there is competition between a man and a woman, usually a man wins" (Physics, researcher, age 31-40).* By eliminating women from competition men-scientists descend the benchmark for themselves and in this way make harm to their professional competence and the level of science in general. This is especially felt in small countries, narrow professional spheres, and after 15 years of Lithuania's independence the tendency became obvious in various fields of science. If obstacles to women were not erected, if they could develop their potential *"perhaps men-scientists would catch up (laughing). Because there are obvious crocks"* (Biochemistry, doctoral student, age 21-30). Besides, *"there would be more order" (Physics, senior researcher, age 31-40), work-related functions would be more deeply and diversely performed (mathematics, assoc. professor, age 41-50).* So if women discrimination in science exists (and the **research shows its presence**) it is not only women (or their relatives) who suffer from it and it is *not women who suffer most*. In fact, it is the organization, the profession or the field of science who incurs the highest losses (a woman can endure the losses by distancing herself from the situation). It is the work, the task, the *function* and its quality *performed by a woman*, hence, the structure (both at meso and macro levels) that suffers most. Therefore the circle of stakeholders in the case of discrimination is much bigger than it is assumed by most respondents (as well as the society). Only the minority of the respondents express the idea that the elimination of discrimination is needed not that much by women but by Lithuania. It is the reason why the problem of eliminating discrimination of women in science is raised at the national level by the EC. It is a factor whose elimination would help to gain additional **resources** and increase Europe's **competitiveness**. The problem signals an alarm to Lithuania as well. Considering all socio-economic costs of women discrimination we can maintain that the issue is not a concern of one group of interest. The *necessity of eliminating discrimination* is determined by the *public interest*. Thus, at this point it is necessary to deepen (public) understanding of the issue and reconstruct the social-organizational policies and systems which favour discrimination.

The tolerance to discrimination (in Lithuanian organisations/universities) is determined also by

unawareness of some social and organisational issues related to discrimination, to put more precisely confusion of appropriate definitions, criteria and indicators. There is also unawareness that these phenomena in advance societies have not been left to the mercy of fate or to everybody's personal arbitrariness, but everything was made clear, articulated, discourse-based and being managed in a proper way. Generally it is possible to confirm by the research data that the majority of scientists are insufficiently familiar with social phenomena, not aware of their today interpretations prevalent both in social sciences and in the EU and international legal documents. They are also unaware that human rights standards are to be realised through managerial systems and practices. Judging by responses of the respondents they seem to orient themselves in social environment only on the base of everyday customary moral norms, peculiar to the pre-civic society and pre-conventional morality. For such kind of a society inequality of women, predominance of power/big boss or immanent rightfulness of a majority, tolerance to injustice, indulgence to mockery, formal declaration of humanism and its non-fulfillment in reality are rather typical. For instance the definition of "competition" is comprehended /interpreted by the majority of respondents as forcible struggle of individuals with each other, reckless striving to career by all means, putting up strong resistance to these pursuing higher positions even if the rivals are more advanced. Besides the respondents as if customary interpret competition as immanent resort to dishonourable means (like slander, gossips, mockeries, false facts, insulting nick-names, giving short shrift using students etc), instead of search for **objective competitive superiority** and providing preferences to these with better work results.

The respondents express especial concern that it may occur with privileges and quota for women. That is why, be it reformation of (organisational) structures or introduction of innovations. All should be done on the base of scientifically sound value management with simultaneous research of social facts, modeling and consistent reconstruction of institutional facts, peculiar to the definite domains of a practice. *"Search for preferences/privileges (for women) is really the wrong way" (Physics, lecturer, age 31-40).* That is why the special measures are often put in doubt and they express a firm position that realisation (enforcement) of equal rights is enough to correct the status quo *"we should just work in parallel with those men and our rights will be equal. No need to ask for some priorities, since any request for it immediately put you in a position, as if you are poor woman and you need compassion and privileges. I don't think so; it seems to be degrading for me" (Physics, lecturer, age 31-40).* The majority of women do not want any degrading privileges that are presenting them as if handicapped, but they look forward equal rights, universal rules, objectivised criteria. They emphasize necessity to give priority in compliance with abilities to those persons who meets established characteristics/indicators (*astronomy, researcher, age 31-40; Mathematics, chief researcher, age 51-60; Chemistry, researcher, age 21-30*). *"All these aspects of work should be should be impartially evaluated" (IT, lecturer, age 31-40).* Some respondents are in the firm belief that in case if sex becomes the criteria for providing financial support, then unequal and discriminating assessment of women-scientists will gather momentum even more (*IT, senior researcher, age 41-50, Physics, chief researcher, age 51-60*), besides the whole system of science will suffer great losses (*Chemistry, assoc. professor, age 41-50*). There are less respondents that approve the system of grants (*Physics, senior researcher, age 31-40; astronomy, doctoral student, age 21-30; mathematics, assoc. professor, age 41-50, chemistry, researcher, over 60; Physics, researcher, age 51-60*) and the most part of them are rather sceptic in their approval comparing with firm conviction of those who express their negative attitude and regret. The statements of some respondents are rather symptomatic, since those women from their Lithuanian experience of various reforms and innovations do not see any possibilities for objective truth and justice in (work) assessment. Observing the behaviour of various persons that occupy various levels of power the respondents conclude that any benefits are senseless, since *"privileges belongs to those who supervise everything" (Biochemistry, senior researcher, age over 60).* All

(women)-scientists gained such an experience through the monitoring of various social organisational changes on macro level as well as keeping an eye on the behaviour of the bosses of various scientific structures under the condition of self-government, when the funding is not transparent and the money distribution is non-objective. So, it may be additional argument explaining rather pessimistic respondents' view on possibility of changes. Nevertheless, the expectations for transparency and elimination of authoritarian paternalistic management are reflected in the positions of respondents: "*there is no clear law and order*" (*Mathematics, chief researcher, age 51-60*), "*... everything should be public/transparency, but not just established from above*" (*Chemistry, researcher, age 41-50*).

Unawareness of management ethics in organisations (management values by organizational processes) and absence of knowledge in contemporary management makes an individual facing some problems to solve them by himself.

The researches confirms that discrimination exists by this **objective** criteria, though woman themselves do not want **subjectively** to admit it. It is important to disseminate educative activity, implementing comprehension of standards and make clear that discrimination occurs whenever something other than qualifications affects how an employee is treated⁴. So firstly it is necessary to enforce realization of all accepted *de jure* documents. No need in special measures that woman do not want or even fear for (it is obvious from the research data that woman still have no idea about *affirmative actions* policy as models). Application of anti-discrimination measures is not just taking over a "good practice" experience of Western countries (woman often fear for it), but firstly the **adaptation of affirmative action policies to a definite social-cultural context** along with exposure of specific factors, vectors of impact, calculation of efforts/effects and their purposeful managerial processing. To identify socio-cultural obstacles for building and managing values (compliance, integrity) in organizations of transitional societies one should take into consideration:

- Authoritative/ autocratic relations in organizations;
- Lack of trust among social actors;
- Lack of compliance - as a result of authoritative rule-setting and, consequent imitation of standards or their disregard. The most of respondents repeat a stock phrase that "formalities remain formalities, but real life is another matter". And this majority sees no problems in it.

It is business/applied ethics (in our case, **Academic Ethics**) that helps to make the **law functional** (transfer from *de jure* to *de facto*). Besides, it regulates the domains in which legal norms are not valid. That is why its purposeful, methodically-based institutionalisation takes place in various organizations, enterprises and professions.

It certainly helps the respondents to grasp that discrimination of any individual inevitably leads to the destruction of human resources, as well as it undermines the effectiveness and competitiveness of organizations including the structures in sciences.

Today advanced organisations create the base for integrity formation, using elements of ethics infrastructure when managing the complex of factors, exercise factual approach to decision-making, construct [required] processes, motivate individuals to behave in a definite way according to the organisation's standards / values. It is how the management of values is realised and how ethics goals (justice, principle of universalism, i.e. non- discrimination) operationalisation is

⁴ Unequal treatment – usually unfavorable can take many forms" (Treviño, L.K., Nelson, K.A. (1999). *Managing Business Ethics*. New York: John Wiley & Sons, Inc. p.55). "Discrimination means treating people unequally because they are, or appear to be, different" (ibid., p.57).

"Discrimination in employment – treating some employees, job applicants, or other job applicants less favorably than others on the basis of characteristics that have little or no relationship to the person's abilities to perform a particular job". (Blackwell encyclopedic Dictionary of Business Ethics, Werhane, P., Freeman, R. E.(eds.) Blackwell Business, 1998, P. 170).

possible.

Definition of Academic Ethics:

Academic ethics is a commitment, observed without fail, to its **fundamental values**. These values determine principles of behaviour that **enable** academic communities to implement the principles/values/standards into actions, into all organizational processes by managerial methods, i.e. to construct **academic integrity**. **The implementation of Academic Ethics creates a background for elimination of women discrimination in sciences**

Functions of Academic Ethics:

- deepens public understanding and increase social sensitivity to ethical aspects of women discrimination in sciences
- highlight the importance of universalism principle in diminishing gender discrimination;
- enables to audit/analyse typical and unique cases of women's status and identifies the moral aspects to be specially accentuated in gender strategies in sciences, especially on the organizational and state level;
- introduces managerial measures for remodeling and reconstructing social attitudes and unfavourable conditions in particular academic structures which sustain discrimination in the field up to now.

The processes of ethics institutionalisation are taking place in many spheres of social life and equally related to academic structures/universities. Yet, in the latter domain it is not properly knowledge-based and appropriately resulted in multiple failures or even stipulates opposite effects. Shortcomings of ethics codes and ethics committees in Lithuanian academic structures are determined by their pretentiousness, prescriptive character (in the spirit of moral sermon). In mass consciousness they are still comprehended as a sort of social game, fashion or simulacrum, and is not regarded as a tool for self-regulation in organisation, but as one more instrument of administrative pressure.

Values/norms of all organizations and their accountability to stakeholders cannot be introduced only by declarations. There should be real actions directed to reconstruction of management models, where the values are directly integrated. Contemporary systems of ethics management instrumentally introduce values into organization activity.

To have it implemented building of *moral competence* is necessary in academic structures:

- good education (learning to see & learning to judge)
- good knowledge (knowing how & knowing what)
- good decision-making (right action in science, ethics & job performance)

What is to be done?

Integrating values by ethics infrastructure in organizations is the way to implement expected goals (non-discrimination). Required steps constitute:

- Revision of management principles and reengineering of organizational structure;
- Measures to enforce discourse among stakeholders as well as to enhance moral competence;
- Reasoning the initiated processes and (offered) set standards/norms;
- Setting the mission and values as behaviour standards.
- Establishing professionalism as a value: fostering critical self-reflection, switching on "honour mechanism";

- Emphasizing principles of structural functionalism – clearly defined tasks of the professional roles and reasoning the necessity of accomplishing them by pragmatic arguments (reputation, human potential, competitiveness);
- Establishing clear indicators for professional behaviour in an organization and assessing every individual against them.

Preconditions:

Creation of organizational processes with ethics infrastructures and introduce SOPs (Standard Operating Procedures) to enforce integrity in organizational behaviour, i.e. to realize the imperatives of values (justice/ universalism; responsibility/professional commitment and honour; dignity; compliance/respect to law and ethics norms; trust, solidarity/subsidiarity etc.)⁵

There are a lot of special methods and related scientific literature devoted to 'Building moral competence of organizations', 'Constructing trust, justice and solidarity', 'Managing dignity', or 'Modelling integrity and responsibility', etc. In such literature one can find required knowledge that can help to realize *how* applied ethics instrumentally teach organizations to create and integrate the formalities (conventions, norms, rules, standards, principles) and real practice/performance, to model and reconstruct existing organisation anomalies and bad social order, to repair malfunctions, and to develop responsibility and integrity standards in all workplaces. Existing indecent relations in academic organizations (e.g. discrimination, mobbing) require particular investigation and reconstruction by methodologically reasoned ethics management. Under these conditions the behaviour technologies and social engineering methods contained in soft management (ethics-filled management) may serve for positive changes. This way there appears possibility to turn activity of organization to one or another direction through reconstruction of corresponding processes. This sort of reconstructions of organizations' practices requires a system approach especially in transitional societies. It is possible through implementation of standard operating procedures (SOPs) that firstly ensure independent and competent decision-making, changing organizational structure and communication processes.

These considerations require clearly defined operating procedures such as : 1) decision-making instruments, 2) decision-making rules, 3) instruction for decision-making, 4) quality standards for decision-making, 5) the practical implementation of decision-making standards, 6) compliance programs in organizations. The implementation of SOPs makes good (socially responsible) decision-making visible in real practice. All these methods enable building integrity, e.g. transfer from *de jure* to *de facto*. Ethics management tools terminate circumstances when "formalities remain formalities, but reality is another matter", purposefully eliminate the gap between *de jure* and *de facto* in organisational practice, thus turning formal prohibition of women discrimination into factual prevention of this social evil. This ethics-filled (soft) management, assuring principles of justice /universalism, participation in decision-making, formation of communicative discourse and consensus and establishing morally favourable atmosphere, optimizes academic structures activity. Thus it is a huge reserve of human resources augmentation. Ceasing the practice of woman discrimination in sciences is not only the issue of humanism, but also the imperative of effectiveness and competitiveness.

⁵ In these contexts various rules / values (imperatives) are psychologised and transferred from prescriptive ('*OUGHT TO*') to the descriptive ('*IS*') level. Then they actually start working. Certain ethical principles have to be shaped on **system level** by management tools. Then the '*ought to*' (standards, norms) can be achieved instrumentally, i.e. become reachable in artificial way with the help of definite procedures (ethical constructivism, ethical decision making, procedural ethics, values/standards' operationalisation = soft management). Today post-modern business *ethics as a new managerial discipline* and simultaneously a tool for practitioners, purposively teaches **how** to manage values practically. It teaches **how** to model and construct social reality on meso and macro levels.

II.2.5. Conclusions

The data about satisfaction of women-scientists with job reveal a very strong motivation of women for scientific work. However, scientific achievements of women-scientists are hindered by problems plaguing the whole science system in Lithuania – a lack of funds for research and outdated technology. Another factor hindering career of women is changeable qualification requirements for scientists.

In the interviews, scientists emphasized that indicators of scientific achievements established in the science system are not sufficient to evaluate achievements of scientists. First, publications in international journals with high citation index depend not only on efforts of each scientist to write the articles to these journals, but also on the objective conditions – the state of research equipment in laboratories, the funds for research, networks, international relevance of research. Second, in higher education institutions, educational activities of scientists take a lot of time, however, evaluating scientists quality of teaching is not taken into account. Women-scientists, who attach great importance to quality of educational activities, often loose in terms of achieving more according to established criteria of evaluation, namely, they have less time to write articles, prepare presentations for the conferences, etc.

Evaluating importance of career in their life, women-scientists often reduce meaning of ‘career’ to ‘position’, mostly understood as an administrative position, which as a rule is not aspired to by women-scientists. On the other hand rejection of career as a value may be determined by giving preference to other values such as family and children, or women’s negative evaluation of possibilities to climb career ladder in their scientific institutions. Women-scientists do not associate “excellent scientists” with characteristics that may be crucial for making career: “objective” scientific achievements (number of publications, participation in conferences, taking part in the international research projects, etc.) and positions, which would provide possibility to guide research of a team of scientists. Such value-orientations of women weaken their motivation to seek leading positions both related to scientific career and participation in decision-making bodies.

Application of double standards for men and women is still present in scientific institutions, though women-scientists of older generation point out that in this regard the situation is gradually improving. The interviewees indicate that women have to achieve more than men in order to be recognized in the scientific community. In addition to, a subjective perception of unfair treatment at the scientific institution cannot be attributed exceptionally to the gender factor which makes difficult to recognize cases of the discrimination on the basis of gender, admitting that not personal factors but objective conditions may determine a course of events.

Family life has the strongest influence on scientific careers of women: maternity leave slows down work rates, reduces scientific production, it takes a lot of efforts to overtake colleagues. Besides, family responsibilities often reduce women’s possibilities to take part in the international conferences, they have to refuse themselves internships or work abroad.

The results of the research reveal that gender is an important factor for careers of women in respect of their participation in decision-making bodies in the Baltic States’. First, women seeking leading positions must have higher achievements than men. Second, gender stereotypes and gender roles prevailing in the society also may hinder participation of women in decision making bodies and cause discrimination of women, especially in situations when decisions are taken in councils that consist only of men.

Women-scientists often do not want to seek leading positions due to negative evaluation of the consequences of administrative work to their scientific career. The leading position is not

conceived by women-scientists as a source of power to control recourses (financial, human, etc.) important for scientific research.

Women are discriminated in the science system. The evidence of women discrimination in the science system are jokes or direct expressions about women in sciences, the association of women achievements with their appearance and unvalued labour of women-scientists. However, the experience of discrimination is not pronounced and could be traced only latently, women are not ready to talk in public about gender problems in their scientific institutions.

The inequality in sciences and negative reaction towards problem solving attempts (comparing to radical feminism) are related to the low information level about these problems. Women in sciences propose to educate society about inequality in sciences and about feminism through mass media.

The implementation of policy actions which encourage women-scientists to make career in sciences or seek administrative positions in the science system is treated skeptically. There is a quite strong disapproval of such policy actions, while approval is expressed with reservation. The main conditions for the approval of such actions are: if the discrimination is real, if there is a need for those actions, if women are active enough, if there is only an aspiration, but not the rule and etc. The disapproval is motivated by the negative outcomes to the science system, the increase in discrimination or inequality, unnatural nature of such policy actions and even insulting women or threat for their self-respect.

The most favourable policy actions are associated with better support after maternity leave. Scientists agree that better support after maternity leave is the best policy action and should be implied in the science system. Women need more support as they have a break in their career and have to rebuild their abilities. However, the policy should be associated with the child care, but not gender – it should be offered to men after the paternity leave.

The support after maternity or paternity leave should be in such spheres. First, the system of labour evaluation or attestation should be changed, taking into account the time in the maternity leave. Second, women should be encouraged to return to work, to have special courses, ability training, etc. Third, young families should receive a better financial support. Fourth, the child care facilities should improve, they should be arranged in the close neighbourhood or within scientific institutions.

II.2.6. Recommendations for the common strategy in the Baltic States to increase women's participation in sciences and HT

The schools

The research shows the importance of school and teachers for motivation to study sciences. Though the strategy is not to solve the problems of secondary education (different expectations of teachers towards girls and boys), the strategy should include recommendations for improving the situation in schools:

- a. Changing the attitudes of teachers via mass media and information in workshops. Children of both genders should meet with the same expectations from their teachers.
- b. Including the course of gender studies or similar in the programmes of teacher training-colleges;
- c. Encouraging girls to take interest in sciences. It could be done in special lectures of scientists for school children or guided tours to scientific institutions.

The science system

The strategy should deal with the general science policy and obstacles it creates for seeking scientific career:

- a. Substantially increasing financing of sciences and renewing outdated technical base;
- b. Substantially increasing salaries;
- c. Setting stable qualification requirements;
- d. Increasing value of educational activities, work with students;
- e. Increasing value of science popularization activities.

The education of women-scientists

Seeking to encourage a more active participation of women in sciences, the strategy should include education via informational seminars of women-scientists in these areas:

- a. Organizational aspects of scientific research (funding, employment procedures, etc.);
- b. Development of leadership values (a sense of empowerment of being in leading positions);
- c. Gender inequality and causes (social and cultural) that underlie it.

The scientific institutions

We recommend discussing these policy actions for encouraging women in sciences:

- a. A quota system in public committees, commissions, related to decision-making processes in sciences (however, it is important to stress, that the quota system would be in contradiction with wishes of most women-scientists and could result in the increase of prejudices.)
- b. Measures for ensuring transparency of employment procedures;
- c. Special measures for parents' reintegration (both, men and women-scientists) after maternity/parental leave
 - i. Grants, courses, scholarships;
 - ii. Not to count the period of parental leave into evaluation period of scientific work.
 - iii. Flexible work hours.

The society

The strategy should include the recommendations of measures for the whole society:

- a. Accessible and more flexible day care system;
- b. Education of society in attitudes towards the parental leave;
- c. Educating society on gender inequality, gender issues.

II.3. LATVIA: Country Report

Ilze Lace, Brigita Zepa

University of Latvia

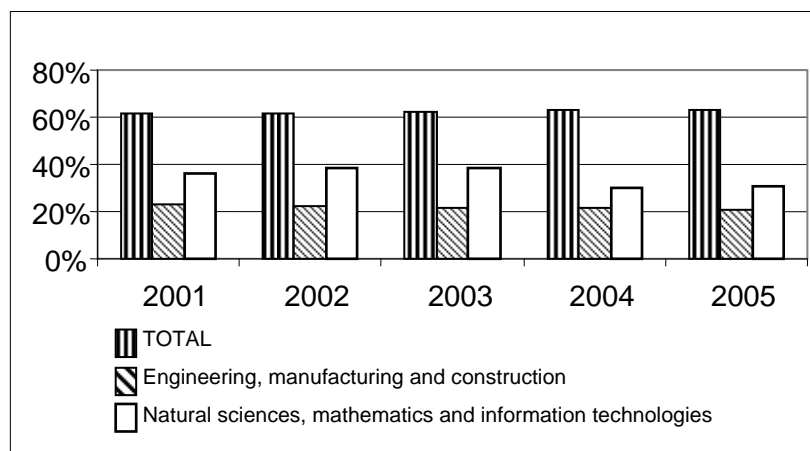
Introduction

Till present there has been no research related to gender issues in sciences in Latvia. Likewise the Central Statistics Bureau does not have data about the number of men and women employed in scientific institutions. One of the indicators that one can use to describe the current situation is the statistics of the proportion of women among students of various subject groups.

Table II.3.1. Enrolment in higher education institutions and colleges by subject groups⁶

Subject group	2001		2002		2003		2004		2005	
	Enol- led	Wo- men	Enrol- led	Wo- men	Enol- led	Wo- men	Enol- led	Wo- men	Enol- led	Wo- men
TOTAL	110500	67991	118944	73403	127656	79473	130706	82575	131125	83010
engineering, manufacturing and construction	11320	2582	14398	3164	14899	3188	12352	2648	13159	2735
natural sciences, mathematics and IT	7905	2831	6090	2331	6354	2421	6853	2058	6792	2070

On average every fifth student of engineering, manufacturing and construction is a woman (21% in year 2005). Women constitute one third of the students of natural sciences, mathematics and information technologies. If statistical data of years 2002 and 2005 is compared, the proportion of women in this subject group has reduced from 38% to 30% percent. In both of these subject groups the proportion of women is lower than the average overall proportion of women students (see Graph II.3.1).



Graph II.3.1. The proportion of women among students by subject groups

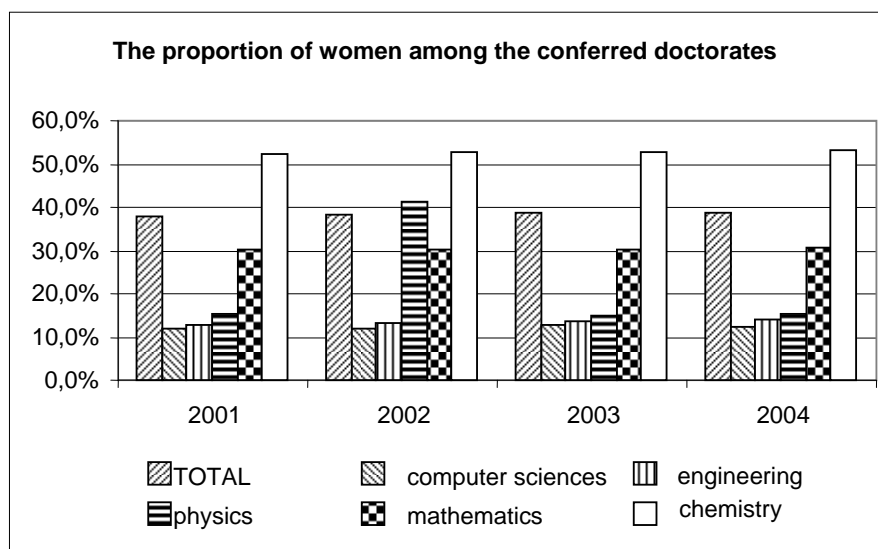
⁶ Central Statistical Bureau of Latvia Data base in the Internet [viewed on 24.08.2006.] <http://data.csb.lv/EN/temp/09-19a2006911174374.xls>

Another important statistical indicator is the proportion of women among doctorates conferred in the country.

Table II.3.2. Doctorates conferred in Latvia (by field of study)⁷

Field of study	2001		2002		2003		2004	
	Total	Women	Total	Women	Total	Women	Total	Women
TOTAL	5559	2116	5612	2151	5692	2197	5771	2246
computer sciences	108	13	109	13	111	14	115	14
engineering	1340	171	1351	177	1369	184	1384	192
physics	422	64	425	175	425	64	429	66
mathematics	129	39	129	39	129	39	130	40
chemistry	529	277	530	279	531	280	534	283

The tendency over a number of years was that the number of women who have gained a doctor's degree in all fields of study has been a little under 40% with a tendency to increase slightly (from 38% in year 2001 to 39% in year 2004). If we regard the exact and natural science fields, chemistry is the sphere with the largest proportion of women doctorates. Women constitute 53% of doctorates in chemistry. Other fields of study have a smaller proportion than the average of all fields of study. The smallest proportion of doctorates conferred to norms is in computer sciences and engineering, correspondingly 12% and 14%. These are followed by physics with 15% and mathematics with 31% of women doctorates.



Graph II.3.2. The proportion of women among the conferred doctorates

Currently male science personnel receives bigger salaries than women-scientists. The average gross wage for science personnel is 218.51 Lats, on average men-scientists earn 239.4 Lats and

⁷ Central Statistical Bureau of Latvia Data base in the Internet [viewed on 24.08.2006.]
<http://data.csb.lv/EN/temp/09-26a2006911384653.xls>

women-scientists earn 201.81 Lats, which makes up 84.3% of men earned income. A similar situation exists regarding the hourly wage. If the average hour wage for science personnel is 1.30 Lats, on average males receive 1.43 Lats and women 1.20 Lats an hour, which is 83.9% of male earned income⁸.

If the average amount of paid working hours among male and woman science personnel is compared, the full-time work hours are almost the same: on average scientists work 167.5 hours a month, men work 167.3 hours and women work 167.7 hours. It could be noted that all these numbers exceed the eight-hour work day. The situation regarding part-time working hours is different. The average amount of paid part-time working hours is 79.6 hours a month but if men part-time work consists of 76.8 hours on average then women part-time work is 83.0 hours a month⁹.

In order to explore gender-related issues in science and high technologies (HT field) the Baltic Institute of Social Sciences conducted 20 interviews with women- scientists working in these fields of study. The fieldwork took place from 26.06.2006. to 15.09.2006.

Table II.3.3. Sample description

Resp. No.	Field of work (Science)	Institution	Position	Age	Marital status, number of children
Women-scientists					
1.	Astronomy	University of Latvia Institute of Astronomy	research assistant	over 60	single
2.	Astronomy	University of Latvia Institute of Astronomy	researcher	21-30	single
3.	Biochemistry	Riga Stradins University Department of Medical Biochemistry	docent	41-50	divorced, 1 child
4.	Biochemistry	University of Latvia Institute of Microbiology and Biotechnologies	senior researcher	over 60	single, 1 child
5.	Chemistry	University of Latvia Institute of Chemical Physics	senior researcher	51-60	single
6.	Engineering and electronics	Riga Technical University Faculty of Energetics and Electronics	associated professor	31-40	single

⁸ LR CSP *Profesiju apsekojuma rezultāti Latvijā 2004. gada oktobrī*. (The results of profession inspection, Latvia October 2004.) Rīga, 2005

⁹ *ibid.*

7.	Information technologies	University of Latvia Institute of Mathematics and Informatics	research assistant	21-30	single
8.	Information technologies	University of Latvia Institute of Mathematics and Informatics	researcher	31-40	married, 3 children
9.	Information technologies	Riga Technical University Institute of Applied Computer Systems	associated professor	21-30	married, 1 child
10.	Mathematics	University of Latvia Faculty of Physics and Mathematics	lector	21-30	divorced, 1 child
11.	Physics	University of Latvia Institute of Solid-state Physics	researcher	21-30	single
12.	Physics	University of Latvia Institute of Polymer Mechanics	research assistant	21-30	married
13.	Physics	University of Latvia Faculty of Physics and Mathematics	research assistant	21-30	single
Women-scientists in senior position					
14.	Biochemistry	University of Latvia Biomedical Research and Study Centre	head of laboratory	31-40	married
15.	Chemistry	Riga Technical University Institute of Inorganic Chemistry	head of laboratory	51-60	widow
16.	Chemistry	Riga Technical University Faculty of Material Science and Applied Chemistry	vice-dean	41-50	divorced, 2 children
17.	Engineering and electronics	Riga Technical University Faculty of Energy and Electronics	head of department	over 60	married, 3 children

18.	Engineering and electronics	Riga Technical University Institute of Railway Transport	head of department	over 60	married, 1 child
19.	Mathematics	University of Latvia Faculty of Physics and Mathematics	head of department	31-40	married, 2 children
20.	Physics	University of Latvia Institute of Solid-state Physics	head of laboratory	51-60	married

Method of data analysis: Qualitative content analysis.

II.3.1. Scientific career of women in sciences and HT

A Path to Science

Motivation for studying sciences and HT

In interviews women-scientists mentioned several reasons that motivated them to work in their current sphere. One of the first encouragements to a number of women-scientists was personal ability and interest in particular scientific discipline, which formed in early childhood and youth because of the subjects at school or because of other influences, for example, books.

Abilities and interests	<i>Already in high school it was observed that I am doing well with assignments in physics. I was not preparing for classes; it was enough to read school materials. [...] later I realized that I like astronomy very much and so I decided to study physics. And right after finishing high school I entered faculty of Physics and Mathematics in University of Latvia to study physics. (Physics, researcher, age 21-30)</i>
Books and interests	<i>Everything depends on interests that emerge in early childhood or in school. I happened to read a book of catholic priest and professor, called "What is world?" and there it was written about the stars. It attracted my attention and it seemed interesting to me that we are fully dependent on earth and life on the earth is dependent. (Astronomy, assistant, age over 60)</i>

The influence of parents and teachers is very important, because they have encouraged the interests of future women-scientists and have helped to develop their abilities. In regard to parents it might be that the incentive to turn to science might be caused by their scientific occupation or with their unfulfilled wish to work in sciences.

The University for him [colleague] is as a hobby in the free time of job and it is so because his parents and also my parents, practically all the new generation that we have, we all have genetic power of gravitation, as we are joking. We all are in University only because our parents come from that milieu, we dedicate our time and energy. (Engineering and electronics, associated professor, age 31-40)

One [encouragement to turn to that science] was my mom's unfulfilled career in chemistry. (Chemistry, vice-dean, age 41-50)

In their turn teachers with their support or, probably, with quite not supporting the interests of a child, might lead to their directing to the scientific sphere, which is interesting for them. Not only separate teachers but also school in total can be significant. Some of the women-scientists have mentioned studying in Riga State 1. Gymnasium as the school where the interest about science appeared. The former students also mention possibilities to participate in the study Olympiads.

Influence of a teacher	<p><i>In the school time I liked physics very much, I was successful in it and in technical sciences in general. There was a good teacher, who helped me to understand and to carry through everything. I was participating in various Olympiads already in school time. And so I thought that I need to study physics, because I like it. (Physics, research assistant, age 21-30)</i></p> <p><i>I did not like my chemistry teacher. I was studying chemistry in spite of him. He wanted to stop me and in the adolescence there is characteristic process – if he wants to stop me then this is exactly the thing that I need to do. (Chemistry, vice-dean, age 41-50)</i></p>
Study Olympiads	<p><i>I am coming from Riga State 1. Gymnasium, there was connection with mathematical Olympiads, it seemed that this thing is interesting enough and I was successful enough, so this choice was not very unexpected. The interest was quite longstanding. (IT, research assistant, age 21-30)</i></p>

Women-scientists in the age over 40, who are currently working in the field of chemistry and biochemistry, mention the popularity of Chemistry in 60ies (in the time when they needed to make their choice) as one of the main reasons why they have chosen to study this subject. In regard to other scientific disciplines, for example, in Information Technologies the novelty of the sphere appears as one of the motivations.

Popularity	<p><i>Then when I started to study, [...] chemistry was very popular. Chemistry was even prestigious, I would say. I liked Chemistry already in high school. I also like many other things – literature, history, but chemistry in that time was a kind of “top thing”. (Chemistry, head of laboratory, age 51-60)</i></p>
Novelty	<p><i>In that time computer actually computer technologies and things like that started to develop and it seemed interesting and I went to study there. (IT, researcher, age 31-40)</i></p>

Several women-scientists as a condition that have influenced their choice mention factors that are related to study environment, for example, the number of women from all the students in a particular science.

I made a choice between the faculties of Economics and Computer Science. [...] It appeared to be that in Economics there [in Riga Technical University] are studying mostly women and then I imagined that I do not want to be in such a girl body, because we had only two guys in school. When there are mostly girls in the class then there are different intrigues and I did not want it anymore. (IT, associated professor, age 21-30)

Although in most of the interviews the choice-influencing reasons appeared some of the already mentioned ones, some women-scientists admitted that their choice was accidental or that they have used the method of exclusion. For example, first there were excluded such subjects where they did

not succeeded and then afterwards the choice was made between those subjects that were successful.

I went to Chemistry because Mathematics was too “dry”, Physics was too difficult and I had no talent for humanities. To put it in a humorous way. (Chemistry, senior researcher, age 51-60)

All the motivation was more occasional, life had formed that way, and it was not like I was purposefully going in this direction. (IT, associated professor, age 21-30)

We were going to Chemistry in Polytechnic Institute and they offered me instantly to come to evening section because of my good grades, but the other girl had problems and she was not accepted. I was thinking that I will not go alone, but they said that we should go to the other side of the street – there in Faculty of Energy were not enough applicants. [...] I was sure that I will not study there and I will come back to chemistry and was told that I will have such an option. But then when studied there, I realized that it is very interesting and actually fortuitousness played the main role in this case. (Engineering and Electronics, head of department, age over 60)

Factors that determined the choice of the current field of research

If school and teachers can influence the choice of a particular scientific sphere, then lecturers can be those, who develop more specific scientific interests and encourage future scientist to choose the sphere of specialization during the study period.

There was a very good laboratory and also a very strong personality – Edgars Siliņš. [...] He was my supervisor, a very interesting figure. He also influenced my turn to Organic Physics. (Physics, head of laboratory, age 51-60)

I have finished the specialty of Geodesy, but Astronomy was my interest for a long time. But here there were no such possibilities of studies. Then I was studying in RTU. There I got acquainted with Māris Ābele, he is working here in the Institute of Astronomy; and then I started to write my Bachelor Thesis that was related to Astronomy and Geodesy with his help. After that Māris engaged me here. Then I have finished Master Studies as a geodesist, but at the same time I was writing also in the field of Astronomy. Now I have entered the Doctoral Programme in the Faculty of Physics and Mathematics. (Astronomy, researcher, age 21-30)

In both previous quotations there was visible one more factor that contributes to turning to a certain scientific sphere, namely, the beginning of research work already in student days. Consequently, it means the acquisition of a job that is connected with studies. Such a job, the possibilities to participate in conferences, comparatively early involvement in scientific milieu develops scientific interests and creates conditions that ‘hold’ a student in research.

Strong conviction about the wish to be engaged with Molecular Biology appeared in the end of 2nd year, when I rather accidentally came in this institute; then it was the Institute of Molecular Biology. (Biochemistry, head of laboratory, age 31-40)

I was very fortunate that, being a very young student, without any diploma of higher education and studying only at the Bachelor level, I could start to work in research. I was trained, inaugurated in the world of research. [...] I could start doing research in the

interests of my laboratory, I could participate in conferences, to gain experience how to formulate my new research and write abstracts, and go abroad to present my results. (Physics, researcher, age 21-30)

There is also a possibility that the decision about turning to a certain sphere is strengthened with quite the opposite situation – doing works that are not connected with research allow a student to understand in what direction he/she wants to make his/her professional career. However, also in such cases it is important to have an option or alternative to work in some kind of research institute.

Spending one year in a business company I understood that the company is very nice and good, but scientific interests are starting to split, because in the time a cooperation started with this institute, I was writing term papers and it differed from that what I needed to do daily in job. Then I decided that finally I need to put it all somehow together and to come out in favour of one of these sides – giving preference to production, elaboration of software or though more to research. (IT, research assistant, age 21-30)

In selection of direction of research there is also importance to such factors like perspectives, popularity or offered potentialities of certain direction. Further scientist can choose specialization mainly because of the possibilities that she sees in that, for example, in comparison to other specializations of a certain science.

Popularity	<i>The profession has been popular since the boom of Chemistry in 60ties. If the overall popularity of Chemistry has went downwards, then specialization – biologically active conjunctions always has been with the interest of applicants. [...] So this was one of the reasons why I have chosen. (Chemistry, vice-dean, age 41-50)</i>
Perspectives	<i>The most interesting of those subjects seemed Astronomy. But unfortunately in Latvia it is almost impossible to get a job in this sphere. So I needed something on what to live, it is impossible to live on the fresh air and love to this science. (Physics, researcher, age 21-30)</i>

Scientific achievements and work environment

Job satisfaction

There are several conditions that influence the satisfaction of women-scientists with their job and work environment. Almost all of the interviewees express their satisfaction with a science as a sphere of activity. They like the freedom of science work, i.e. the possibilities to set their working hours themselves and to examine themes that are interesting to them and, also, the creativity of scientific work; there is very little routine in it.

Freedom	<i>I like and probably I will always like freedom when I can decide myself when I will and when I will not work. Of course, it also means that I have no days off at all. [...] But if in concrete hour and day I need free time then I get it! In any moment when I want. (Chemistry, vice-dean, age 41-50)</i>
Creative work	<i>Work of scientists is very interesting and creative. You can always find a theme that interests you more and then work and examine it as much as you want. (Physics, research assistant, age 21-30)</i>
Little routine	<i>Here there is very little routine, consistently few such jobs that should be done because they should be done. It is creative work after all. (Biochemistry, head of laboratory, age 31-40)</i>

Women-scientists also like other features that are connected with this sphere of work: continual development and fluidity of sciences, which means continuous acquisition of new skills, entry of new technologies and appearance of new possibilities of cooperation. Science as a sphere of work thus is and remains interesting to people, who are working in it. Few women-scientists mention that also students are those, who make them to keep up with novelties in certain sphere.

Changes	<i>Researches also are not stopped, they are changing all the time and that is the nicest thing. [...] Pleasant thing – you will never know what will develop – not only the science, but also in life as such. (Physics, head of laboratory, age 51-60)</i> <i>The pleasant thing is that there are very big possibilities to work creatively, logically. Each month, each week can bring something new. There are very many offers for international cooperation. This international cooperation allows developing new projects further. (Engineering and electronics, head of department, age over 60)</i>
Importance of students	<i>I like that students always press to be in form, to explore something new all the time, to look around. Hence, it is mostly difficult, because each year you need to change slide-shows for classes and syllabuses to keep in these new technologies and to be interesting for students. (IT, associated professor, age 21-30)</i>

As an interesting part of work especially the most experienced women-scientists continuous learning and challenge, aspirations with rather restricted means to reach considerable results and certain level of development are mentioned.

Plusses are those that all the time you need to learn something, at least the computer. You need to acquire different programs, games, this all is interesting. [...] Also attracting is that with our minimal money we have always tried to bear a resemblance to this or that level. [...] It attracts – we try to attain some kind of development with that what we have.

(Chemistry, senior researcher, age 51-60)

The work of a science and aspirations to strive for the best that is possible to achieve are factors that attract women-scientists. Therefore, it is natural that few interviewees name failures in these aspirations amid unpleasant aspects in work.

One likes to be successful in work and to be able to create something. But you do not like when you are not successful, because it is a labour-consuming process and it not always gives positive results. [...] If it refers to job, then I would say that now and then there is bitterness about the fact that we have spheres where we succeed and there are spheres, where we invest huge work and it is not going the way we would want to. (Chemistry, head of laboratory, age 51-60)

For women-scientists in job satisfaction is important not only the specifics of work of certain sphere but also the work collective in which they work. The interviewees point out that they feel big satisfaction in working in a creative and intellectually rich collective of scientists and also in the team spirit with responsiveness and helpfulness. One of the women-scientists stresses that in her work collective problems appear because of men's chauvinism. Probably this is more characteristic to particular spheres, for example, engineering and electronics.

Cooperation	<i>It would be difficult to find such an interesting environment around in the sense of people and of intellectual strength. Surrounding people and atmosphere is one of the very positive aspects that I am aware of, because there are not much places in Latvia, where it is possible to get such package. (IT, research assistant, age 21-30)</i>
Chauvinism	<i>The most unpleasant is that men's chauvinism is dominating, that is for sure. In engineering it is more explicit than in other spheres. But in energetics it is for sure, because this environment, it is very difficult to achieve that woman will be listened in. (Engineering and electronics, head of department, age over 60)</i>

Women-scientists also mention several conditions that hinder them to be completely satisfied with the chosen occupation and work environment. One of such obstacles is connected to insufficient financing and wages that force to take on more tasks than it would be advisable for a quality work. In some institutes there are also problems with outdated technology and in addition to that women-scientists do not have faith that this technology could improve with time.

Lack of financing	<i>The blunt truth is that this level of income, which can be ensured by working in higher technical academy, is not sufficient to ensure normal, prosperous life and this is completely obvious and everyone knows it. This is nothing new – science is in a miserable level and if in scientific grants I have personally received maximally 400 Lats, then it is impossible to hope to do some kind of science for that money, especially for sciences, where a lot of technical resources are</i>
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	<i>needed. (Engineering and electronics, associated professor, age 31-40)</i>
Combining of jobs	<i>The negative side that has appeared in last years – sometimes there is big friction between different jobs. It is impossible to live on if you do something one. I need to split between different duties, different positions and different projects. (IT, research assistant, age 21-30)</i>
Future prospects	<i>Work environment now is not as good as I would like it to be and as I have seen how it is abroad. There is no certainty that after five, ten years it will be as good as it is now. I mean scholarships, money from structural funds. (Physics, research assistant, age 21-30)</i>

At the same time there are women-scientists, who point out that the situation with financing has changed for the better in the last years at least in some spheres, e.g. in biochemistry.

Until now we could name very low wages as a negative point, but now in the last year this situation has substantially changed. (Biochemistry, head of laboratory, age 31-40)

Now the situation in terms of salary has improved. In the last year the situation improved considerably. Before that it was different – we took unpaid vacations to go on official journeys. There was no other choice... (Biochemistry, senior researcher, age over 60)

Scientific achievements

To provide scientific achievements at the international level, women-scientists need to participate in different international research projects, to participate in conferences and to publish their articles in prestigious journals. To manage all this financing is necessary and it can be obtained in two main ways: 1) from Latvian governmental institutions and 2) from the European Union (EU) institutions.

Each year from the total budget of Latvia there is a definite percentage for financing sciences given. The main institution that ensures distribution of governmental financing is the Latvian Academy of Sciences, which allocates grants to scientists each year. The interviewees pointed out that governmental financing most often is insufficient, it is not enough either for salaries, or for required technology and besides, it is comparatively difficult to obtain this financing. In total a number of women-scientists expressed the opinion that Latvian government is not taking enough care of sciences.

Lack of financing	<i>Of course, there is never enough financing for sciences. If you take a percentage of Gross Domestic Product that is devoted to sciences, then the money really is very small. We are indeed still falling behind, to compare with other countries of the European Union. (Physics, researcher, age 21-30)</i>
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Difficulties with obtaining financing	<i>Apart from the amount of financing, it is not easy to get it. Nevertheless, we need to participate in competitions, we need to show ourselves. But on the other hand this is kind of bewitched circle – we write what amount of financing we would need for this theme, but not always Scientific Council gives it. Wherewith we cannot buy the equipment. (Chemistry, head of laboratory, age 51-60)</i>
Situation of the science in Latvia	<i>Each country needs to maintain its culture, with its understanding not only culture in traditional sense. This also partly becomes apparent in financing – it is basically state financing, the system of grants or projects, which unfortunately has been fairly miserable all these years. I do not know whether it is as a result of impact of society, but we feel like stepchildren. Not only institute, but also the whole science in Latvia. (Physics, head of laboratory, age 51-60)</i>

Several women-scientists expressed the opinion that the Latvian Academy of Sciences has unclear and/or unfair principles of allocation of financing and often they give preference to institutes that are working under the wing of the Academy of Sciences. It is possible that discrimination exists in the division of these research grants.

My students, who are working in the institutes of the Academy of Sciences, they have three and more times bigger grants than I have because people from the Academy of Sciences are deciding about these grants. Then it is clear how they distribute the money – University does not need the money at all. They give some amount of money to University and ask to divide it for all grants. [...] Then the result is that nobody is comparing the substance of this grant, but simply divides it between the institutions. (Chemistry, vice-dean, age 41-50)

I am a little sore towards our own Council of Science's grant system. [...] There have been unpleasant moments in the last two years when I have applied for a grant from our institute. In the competition we were three women who were heads of grants, we were also the youngest ones, and we all got the smallest financing. I do not know if I should make some fundamental conclusions from that, but a fact is a fact. (Mathematics, head of department, age 31-40)

The second way of obtaining the financing is through different institutions, funds and grants of the EU. Obtaining this money means participation in different competitions; it is connected with the promotion of international cooperation, because the projects most often foresee cooperation of representatives of several countries. Some of the women-scientists see improvements in the attitude of the government because of the impact of the EU.

International cooperation	<i>We cannot announce EU projects only ourselves. There these instruments are "Network of Excellence", there are 15 partners; these are integrated projects, where number of partners is approximately the same – 15-20. There are smaller, so-called "Step" projects; there it can be around 10 partners. (Biochemistry, head of laboratory, age 31-40)</i>
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Improvements connected with the EU	<i>I cannot speak out so pessimistically about the last two years. But again it is thanks to the EU. All the structural funds, we have received a lot of equipment. Then also governmental research programs, because in material science this is the leading institute. Really, during the last few years. But my personal opinion is that it is because of Europe. (Physics, head of laboratory, age 51-60)</i>
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Women-scientists in leading positions name few negative aspects that are connected with obtaining EU financing. For example, there is considerable competition and it is a bureaucratically complicated process, which is also sometimes entangled into uncertainties in governmental institutions. Furthermore, since Latvia is a member-state of EU, the scientists need to compete with the scientists from all other countries on equal basis and without privileges; and that is why there are certain difficulties.

Bureaucracy	<i>We have participated only once when it was possible to apply for ERAF projects. In the very beginning it was not clear for the ministry itself... they were organizing as a competition of ideas and we were participating in it, but further on we were not participating, because there is very much paper work. I simply stopped doing it. Although I had worked with ERAF projects, I am not able to write so much. [...] It is possible to participate, but we currently are not participating and we do not know whether we will do it further. Exactly the bureaucratic not the financing part is difficult. (Chemistry, head of laboratory, age 51-60)</i>
Competition	<i>There is very big competition about the projects of the EU. If in previous years when we were not in the EU we had such privileges that it was politically supported. Then there were made these consortiums, where they had involved us willingly. These consortiums had privileges, but now we are on the completely equal status with English, French people, Swedes, Germans and because of that our possibilities to get in consortiums and to get in the most successful ones of course are not big. (Biochemistry, head of laboratory, age 31-40)</i>

There is a good job done in mastering funds, offered by the EU by several Latvian institutions, for example, the Latvian Investment and Development Agency is providing scientists with information and consultancies that scientists need.

I am very grateful to the Latvian Investment and Development Agency, because it is informing about the recent conferences or educational seminaries, because there are students from the Europe who are studying here and also in legislation there are many nuances about studies, about living and how to organize it all. These "Europoints" [institutions which help to acquire money from EU funds] that are in Latvia consults us and we are in the know of what is going on. (Biochemistry, docent, age 41-50)

Nevertheless, women-scientists point out that the possibilities to obtain financing are connected to certain specifics: both governmental and EU programmes often more willingly are supporting applied, market or practically oriented research and not “purely scientific” research. Because of that the institutes often need to make applied research to be able to undertake “scientific science” and to pay materials, participation in conferences and other expenses, which it requires.

Advantages of applied research	<p><i>Financing mostly is coming to applied research, there where some kind of practical result is expected in the end. For some kind of theory, there is no financing for writing of articles that would not be connected with applied side or cooperation. (IT, research assistant, age 21-30)</i></p> <p><i>More or less normal salary have only those, who have applied research, who have contracts. With foreign countries, as, for example, it is in the Institute of Organic chemistry. [...] But I am not working in applied sciences and hence we have very scarce financing. (Astronomy, assistant, age over 60)</i></p>
Earning for science	<p><i>Basically part of the money is coming from ministry, some kind of grants. Then we are participating in projects, in each case this project money is diverted to science. For science we are earning in projects, but absolute numbers I cannot say how much it would be. (IT, researcher, age 31-40)</i></p>

Several women-scientists were not satisfied with criteria of allocations of financing, specifying that institutions with different starting positions in the sense of materials and equipment are receiving equivalent financing. However, in general there are different and wide ranges of possibilities how to get financing.

Problems of allocating financing	<p><i>The very same financing is going also to former academic institutes of the Academy of Sciences, who are now independent. This money is going in two equal flows, but nobody is taking into account that we are in totally different situations. [...] It means that the biggest part of money has gone to those institutes, which already have been rich. We remain with a smaller part of the money. (Chemistry, vice-dean, age 41-50)</i></p>
Possibilities	<p><i>Each of the groups in the institute is working with those projects, grants, which we are receiving either from the Latvian Council of Science or now there are different EU, ERAF or governmental research programs. We can also participate in projects that are financed by the EU, like 6th framework programme. Withal there are different scholarships, like ESF, L'oreal scholarships, stipend of Kristaps Morbergs in University of Latvia. (Biochemistry, head of laboratory, age 31-40)</i></p>

In the interviews women-scientists indicated that they have had opportunities to participate in different international conferences as well as publish their articles in journals of local and international consequence. Nevertheless, viewpoints differ about possibilities to participate in conferences and to publish.

The interviewees think that the participation in conferences is an obligatory part of their job and there is a wide range of possibilities for participation. However, these possibilities are limited by the already mentioned problems with financing, which make scientists choose only few conferences from all that are offered. Though, as it is mentioned by few women-scientists, even if it is not possible to go everywhere, there are opportunities and it is possible to get the financing from different sources.

Necessity and possibilities	<p><i>We try to go to conferences. This should be perceived as completely normal part of our work, this is no extra wasting of time. (Biochemistry, head of laboratory, age 31-40)</i></p> <p><i>With international conferences it is so that practically it could be possible to live only abroad, in conferences, because there are many options offered. [...] Mostly we are participating in such kind of conferences, where the funding is coming from the organizers. (Engineering and electronics, head of department, age over 60)</i></p>
Acquirement of financing	<p><i>Now there are many conferences, it would be possible to go to many in one year, but there are not enough finances, because the Academy of Sciences is financially supporting two conferences. Now quite often there are such conferences, where we are invited. Then they are covering part of expenses. Depending from the year, there are four till six conferences on average. (Physics, head of laboratory, age 51-60)</i></p> <p><i>There is problem to find money for a scientist to go to conferences. [...] These are quite serious sums and hence the financing is needed. My business trips are paid by the Institute of Solid-State Physics. Occasionally I can get support from the Academy of Sciences and also from the money of European Structural Funds, which I can get in the University of Latvia. If you wish, then it is possible to get funding. But it is impossible to go to all conferences where you want, because it really is expensive. (Physics, researcher, age 21-30)</i></p>

Publications in international journals are connected with participation in conferences, because very often publications are needed for getting invitations. As it is specified by several women-scientists, publications are a necessity, even a kind of the question of “survival”. Furthermore, it is important to have publications in internationally recognized journals.

In our laboratory life the very life drives to publish. If we want to go to conferences and if we want other to know about us, then we need to publish. Therefore we are trying... (Chemistry, senior researcher, age 51-60)

The number of publications is the most important one that defines the level of the group. Of course, there are as many publications as there levels of journals. It should be viewed together. 10 publications in our local journals will not be the same as one publication in "Nature". (Biochemistry, head of laboratory, age 31-40)

In total, as the main factors that defines the possibilities of publication women-scientists mention the quality of work, topicality and originality and also already established status in the scientific society. Sometimes also such factors as who you know and participation in international projects can be important, but some scientists specify that both of these criteria are not decisive.

Actuality of theme	<p><i>On the one hand there is the actuality of theme. If I have chosen something that is not interesting elsewhere in the world, then it is more difficult. And also the quality of written work. And there are possibilities, the world is open. Send to any conference and if the article will meet the demands, then they will take it. (IT, researcher, age 31-40)</i></p> <p><i>To have a publication in some more serious issue of publications it is not obligatory to participate in some kind of large project. I can make a research, which is now marketable, interests me and where I want to enquire something. (IT, associated professor, age 21-30)</i></p>
Existence of status	<p><i>It is not likely that a young, unknown group of researchers will be able to publish some article in „Science” or „Nature“. There, of course, are prestige and identification on the global scale is needed. (Biochemistry, head of laboratory, age 31-40)</i></p>
Influence of social capital	<p><i>Publication of articles has its own bureaucracy and often it is so that one professor is talking to another, with publishers and few researchers and it is easier for him to publish his paper than it is for those, who have a better idea, but who are not familiar with a person. (Physics, research assistant, age 21-30)</i></p> <p><i>It is desirable that there is someone, who you know personally on the editorial board of this journal. But the most important is the novelty of theme and then they are really taking these publications automatically. (Engineering and electronics, associated professor, age 31-40)</i></p>

Nonetheless, sometimes scientists need to pay to be able to publish their articles in prestigious journals. Because of the already limited financing it reduces the possibilities for scientists to achieve attention.

There are problems with publications if the theme is topical, the results are published. [...] But here is another problem – you need to pay a deposit to publish. You can be very smart and you can have good achievements and publications, but you need to send money for publication. I think that it is not quite right. (Biochemistry, docent, age 41-50)

The majority of women-scientists says that chances to have a career in sciences is very similar to

both sexes, but there are several spheres of sciences, where there are considerable differences.

Equality	<i>We have completely equal possibilities. It depends on each personally – how he forms his work, how he thinks. (Chemistry, head of laboratory, age 51-60)</i>
Differences	<i>If a woman and a man are of the same status, then, of course, man will be more visible. This is so in all professions. (Biochemistry, senior researcher, age over 60)</i> <i>I think that men have better possibilities because they have more knowledge about electronics and technique. There are more men in this science. I have felt that in rare cases men think that they are the leading ones. There are several professors, who think so. It is perceptible that a woman is still kind of young and “green”. But it is in very rare cases. (Astronomy, researcher, age 21-30)</i>

There are bigger differences in the possibilities not between men and women, but between doctoral students and more experienced researchers. The interviewees specify that at the moment doctoral students have wider possibilities to get financing for going to conferences.

It is more connected to money of doctoral sciences; ESF project has money for going to conferences and infrastructure and there it really is very good. [...] It is possible to say that the possibilities for going somewhere are also connected to doctoral studies. (IT, research assistant, age 21-30)

Because I am a doctoral student I took part in a project of European Social Fund: support for doctorates and new scientists. As a part of this project I got the opportunity to go on several official journeys. (Mathematics, lector, age 21-30)

Women-scientists have different opinions about how they want to make their careers. There are scientists, who think that doing what they like is more important, but others think that the wish to make a career is natural and necessary.

I even do not know, for me it is not so important what the title of my position is. The main thing is that I can do what I like and to be sufficiently paid for that. I do not have specific wish to climb somewhere up. (IT, researcher, age 31-40)

If a person does not want to make a career, then something is not quite right. If a person wants to be a general, to be above all, then again it is not good. You need to have a wish of career. If you come to work and say that “I do not want to go further than laboratory assistant”, then is not quite good. There should be a characteristic feature – to understand your level of competence. (Physics, head of laboratory, age 51-60)

I am already quite aged and have already made some kind of career. Of course, it was important to make a career and therefore I am working. It is so in any job that if you have reached something then you have chances to move upwards on these career stairs. Your job also determines all this. I liked that job, I was doing it and somehow I reached so far. (Chemistry, head of laboratory, age 51-60)

At the same time the interviewees have indicated factors that should be taken into account in

trying to achieve the career development in their position. Several women-scientists have mentioned difficulties that can appear when trying to combine professional duties with family life, taking care of husband and/or children, for example, pointing out that family also is some kind of career.

For women, who have family and children, it is also a career. I do not know how happy are those children, whose moms are in very high position – a director or a president; but they see her only in pictures. Maybe for a women, who has children it would be more worthy not to 'speed up' with their careers than to occupy high positions. This job is a career and family also is a career. (Physics head of laboratory, age 51-60)

Several women-scientists pointed out that achieving a higher position can be sooner because of the necessity not because of their own wish. For example, you need to reach a certain level of education to be able to make a research as a scientist and, furthermore, this development should not be stopped to lose your position.

Necessity of education	<i>I never think about my career, I am just doing that what I like. But then when you have reached some border, finished Master Studies and you think what to do further... If you see that you like the job and you want to go this way then you need to accept these rules. To become a scientist you need a Doctoral degree. This is a rule to continue work. (Physics, research assistant, age 21-30)</i>
Competition	<i>I am not setting up an aim to become academician, but I need to make some further steps to stay in university, otherwise I will just not be able to stay in my position. Young people will come and I will need to go further; they will take my position and then I need a place where to go further. Making a career for me is more a compulsive factor; I had never wished to have some positions, just the circumstances made me to go further on. (IT, associated professor, age 21-30)</i>

The role of a team in the scientific career

Most of the women-scientists work in teams, some are leaders of the team and some are in subordinated positions. Majority of scientists in their interviews have pointed out that the division of works in their team is set by the abilities and interests of each person and not because of his/her gender. The women-scientists in leading positions especially emphasized that they try to find more suitable works for each employee individually.

Principles of work division	<i>It is really impossible to separate something in this sphere. Because there is nothing what to distribute by gender criteria. I cannot imagine (IT, research assistant, age 21-30)</i> <i>I think that there is no such division by gender, there is only strict division by professions[.] But by gender – men and</i>
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	<i>women – there is none. Probably there are proportionally more women working in this sphere. But there are no ties that it would be somehow linked with income. (Biochemistry, docent, age 41-50)</i>
Substantiation of division	<p><i>In division of duties I have always followed, firstly, abilities of the person, what he can do. In that moment it makes no difference to me whether h/she is a woman or a man, blond or brunet, round or skinny, it has no meaning anymore. First of all, it is important whether he/she understands this thing, whether wants to do it and whether he/she is able to work together. (Physics, head of laboratory, age 51-60)</i></p> <p><i>We are trying to make it the way that everyone could participate more or less in all methodologies. We are trying to make it like if Jānis is not present then Anna can do it and if Anna is not here, then Pēteris can do. We would like to make it this way, but not always we succeed. There are people, who cannot do something. We are finding a work for a person. (Chemistry, senior researcher, age 51-60)</i></p>

Nevertheless, many of the women-scientists have mentioned that there are tasks, where men are more successful and tasks, which women can do better. Women unlike men are able to do several tasks simultaneously; they are more accurate and precise. In their turn, men more often get tasks that are connected with technical or electronic questions. Such work division may not be so common in other countries and women- scientists comment such cases with certain amazement.

Women are not only working quietly, but they also do most of the work. However funny it is, but so it is. Working with men and women I know that there is one important difference between them – man can take a work and do it till the end. [...] Woman can do several tasks simultaneously. (Engineering and electronics, head of department, age over 60)

There are several tasks, which will be done better by women because they can work more accurately. My opinion is that men are more successful in electronic stuff. But it is not determinative. Thank God, we are different. If there is a need to arrange notes, then women are doing it better, maybe they are more used to it. Maybe this is diligence. But at the same time you can find also diligent men. (Physics, head of laboratory, age 51-60)

In foreign countries all the laboratory work is done by men. Of course we look up to that because laboratory work is a little like kitchen work where kitchen skills are needed. So, successfully working foreign boys can be admired. Our men are different. (Biochemistry, senior researcher, age over 60)

In total women-scientists do not see problems with division of works, which is based on more characteristic features of each person. Interviewees also point out that in their spheres of science there are no unequivocal male or woman works, but the fact that men get works that are more appropriate to their gender could indicate that “gender-appropriate” division is not made on purpose. Very often representative of each gender are just are turning to themes that are more interesting or suitable to them.

Unconscious division	<i>I cannot say that there are special differences in what works men and women do in laboratory. Maybe it has become a custom that those tasks, which are connected with the usage of equipment, are done by men. Two guys are working there, but it is not purposeful, it just happened so, it was not planned to be so. (Biochemistry, head of laboratory, age 31-40)</i>
Self-division by interests	<p><i>There are more of these technical things and therefore there are more men in Astronomy. You need to know all calculations, electronics, and optics. That is why there are more men. Women are more afraid of it. [...] But in Astronomy it is not so that there are duties and tasks that would be done only by men or women. (Astronomy, researcher, age 21-30)</i></p> <p><i>The part of men is programming, testing, maintenance, but talking with a client, modelling of system, understanding, analytical thinking... mostly it is so, that if girls are staying in university, then they go to these subjects. Guys are more interested in this part, maybe girls also do not like this programming very much (IT, associated professor, age 21-30)</i></p>

A part of the women-scientists in interviews pointed out that there are no connections between scientific achievements and gender, there is no discrimination. Nevertheless, there were interviewees, who had faced discrimination personally or had heard about such cases.

Both men and women are making a career and they both are doing research. Even the proportion is approximately equal. (Biochemistry, docent, age 41-50)

Maybe I have been a bit lucky in my life, but sometimes we feel that at times a woman in different spheres, groups or work collectives need to show more to be in the same level. But I have had an atypical case when the head of laboratory was never making a difference and I have never felt things like – “because you are a woman, stand in the corner”. [...] I know that there are groups where it has happened. (Physics, head of laboratory, age 51-60)

I think that I am underestimated. [...] For example, in sciences there are correspondent members, academicians, all this hierarchy, nobody has ever nominated me there, I have never received any diplomas except for the official ones, which are given to everybody. And I have never had possibilities to develop something, because I have been doing everything from the very bottom till one certain level. (Engineering and electronics, head of department, age over 60)

Women-scientists themselves explain this unequal attitude with stereotypes about “men” and “women” occupations, pointing out that such opinions mainly are present among the scientists from elder generation. This problem of inequality is not present in all spheres of sciences; the most explicit it is in engineering and electronics.

Stereotypes about professions	<i>Speaking about women discrimination, although formally it is not existing, nobody discriminates anything and 'bla bla bla', but, if we take into account that in the Riga Technical university it has</i>
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	<i>been historically regarded that this is men's occupation all these technical spheres, then there is nothing to do for women. [...] It is clear that I need to climb over much higher barriers and get over more difficult walls. Nobody is showing it openly, but, seeing this entire attitude and everything, it is not so easy. (Engineering and electronics, age 31-40)</i>
Problems with elder generation of scientists	<i>Of course, it is clear that attitude from colleagues, who are my age; their attitude is different, considerably different. But all this so-called "old guard", representatives from generation "over 50", which is dominating in the department, it is beyond hope, there is nothing you can do. (Engineering and electronics, associated professor, age 31-40)</i>

Speaking about competition inside their groups of scientists and its influence, women-scientists pointed out that the competition can be both good and bad. The good aspect is the spirit of competition, which contributes to development, but in its turn bad competition is obstructing successful process of doing research. Women-scientists feel better in that kind of work collectives, where there is no competition or it is very little.

Overall influence of competition	<p><i>The same as envies, there are two kinds of competitions – 'black' and 'white'. Black competition is stealing of ideas and ideas are stolen a lot, because ideas are emerging when you are working. [...] What I do not like from this 'black' competition is that after someone has stolen this idea and tries to realize it, he tries to bite off all the others, who are working in the same field in a little bit different way. (Engineering and electronics, head of department, age over 60)</i></p> <p><i>There was no competition before, because I was the only young student and there was no one to compete with. Now, when there are more, it is very good. It stimulates and motivates to direct your work further. (Physics, research assistant, age 21-30)</i></p>
Evaluation of status quo of the workplace	<p><i>It is difficult to judge about competition inside the group. I think that each has his/her theme and each is working on his/her work. It would be good if there was a sort of healthy competition, but I do not quite feel it. (Biochemistry, head of laboratory, age 31-40)</i></p> <p><i>Our atmosphere is extremely nice, because we, firstly, do not have unhealthy inner competition. In many places there is extremely unhealthy competition, where because of 5 Lats, exactly in the University... (Engineering and electronics, associated professor, age 31-40)</i></p> <p><i>Atmosphere is good and in general the collective of institute is very responsive and friendly. You do not feel competition and rubbing between people, because each is doing his/her work</i></p>

	<i>and results are demanded. (Chemistry, head of laboratory, age 51-60)</i>
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Although competition could have its positive sides, women-scientists stress that cooperation is very important in the process of research, because one scientist cannot achieve anything. Besides that in research institutes possibilities of mutual competition are reduced by the fact that people, who work there have explicitly chosen their sub-themes and they are not “sneaking in others’ field”.

I am afraid of that kind of competition, when “I want to take his position and I will not help him, but...” Because in our job we cannot work individually. One is measuring; another is calculating and doing it together. But if one of them thinks out that he wants to achieve more than the other and I will start to do the dirty job for him/her. (Physics, head of laboratory, age 51-60)

Science is not developing in the conditions of competition. Competition could be as contributing factor in business, but in science competition more holds back. It is difficult to create something, to work creatively if you know that somebody else is breathing behind you, who want to do more in your field. These are not such circumstances. (IT, associated professor, age 21-30)

The concept of an excellent scientist

The image of an outstanding scientist for interviewees is connected with several characteristic features. The first mentioned by many scientists is affection and interest about the field, where he/she works. A scientist cannot stop asking questions, trying to find out something new, he/she cannot lose interest and the wish to go deeper in examining questions. These characteristics – wish of cognition and explanation – should be essential characteristics of a scientist as a personality.

To retain interest all the time. Heaven forefend that you become indifferent with time. [...] To be a researcher you need to have a wish, interest. (Physics, head of laboratory, age 51-60)

It should be this worrywart, somebody, who likes to dig, search, and find out something new all the time. This is the main thing. (Chemistry, vice-dean, age 41-50)

The wish to understand, to go deep. Interest about the research object. And not that kind of interest that is stimulated by some external successes, but that kind of interest that comes more from a person himself. That sort of inner necessity to ascertain, to find out. (IT, research assistant, age 21-30)

But just the desire of cognition alone is not enough. For a scientist to achieve excellence, he/she needs to have appropriate mental abilities that enable him not only to ideally know his field, but also to exceed the borders of his field. Relevant is the experience that is gained over years and also such characteristics as ability to concentrate and determination are important characteristic features of a scientist.

Mental abilities	<i>Scientists must have developed analytical thinking, ability to see things not in a narrow aspect, but in high abstractions. A person needs to be creative. (IT, associated</i>
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	<p><i>professor, age 21-30)</i></p> <p><i>There needs to be an enormous ability to concentrate, determination, ambitions. Of course, one should have mental abilities for working in science. (Physics, researcher, age 21-30)</i></p>
Overall erudition and knowledge in his/her own sphere	<p><i>That basic ability is to be able to think globally – in physics, chemistry, mathematics. Because everything is in interrelationships. Experience and also intuition. Because nothing is outside the overall regularities. (Chemistry, senior researcher, age 51-60)</i></p> <p><i>The outstanding one needs to orientate oneself very well in the problem that he wants to deal with. It means that he needs to know very well what already is being done in the world and what the existing problems are. And there somewhere needs to be clear objectives how to do it. (Chemistry, head of laboratory, age 51-60)</i></p>

In so much as the work of a scientist is connected with cooperation and publishing of his/her research results, an outstanding scientist also needs to have abilities to work together with other people and, in general, should have good communication skills.

In science you need to be able to work in a collective – to be glad about achievements of others and to help others, but heaven forbid that the other one is using it all the time, I did not mean it that way. Because it is impossible to separate if you are working together – “I did till that place”. (Physics, head of laboratory, age 51-60)

You need to be able to communicate with people, this is one of the most important factors. Sometimes it is even more important than your knowledge, as far as I have understood from conferences. (Physics, research assistant, age 21-30)

Although all previously mentioned characteristics are important for a scientist, interviewees emphasize that working in science is a very hard work, where one needs to invest a lot and continuously; where success is not coming instantly, but sometimes only after several years work. Because of these reasons scientists need to devote a lot of their time for the issue of their research and they should not lose belief in what they are doing.

Careful work, work and work. And qualitative work. There is nothing else. (Astronomy, assistant, age over 60)

Not to lose belief in your work. [...] You need to take into consideration that luck could come neither today, nor tomorrow. Maybe it will be tomorrow, but maybe after a year. But to believe in what are you doing. (Physics, head of laboratory, age 51-60)

Very big predisposition and diligence. If you will give up, if you will not be diligent, then you will not get further. Now everything depends on you, are you searching for, do you want to prove yourself, you will not succeed if you will just wait. (Astronomy, researcher, age 21-30)

The aims and work experience of women-scientists determine their viewpoints about what

characteristics an outstanding scientist should have. The interviewees, for whom career making is important, name determination, initiative and wish to prove oneself. A big emphasis in a number of answers is put on investment of enormous work and not losing belief in the work that is being done. This kind of answers is dominant in answers of more experienced women researchers and one of them also mentions an example:

For a while we were told: "Why are you working with these organic materials for so long time? There is no use of them anyway." And, here, in 2000 there is very fast growth. So you should not lose belief in your work. (Physics, head of laboratory, age 51-60)

In general, it is possible to say that the ideal type of a scientist for each interviewee is connected with those skills and characteristics, which have proven as necessary for work in women-scientists' work experience. It may also be a reminder for themselves about the characteristics that should not be lost.

One of the women scientists also pointed out that she is not regarding herself as a real scientist, because she needs to spend too much time with her family:

It would be difficult to regard myself as a scientist, because it demands too much time. If I have a family and a spouse at home, then I cannot dedicate myself there in full value. I know colleagues, who also come home and are working hard there and wherewith that result is bigger. (IT, researcher, age 31-40)

Work and family life

Most often difficulties with combining family life and scientific career are connected with the lack of time, because, as it is pointed out by the respondents, science is not only a position, but it is lifestyle. One of the women researchers pointed out that she never stops thinking about the issues that are connected with her work and therefore a husband would obstruct her from dedicating herself fully to science.

Once the founder of observatory of the Academy of Sciences Jānis Ikaunieks has said that "a scientist is working 24 hours per day", because during the night also his brains are concerned with that problem, which was not solved in day; it is solved at night. Not because of being awake, but brains just have a task and they are working. (Astronomy, assistant, age over 60)

Now I do not have a husband, I have a 13 years old daughter, she is now independent, [...] but if there would be a husband, then it would be difficult, because then I would need to think in evening what to cook. You need to think and analyze, because for a person – for a scientist as me (I am not saying that it is so for everyone) analysis is going on constantly. You get some results during the day, you have read something and some synthesis is continuing all the time. Therefore it is difficult to switch to social life – kitchen and all the rest. (Biochemistry, docent, age 41-50)

The women-scientists, who are married and have children, in interviews were expressing opinion that it is impossible to be an outstanding scientist and good wife and mother at the same time, and therefore each scientist needs to make her priorities. The main problem is time, but there are also scientists, who, although with certain difficulties, have managed to combine career with family life.

Lack of time	<p><i>If a woman wants to have some outstanding results or to make a career in particular science, then she probably should lay aside the idea of family. [...] Probably, it is more a question of lifestyle, because, when I come home, I cannot continue thinking. I am sitting here, I have that thought, but I know that I need to go, to take a daughter from kindergarten, husband is waiting, and then I am going and thinking what to cook. I am thinking that “logical chain”, but by the time when I would have come to the idea and its realization, I need to go home, because there the family is waiting. (IT, associated professor, age 21-30)</i></p> <p><i>The question is about what a person wants in his/her life – to nurse children, to be a good wife and to go on, then there just physically is no time to be a good scientist – it is impossible to combine these things. And then is the question, what is most important in your life. If more important for you is your career, then it is career, but if you need a family with many children and good relationships, then, of course, there is no time for all this. (Chemistry, vice-dean, age 41-50)</i></p>
Benefits from combining	<p><i>I think that this [combining of work and family life] helped me to perfectly divide my time. I could take all three daughters to music schools, circles of drawing, sports and so on. In the same time it is also positive, because it mobilizes and does it very precisely. Makes me divide my time precisely and to understand that time is money. (Engineering and electronics, head of department, age over 60)</i></p>

Women-scientists are aware of difficulties of combining work and family life and therefore one of the used strategies is to primarily turn to career and achievement of certain position and financial guarantee. When it is achieved, then women are ready to give more to family questions.

Until now it has been so that I was mainly working and was not thinking about family, but right now I have decided to resolve family questions. There is enough worked and achieved and I can allow myself to relax a little bit. Because I have reached so far that I do not need to run all the time. (Engineering and electronics, associated professor, age 31-40)

Life stories of interviewees prove that a better combination of career and family life have those women-scientists, who are married to a person, who comes from the same or similar sphere of work. These women receive more understanding and support from their husbands than those women whose husbands are unfamiliar with wife's work and its requirements. Furthermore, if both spouses are scientists, they are able to adjust their work hours to combine work and family.

There is also some importance of society's dominant viewpoints about the roles of a woman and a man in the family. In accordance to them a woman-scientist cannot fulfil her gender role. It is possible to notice support of these classical gender roles also amid women-scientists despite the fact that most often they are not fulfilling their roles. Nevertheless, there should be remarked that women-scientists, who really support traditional roles, were not able to form a successful family life and they are divorced.

Importance of husband's profession	<p><i>The best families are those, where both are working in sciences. Maybe it is better that they work in different fields and not in the same one, but then at least people understand each other and understands what means to be in exactly in that moment in that place, where he wants to be. But if a spouse is not connected with science and education, then it is quite difficult to understand needs and necessities – why you need to be there in that exact moment. (Chemistry, vice-dean, age 41-50)</i></p> <p><i>My husband and I are both university people, we are both mathematicians and we practically work in the same place. This means that the time for talks with students we have adjusted so that when one of us is at work, the other one can be at home working on publications or preparing lectures and such. (Mathematics, head of department, age 31-40)</i></p>
Traditional gender roles	<p><i>Only strong personalities can combine family and career. [...] Wherever you look, everyone has instilled more that woman needs to be the one, who will protect house, take care of family, bring up children, 'there will always be fire in hearth' and 'porridge will be warm'. To imagine that woman now will run and do research in physics, it might seem odd to men. (Physics, researcher, age 21-30)</i></p> <p><i>Of course, a man can help to nurse children and to let her go somewhere. But, to my mind, it is wrong that a man sits at home with a child and nurses it. Because always it is provided that woman will have children sometime and she needs to nurse them. It has been so for hundreds of years until now. (Chemistry, vice-dean, age 41-50)</i></p>

Women-scientists with grown-up children say that because of the work they did not have enough time to spend with children, when they were growing. But interviewees perceive this situation as logic consequences of their priorities.

My children at times have rebuked me that I was too little time at home. It is so. When they are grown-up, now they are saying it. (Engineering and electronics, head of department, age over 60)

I need to admit that I have devoted too little attention to my children. When they were small, I needed to finish university, to defend my thesis and these years are running and they will never return back. I have a thesis, but the children are not seen. And I will never see them in that age. This is question that maybe at that moment it would be better to stay with children, to stop career. That kind of dilemma. But nobody is at fault there. A woman herself chooses whether she wants to be with a child or to make a career. (Chemistry, vice-dean, age 41-50)

There might be problems in family life exactly because of the irregular working hours of a

scientist, which means that women-scientists need to work also late evenings and weekends. As some interviewees point out, there is no such term “overtime hours” in science; you need to do that work, which is necessary. Nevertheless, it is possible to plan doable works in the way that working hours at least approximately would be taken into consideration.

Each profession and career is egoistic. Quite a lot you need to subordinate to work. [...] I do not have eight hours working time with all consequences. I have had Saturdays and Sundays when I need to put aside my personal interests. (Physics, head of laboratory, age 51-60)

We have praxis to work more if there is need for it. If I am not loaded with works, I can organize my time more freely. Of course, there are people who are coming at eleven and work in evening, but nobody is used to counting hours. (IT, research, age 31-40)

Whether these are overtime hours or working hours, it largely depends on how each plans his/her experiments. If he/she does it well enough, he goes in as if in official working hours and does everything. If you cannot plan your work and you will need to come again, of course it goes into overtime hours. But it should be understood that the experiment needs to be finished and it cannot be left in the middle and go home. (Biochemistry, head of laboratory, age 31-40)

The women-scientists, who have children, also mention other aspects of combining family life and career. For example, there are situations, when the employer himself is promoting compliance to working hours. On the other hand the respondents also mention possibility that the employer rather chooses to hire a man, because he could potentially devote more to work. Several women-scientists also point out that there are works, that would not be advisable for a woman to choose because of the reason that because family will make them leave their jobs at least for a while.

Prompting to observe work hours	<i>It is the opposite with overtime hours – all our big bosses are complaining that we have stayed here; that we should go home, the family is waiting. But in the cases, when you are succeeding well, you can sit till some 10 o'clock in the evening. (IT, associated professor, age 21-30)</i>
Women as unfavourable worker	<p><i>I think that many employers look at women that they could have children, they could go in decree and wherewith it is not comfortable and then also children might be ill. In any case a woman is more connected to family and if work takes more time, and then it is more difficult for her. (IT, researcher, age 31-40)</i></p> <p><i>It is completely clear that a girl sooner or later will get married, she will have children, some interruption in career, will have a family. She should not be a technologist in the factory. (Chemistry, vice-dean, age 41-50)</i></p>

One more difficulty that women-scientists face is returning back to work after maternity leaves. The respondents say that there are scientists that choose to quit their occupation after the birth of a child. An important factor is the length of maternity leave, because after a long break it is difficult to return because of „going out of circulation”.

Wish to return	<i>It depends on the person – if she wants to spend more time for family or she has new interests, then she goes away from science. But if he/she likes what he/she is doing then a person returns. Of course it is difficult get back in work rhythm if you have not been working for a while. But if there is a wish, then there are no problems to combine. (Physics, researcher, age 21-30)</i>
Difficulties of returning	<i>It is not the working place's wish to take back or the financial support but the maternity leave and the break that determines. Unfortunately it is the break itself – unfortunately this person is out of circulation. There are a lot of things happening in science in that time. (IT, research assistant, age 21-30)</i> <i>Science demands very, very much time, it is a continuous process. If you go away from this process for a year or more, then you are out of circulation and it is very difficult to return back in this circulation, to read what has been written during that period. This is the main problem. (Biochemistry, head of laboratory, age 31-40)</i>

The interviewed women-scientists with children had taken as short maternity leaves as possible to have an easier return. For others faster returning to work was determined by financial reasons. One of the scientists mentioned that in her career she had experienced a case, when it was tried to make her take the child care leave in order to place another person in her position.

I did not take the break. My daughter was four months old, when I started to give classes again, at least few hours per day. [...] I was not making that break, because I had doubts that I will return there after doing nothing for a year. (IT, associated professor (age 21-30)

I have never used leaves, and I have had such a situation, when it was very difficult to live with three children if you were not working. Simply there where no means for living. I even had a situation, when the head of the laboratory wanted me to take a break to bring forward his colleague in position of elder lecturer. (Engineering and electronics, head of department, age over 60)

Although the returning from maternity leave can cause problems with returning to sciences, there are scientists, who do not consider returning as a problem.

There are no problems to return in science. Maybe there could be problems of returning in manufacture, but it is possible to return to science in any moment, because it is academic freedom. Maybe it will not be the very same position, where a person was, because she had to be replaced for that period, when she was away. (Chemistry, vice-dean, age 41-50)

Interim conclusions (summary)

The factors that contribute to scientific careers of women:

- In childhood, youth and study period the necessary support is received from parents,

teachers and lecturers to develop current skills and interests, and encourage to choose a scientific career;

- The popularity and novelty of science;
- Early involvement in work environment, i.e. options to start working in a scientific institute during the study period; to get to know requirements and benefits from scientific work;
- Favourable work environment – a work collective where support from colleagues and lack of competition is present, as well as possibilities to do creative work, where each women scientist can research questions that are of her interest;
- A wide range of possibilities to get funding for doing research, participation in competitions and publishing both in local, and in international level, also institutional support in allocation of financing;
- Successful family life, which is characterized by support and understanding from husband, his help to combine work and family duties.

The factors that are obstructing scientific career of women-scientists:

- There are difficulties in formation of careers that are connected with lack of governmental support and lack of financing for acquisition of necessary technology, doing research and participation in conferences. Difficulties are also connected with complexity of allocation of EU financing and the big competition about the gaining of necessary funds;
- A necessity for wide social network to be able to publish their articles (in separate cases);
- Existing stereotypes about men and women professions are not favourable to women-scientists because they need to face these stereotypes both outside and inside of the scientific environment, especially outspoken it is in spheres, where women proportion is small;
- Combining of career and family life creates lack of time and this situation is even more sharpened by support of traditional gender roles in family by society and women-scientists themselves. Most often women-scientists are not able to fulfil these roles completely;
- Problems can also be connected with returning to research work after maternity leave, which most often means detachment from scientific milieu for a certain time period.

II.3.2. Participation in decision making bodies of scientific institutions

Administrative position and scientific careers

All in all women-scientists strictly differentiate between scientific work and research and being in an administrative position. They point out that both spheres are impossible to combine. However, in order to fill a leading position in sciences, in the first place, one has to be a scientist with an appropriate scientific degree.

One might think that it is easy: leading some institute, that is not much, it can be combined with science. It is impossible to combine! Administrative work is administrative work, all the bureaucratic issues – thinking of cleaner's work hours, what paper we should buy, will the printer cartridge be enough. This automatically means that combining would take at least two people. I have done this work for many years and I do not want to anymore. Either you do something scientific or administrative work. (Engineering and electronics, associated professor, age 31-40)

Why I cannot apply for an administrative position despite the fact that I have better knowledge than men in the institute have now? Because I do not have a scientific degree. (Astronomy, assistant, age over 60)

The existing opinion about impossibility to combine administrative work and scientific research makes women-scientists see the administrative career as an abandonment of research work. For this reason some scientists are strictly pointing out that they want to remain in the field of science and research. However, some do not exclude the possibility of filling an administrative position in time.

Administrative positions are a somewhat different sphere; I think people need little different characteristics for that. [...] Anyhow I rather do science than order other people around. [...] Things happen, life can make one do a lot of things but at the present moment I cannot imagine myself in an administrative position. (IT, researcher, age 31-40)

Usually it is very hard to combine a leading position and research. I prefer work in research. I cannot imagine being in a leading position but I do not exclude the possibility. (Physics, research assistant, age 21-30)

Some scientists see administrative positions as a necessity, a post that has to be taken if one wants to make a scientific career. Women-scientists would like to be the heads of research groups with definite managerial tasks while primary actively engaging in research.

The higher one climbs, the more administrative positions. What kinds of administrative positions? With time leading a project or writing application for a project becomes inescapable. It is both a strategic and an administrative work. So I reckon with having more work in the future. Here we have several examples when people who have started off as simple scientists now are spending a lot of time for administrative work and guiding students, creating an environment so that the young can work successfully... (IT, research assistant, age 21-30)

Both women in leading positions and women in subordinated positions admit that they would like to work in a higher post in research (e.g., senior researchers, heads of research groups) or pursuit

an academic career. However, they do not wish to work in an administrative position which would be more related to bureaucratic and managerial procedures than creative research.

As far as I know, real scientists are running away from administrative positions. The scientific career is more related with head of a research group or a laboratory which would not be a purely administrative post but it is work in science. Here the bar can be made higher by enlarging the group or broadening research themes. (Biochemistry, head of laboratory, age 31-40)

I do not like those administrative positions that much, but as I said one inevitably comes to them. I do not feel enthusiasm about leading people and doing paperwork. I do not know if I would like to be the head of an institute. I think that the thing I could do is to lead some particular research projects. (IT, research assistant, age 21-30)

I would not want to do purely administrative work. What I like more is the work in the field deep mathematics, exactly this field. It would be more a methodological work in sphere of education – educating pupils in deep mathematics, developing instructional materials, preparing future students. (Mathematics, lector, age 21-30)

The women-scientists in leading positions are more likely to pursue a career in sciences. The connection between an administrative position and research can be manifested in occupying leading positions. When a scientist is receiving higher scientific degrees and working in research for a long time, the scientist collective can offer her a higher administrative position even against her own wish.

When the previous head of laboratory left, the collective made this decision. On one hand, the leader had guided me to taking this position, on the other – it was a decision of the collective. (Physics, head of laboratory, age 51-60)

I think that a leading position is connected to administrative work. If one works and gets noticed and becomes a director – that is career. If one has deserved it and has proven him worthy, why not? (Chemistry, head of laboratory, age 51-60)

I had a proposal from the administration that they would like to see me as the head of department even though the head of department that was in position then could still participate in the contest. We were two running for one place, both handed in documents and in a close contest I won with a small majority of votes. (Mathematics, head of department, age 31-40)

There are fields where scientists who are not in leading positions but would like to be, admit that both scientific and administrative careers are time consuming. These scientists relate their knowledge and leading projects to administrative duties.

Scientific career	<i>I would not apply for a leading position yet but I would do it in time. Right now I have to finish my dissertation. [To apply for a leading position] one at least has to have a doctors degree, has to have students, new researches. (Physics, researcher, age 21-30)</i>
Academic career	<i>I do not want to apply for an administrative position. But there is another aspect; in parallel with scientific work it is possible to pursue a career in pedagogy. That is something I would not</i>

	<i>say no to. That would be giving lectures in university and being a candidate to becoming a professor. Head of department would be closer to administrative work and I probably would not want it but that would be a logical next step in the pedagogic career. (Biochemistry, head of laboratory, age 31-40)</i>
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Being in a position of leadership

As the most important factors for occupying high positions in scientific institutions interviewees mention professional skills and also informal relationships. The adherence of professional skills and formal requirements is characterised by a fair and neutral competition as a basis for attaining a position. In its turn, the recommendations given by the former leader and a constant overtaking of leading responsibilities in the work place testifies that the woman scientist is accepted as a leader in the informal environment.

Professional criteria	<i>A position is gained after participating in a contest and elections. I hand in my CV with all my data about my achievements and publications, all job descriptions – where I am taking a part, what I lead etc. I participate in a contest, [...] the voters are the Scientific board of the institute. [...] I think it works like this in all institutions. (Chemistry, head of laboratory, age 51-60)</i> <i>In our department what matters most are the professional qualifications because we have strictly divided spheres: students, science, administration, there is enough work for everyone. One can accomplish all one can think of. There are no reasons for competition and unhealthy relations. About informal relations – everyone works peacefully. (Biochemistry, docent, age 41-50)</i>
Informal relations	<i>In the last three to four years before Silins [the former leader] went away a surprisingly good contact developed between us. Back then he delegated several works to me, officially called me the deputy of head of laboratory. I cannot really call it a preparation but a lot of laboratory matters became my responsibility. (Physics, head of laboratory, age 51-60)</i>

Those women-scientists who are in leading positions practically do not talk about controlling resources except such an advantage as access to more information. As a result these women are in a more favourable situation if compared to other scientists.

Administrative position means advantages because it lets to access information that usually is not known by others. It is awareness. A lot of scientists who work in non-administrative positions simply do not find out a large part of information, it does not get to them. Or in

case of Latvia – they get the information too late. Scientists find out about applying for projects when the time-limit is already over. (Chemistry, vice-dean, age 41-50)

Administration is necessary if we talk about attracting funding, the European Social fund money and Council of Science grants. If I am not the head of the grant or involved in another way, I do not even get close to that money. (Mathematics, head of department, age 31-40)

Even though women in leading positions have certain advantages in the control of resources there are also explicit difficulties that arise because of the administrative duties because – limit the time for doing scientific work. Women in leading positions see the work in active research as more important and giving advantages often not seeing administrative work as preferential in terms of finances.

Combining science and administrative work	<p><i>The connection between scientific and administrative career is terrible. [...] Trying to make directors out of high-class scientists is a crime. He cannot be a scientist because he is swamped with other works. For me the science part is left on the table but here I have bureaucracy. (Physics, head of laboratory, age 51-60)</i></p> <p><i>I think that astronomy and our institute still exists thanks to our late director Arturs Balkavs – Grinhofs. The administrative work took a lot of time for him and because of that he could not develop a better scientific career. Administrative work is a work that takes nerves and time. (Astronomy, assistant, age over 60)</i></p>
Disadvantages of administrative work	<p><i>The work is not easy but I have to do it. If I am the head of the laboratory I have taken a responsibility. Of course there is more work. I do not think it is a desired position because it is also not appreciated in the financial aspect. (Chemistry, head of laboratory, age 51-60)</i></p>

Most women-scientists have never faced an opinion that there are reasons why women cannot be as good leaders as men. However, several interviewees point out that certain prejudices do exist. On the whole, the negative stereotypes are more pointed towards women as leaders than women as scientists.

Evaluation of women leaders	<p><i>In our institution there have been no stereotypes of men filling a position. Women and men are equal in this sense. (Physics, research assistant, age 21-30)</i></p> <p><i>One can hear gabble in everyday conversations but officially there have been no statements about women as bad leaders. Lots of things happen day-to-day, take the driving as an example. But nobody has specially jabbed at me that I am a bad leader because I am a woman. (Physics, head of</i></p>
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	<i>laboratory, age 51-60)</i>
Woman as a leader and scientist	<i>I have heard that women are not good leaders, exactly in the administrative works. These prejudices do not have much to do with that what happens here in the institute. I think that I have heard more opinions of women as bad leaders not women as bad scientists. (IT, research assistant, age 21-30)</i>

The comparatively small influence of gender on filling leading positions is supported by the fact that women-scientists do not activate this problem. They admit that gender roles have not had much importance in their everyday work in science institutions.

Coming across prejudices about women leaders? I might have heard some such variants but I have never paid attention to them. (Biochemistry, head of laboratory, age 31-40)

I have never heard that women are not good at leadership which is really interesting. I have never heard anyone complaining. Of course, there are some flayers and such. And there are also a lot of good male leaders. I think that having women leaders is very good. (Engineering and electronics, associated professor, age 31-40)

Gender does not have a considerable role in work relationships and becoming a leader. More important are the time-proved skills the person has showed in his research field. Furthermore, women-scientists believe that there are certain common characteristics for leading men and women.

In our institute the acting director is a woman and everything is very well. People appreciate her and she does her work very well. She was put into this position so there are no prejudices here. (IT, researcher, age 31-40)

Opinion of women as bad leaders is wrong because women are very different. Emotionality can sometimes be a good, sometimes a bad thing. It is a stereotype that a man has to take that position, it is the accepted way. (Physics, research assistant, age 21-30)

If a woman has achieved a leadership position there are no prejudices. But at the same time, if I remember the study process, practically it was the study time when it crystallized if one is able to finish physics or not. [...] I have never come across prejudices or not being voted in because of gender. (Astronomy, assistant, age over 60)

Gender and administrative work

While pointing out stereotypes about typical characteristics of men and women leaders, women-scientists also stress the existing equality of opportunities and ignore the differences they themselves have named.

I think the only obstacle for women is their inner built. Men are more tended towards leadership and career, women not as much. There are no such obstacles as: if I and a man compete the man will be chosen, not at all. I think the disinclination of women is the only problem here. (IT, associated professor, age 21-30)

On the other hand, women-scientists describe certain stereotypes as objectively defined, stressing that their social reproduction in certain spheres functions as an obstructive factor not only for achieving administrative positions but also for science work in general, e.g., an unwillingness of

men to work in subordination to a woman.

Characteristics of women	<i>It is a question about the way men and woman think, about the basic differences of thinking that the nature has put in place. One thing is that women are more emotional, that is a dimension men do not have especially in engineering where everything is very dry and numerically accurate. If I come with a more emotional idea, nobody understands me unless I put everything in numbers and mathematical equations. (Engineering and electronics, associated professor, age 31-40)</i>
Not accepting subordination	<i>If the leader is a woman she has to find a compromise with misters who do not want to obey. There might be the difference for women leaders. Lots of people do not find it acceptable – misters do not find it acceptable that a lady is in leadership. (Chemistry, senior researcher, age 51-60)</i>

In Latvia the candidates for scientific positions are chosen from the state's comparatively small and closed circle of scientists. For this reason informal relations have an important role in recruiting people for high positions in science institutions; however none of the scientists mentioned either that in this aspect gender is important or that there would exist differences between genders.

However, it is possible that there is an indirect factor: there is a male majority both in high positions in scientific institutions and among successful scientists. Since it is usually easier to form relations with people of the same sex, women are in a less favourable situation compared to their male colleagues. Forming informal relations is only made less complicated in cases when the women-scientist has an already established status in the scientific community.

Latvia is not a big country so by changing one or another employee surely there are possibilities to receive informal references or to find a person from the previous work place. One should practically count on the fact that people can give informal references. In my opinion, if we talk about making a career inside the institute, the reputation a student has in the university matters a lot. (IT, research assistant, age 21-30)

I have a notion that forming contacts is freer when it is men-to-men. If a woman joins, it is taken somewhat funnily. It depends, if the woman is a personality with a name, then it is easier. But if a woman from the small Latvia wants to go and talk to some "big man" from the US, the contacts not always form. (Mathematics, head of department, age 31-40)

Scientists mention also negative examples when informal relations are the cause for situations when subordinates do not see women as good leaders. Interestingly it is not only men who have objections against women in leadership positions, also several women-scientists pointed out that they would not like to work in subordination to a woman. This view is also shared by those women who are in leading positions themselves.

One of the interviewees points out that even though scientists of both genders hold stereotypes about women as inappropriate for leadership, the work collective will accept a woman leader more favourably if she is chosen from the midst of the research institute's personnel.

Objections against women leaders	<p><i>Women do not receive enough respect from their subordinates. Usually men do not love women leaders. The same could be said about women because also women like male leaders better. I can say the same about myself, I will like if I am given orders by a man, but I would not like to be commanded by a woman. (Chemistry, vice-dean, age 41-50)</i></p> <p><i>I think that men are the ones who should be at the wheels. [...] I agree to the view that men and women are psychologically and psycho-emotionally different. [...] If a collective has only men it is one type of a collective, if there are both genders it is another, if only women – again different. That should be considered and it is better if there is a male leader. I probably would not like to be subordinate to some woman. (IT, associated professor, age 21-30)</i></p>
Stereotypes and exceptions	<p><i>Society has stereotypes. Not always it is acceptable to men that a woman has leadership. There are cases when it can be felt. It can also be the same among women. But this could be more related to the cases when a woman comes from aside. Is she is one of institution's 'own' she has been appreciated before. (Physics, head of laboratory, age 51-60)</i></p>

However, apart from informal relations in the form of inability to accept women in leadership position, the women themselves admit that they cope with various possible prejudices and successfully solve situations where the interrelations of the scientist group could negatively affect the professional work in the scientific institution.

Fight with prejudice	<p><i>It is really difficult at work if an old classmate comes and then it is hard for him to accept that I am in a higher position. I have to take into account that he can say more than someone else could say because we know each other for a long time. All these things have to be taken into account. For me it is important to get the work done and I do not care about his rumble. (Chemistry, senior researcher, age 51-60)</i></p> <p><i>I have never experienced a situation when a women leader gets less respect from subordinates. I would not tolerate that! (Chemistry, vice-dean, age 41-50)</i></p>
Abilities of women	<p><i>The strength of women is the ability to feel the collective, to understand what has to be done to keep conflicts away. (Biochemistry, head of laboratory, age 31-40)</i></p>

Informal relations matter both in hiring a person for a position and the career possibilities, though such objective factors as professional achievements and the number of international publications will always be important in receiving a high position.

It is undeniable that informal relations have a role; that how much the director can count on his next level manager. If he can trust him. Such purely personal relations are important for him to form a view of his employee. But when it comes to evaluating on an international level, publications matter. You can be as good as friend with the divider of the money as you wish but if you do not have publications... (Biochemistry, head of laboratory, age 31-40)

Such typical 'women' characteristic as emotionality interviewees often estimate quite positively in regard to being able to lead a scientist collective and being in a high position. Women-scientists admit that women as leaders are more emotional but for this reason they are able to successfully defend the interests of their collective through better acceptance and understanding of their subordinate's wishes and interests.

Treatment of the subordinates	<p><i>Usually men are very 'direct' but women think more about the person, regard people more as personalities than just workers. Sometimes it is good, sometimes it is bad because it can interfere with work, but in our case it is combined. It can be both strength and weakness. (Physics, research assistant, age 21-30)</i></p> <p><i>A woman will understand it better if someone comes to her and says he could not do the work because of a headache or something like that. She may be more understanding. But I am just assuming, of course it depends. Same goes for character. My colleague and I were laughing that it is easier for women because they can have a good cry, shake it off and continue work. Men should better get drunk, it is harder emotionally. (Physics, head of laboratory, age 51-60)</i></p>
Gains from women leaders	<p><i>My friend from a foreign country said: have you ever noticed that all the leading positions in Latvia are filled with women? The president is a woman, the speaker of Parliament is a woman, the editor of the biggest daily newspaper is a woman, and there are lots of women in high positions in ministries, state secretaries. Lots of successful companies have women. I think that a lot of things have gone so well exactly because of women because they are not occupied with some small mercantile interests. Of course a part of the leading women could be, but women in general are more emotional and they think about a lot of things that men do not pay any attention to. (Engineering and electronics, associated professor, age 31-40)</i></p>

There are cases when women scientists feel much better in a collective or a work group that is lead by a woman because it is easier for them to form more successful informal relations.

Previously the leader was an academic, professor who was the head of University for a long time and also the head of the department when I was a student. He was very authoritative. [...] Later when he was only the head of department the relations become

easier but his previous position was still in my unconsciousness. Now I have very good and democratic relations with the current head of department [a woman]. I can say a lot of things more openly and solving work issues do not always need a department meeting because all matters can be solved as we go. (Biochemistry, docent, age 41-50)

Scientists admit that women, who have in time gradually moved to high positions, are constantly appreciated and their subordinates see them as good leaders. The obstacles a woman needs to overcome in order to gain a high position inure her to be a good and independent leader.

A woman's strength could be the fact that she has had difficult fights and obstacles in her career, but she has gotten to a high post in a fair fight she will be an extremely strong and independent leader. That woman who has fought for this place herself. Because she had to spend more energy, time and work. (Physics, researcher, age 21-30)

Everything depends on the personality, if the person is normally orientated, normally educated and self-sufficient – then when a person does not need more than himself, does not need some husband and a bunch of children or some social life. If you are in an inner peace with yourself, if you are a personality then you can be a fully full-fledged leader. (Biochemistry, docent, age 41-50)

The respondents mentioned that women need to see the connections between many things and they need to be able to do several tasks in parallel. Women-scientists interpret these conditions in two ways: they are either a stimulus to do and achieve more or obstacles to the scientific work.

Positive aspects of multi-tasking	<i>The life itself has made women always mobile. She has to see the totality – both family and work. And it is easy for her to switch from one issue to another. A woman is more mobile. If a man has started something it is harder for him to jump to the next thing. I have a feeling that men are less mobile. (Chemistry, senior researcher, age 51-60)</i>
Negative aspects of multi-tasking	<i>One thing is that on average women spend more time on house care – either it is children or parents, family as such. It is harder for a woman to 'tune out' of house life. On average she has more different things in life – either the child disobeys or the garden stays in weeds therefore she has different thoughts meddling in her head. On average women are more emotional. It is hard to say if it is good or bad, a despot is no good either. (Physics, head of laboratory, age 51-60)</i>

Women-scientists attribute such characteristics as accuracy and precision that to women leaders, these characteristics are best expressed in a well done work. However it is very possible that the work quality is hard to notice from aside, so interviewees point out that women who do administrative work are not always appreciated.

Characteristics of women	<i>The strong sides of women are that they are pedantic, accurate and very dutiful. (Chemistry, vice-dean, age 41-50)</i> <i>Anyone would say that women are more conscientious. But</i>
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	<i>regarding our Arturs Balkavs – Grinhofs, he also was very accurate and careful so it is nothing too special. Everything depends more on characteristics. It can happen that a man is very conscientious and it can happen that a woman is very careless. (Astronomy, assistant, age over 60)</i>
Lack of appreciation	<i>I estimate that the administrative position is one that pulls one in all directions, it is hard to focus on one thing, and several things have to be done at the same time. The scientific work is more steady. I think that women in leading positions are not enough appreciated. (IT, researcher, age 31-40)</i>

The above mentioned is supported by a fact there have never or rarely been women in high administrative positions in certain spheres and institutions. Overall the interviewees from these spheres mentioned the qualities of male leaders.

Only men have been in leading positions so I cannot even imagine. The strength of men and people in my sphere in general is the effort of leaders to be as objective and fair as possible. Also I have been taught to express my thoughts clearly, articulate and formulate my ideas. (IT, research assistant, age 21-30)

A male leader could be better for a true female collective because he will not interfere in women problems. (Biochemistry, head of laboratory, age 31-40)

Men have always had priorities for administrative positions. That of course is only normal. It is possible that a man is more rational. Men are more rational and they can organize some things without unnecessary emotions. Here their superiority has to be acknowledged. (Biochemistry, senior researcher, age over 60)

Possibly the lack of women in leading positions is determined by objective conditions. Men take administrative positions more, women stay with the scientific duties. Such a situation mostly arises because women wish to pursue the work on scientific research which is a much more creative and interesting occupation than bureaucratic and managerial administrative posts.

Here in the institute scientific managers are men. Or simply there are no women among the generation who can now teach students and pursue a career in science. So it is not a question of giving leadership positions to women, the women of that generation have either left the institute and academic environment in the times of change or have passed over to other positions away from science. (IT, research assistant, age 21-30)

It is true that the heads of departments in astronomy have always been men. [...] But, for example, it is completely opposite with the three women professors emeritus who I am helping for the last half year. In astronomy we have three professors emeritus women and just one man. Therefore I cannot say that women have received fewer merits. (Astronomy, assistant, age over 60)

Interim conclusions (summary)

Factors contributing to participation of women-scientists in decision-making bodies:

- An important factor for a woman to procure a high position is the support from the previous leader and/or the whole scientist collective as such;

- Women would like to follow a scientific career; they are especially ready to hold higher positions in research-related positions like senior researchers, heads of research groups. This may later lead to gaining administrative positions as well;
- Women see benefits from being in an administrative position, the most important is a wider access to information which helps to receive funding for their and their institution's research projects;
- Even though gender can be of importance when a person is chosen for a high position, there are much more important and more objective factors, e.g., work experience and achievements;
- Scientists believe that women have several characteristics which make them better leaders than men when it comes to team-building skills;
- Research areas where women are in majority.

Factors hindering participation of women-scientists in decision-making bodies:

- Women often do not wish to compete for gaining high administrative positions because they hold a belief that it is not possible to occupy an administrative position and fully continue research work. Between research and managerial work they choose the former;
- There exist prejudices against women as leaders, and both men and women-scientists can have reservations against working in a subordinate position to a woman;
- Informal relationships are important when it comes to choosing a candidate for a high position. Since in most of sciences and HT field more leading positions are occupied by men, it is easier for males to form these relationships and thus have advantages in the competition.

II.3.3. Solving the problem of gender inequality in science

Recognition of the problem of gender inequality in scientific community

The representatives of several sciences pointed out that they have not noticed gender inequality or specific gender-related obstacles for women in their sphere of work. More important obstacles are related to age and scientific work experience not the gender of researcher.

Non-existence of obstacles	<i>I think that there are no such obstacles. (Chemistry, head of laboratory, age 51-60)</i> <i>Personally I have not experienced any obstacles. If I have had a plan to do something I have been given the chance to do so. If I want to attend a conference I have the possibility. If I form cooperation with colleagues in other countries nobody denies me the possibility. I have not come across any specific obstacles just because I am a woman. (Physics, researcher, age 21-30)</i>
Other factors	<i>I think that there might be obstacles as I continue my career but they are not gender-related. For example, now I cannot apply to become a rector because I do not have the appropriate age, experience, number of publications and other aspects that come with years but not gender. (IT, associated professor, age 21-30)</i>

Some women-scientists hold a belief that the possibilities of each gender representatives are determined by their characteristics or the typical gender characteristics and skills that have encouraged choosing the current profession. Of course an interest about the chosen science sphere is important as well. In general, one of the gender difference aspects that appeared in the interviews is connected to the characteristics attributed to each gender.

Why such things as knitting and embroidery are more often done by women? Women have better developed motor-skills; they are more patient and have other feminine characteristics such as these. In computer sciences, I would not do technical stuff, I am afraid of the computer equipment. Such things characterise women. It might be the reason why there are more men in computer sphere; it is more a mechanical, engineering profession. (IT, associated professor, age 21-30)

Students come if they are interested. Everything depends on the natural abilities and interests a person has and the interests he suppresses or develops in time. That is, of course, if the child has a normal family. If not, if it is like now when thousands of children do not attend school, then it is really a discrimination. But, if normally, there is no gender difference. (Astronomy, assistant, age over 60)

Even though women-scientists do not acknowledge the existence of discrimination, the quotes mentioned illustrate that they do see some differences in the gender positions. The main difference in women and men scientific careers is connected to family (see section 1.3.) which, for instance, limits the possibilities of women to study or do field practice in other countries. Other difficulties

are connected with maternity leave and leave for child care. In these situations women are withdrawn from scientific work for a certain period of time and their possibilities to follow newest scientific developments are limited.

One of the scientists expressed a presumption that spending time for family is the main factor that has created the status quo: there are more men than women in leading scientific positions.

Family life as a restriction	<p><i>I think that it is harder for women to do field practice in other countries for a longer period of time. They cannot leave their families and usually it is hard to take the family with them because their husband or partner has work here. (Physics, research assistant, age 21-30)</i></p> <p><i>One big obstacle that also makes women leave science, which is a quite egoistic field, is the care for family and children. Then a return after three years [the usual period of child care leave] is very difficult because the science always develops. The return after these three or four years is hard. This is the reason why many women reconsider choosing this career. It is like that for everyone. Also male colleagues who have worked elsewhere and want to come back find that it is hard to “jump back in” in this moving train of science. (Physics, head of laboratory, age 51-60)</i></p> <p><i>There comes a moment when a women has to choose the aspect of family or the aspect or career. But if we differentiate between science and administrative work I do not see any outer obstacles in the science field. In the scientific environment itself there are very few obstacles. (IT, research assistant, age 21-30)</i></p>
Effects of family life	<p><i>If I am talking about the exact sciences, most heads of institutes are men. [...] There are more male than woman academicians. Women have a family life which withdraws from science for a while. [...] I would not say that women are not appropriate for this work but nevertheless the family life makes them stay behind and men move forward, it is in their nature. (Chemistry, head of laboratory, age 51-60)</i></p>

The stereotypes about men and woman professions existing in the society are mentioned as a reason for lack of women in exact sciences and the field of high technologies. Studies in these spheres are complicated and women lack the support to learn these sciences. The interviewees point out that these stereotypes are already established in school when teachers motivate boys to study exact sciences and technologies but girls are motivated to study in other spheres, for example, humanities and social sciences.

If women-scientists want to overcome these stereotypes they need a lot of hard work and to prove they are worthy again and again.

Existing stereotypes	<p><i>Women choose to study in more feminine spheres, the humanitarian ones. I think that the new technologies are more meant for males. Physics and mathematics have been a male priority from the start. It is that way and there is nothing to be done about it. It is so everywhere. I do not want to say there is no women programmers but they are certainly a minority. (Chemistry, head of laboratory, age 51-60)</i></p> <p><i>Prejudices are very fearful and tragic because there still exists a point of view that women have nothing to do in the technical spheres, that it is a male priority and women should not go there. That is one prejudice. Another thing is that sciences are very hard. It is not easy to learn in the Technical University of Latvia, it is very hard and complicated. (Engineering and electronics, associated professor, age 31-40)</i></p>
Causes of stereotypes	<p><i>Everything begins already in school. I think that these stereotypes do not form in university, that is just seen as a result. (IT, research assistant, age 21-30)</i></p> <p><i>Already at school women are oriented towards social sciences... (Engineering and electronics, associated professor, age 31-40)</i></p>
Overcoming stereotypes	<p><i>It takes five times more power and energy to overcome all those obstacles created by society's prejudices. The main thing you have to prove is that you are just as capable of doing things as a man. For this reason in a choice between a less capable man and a more capable woman the man often wins. There is a prejudice that there where a woman is there is also the kitchen, church, all the classics. (Engineering and electronics, associated professor, age 31-40)</i></p>

Changes in the state education policy are seen as one of the possible solutions by several women scientists. In their opinion much more attention should be paid to teaching sciences in school because pupils often tend to choose the easy way, i.e., not learning these subjects. It is also important that the children in school are given the opportunity to see and try out the work in sciences. By doing that they could decide if they want to study in one of these spheres.

The importance of state policy	<p><i>Everything largely depends on the state policy. Consider that after the regaining of independence they decided to let pupils choose their subjects. And of course they do not choose the more difficult subjects that need more effort therefore we now have problems with students of exact sciences and the sciences in general. (Astronomy, assistant, age over 60)</i></p>
Informed choice	<p><i>In schools instead of agitating everyone to go learn physics they should tell to go to laboratories because people there are</i></p>

	<i>very responsive. Pupils should explore more during secondary school. A professional orientation. Let them try everything, so they could try one and say "Heaven forbid!" and then try another and say "That is the thing I like!" (Physics, head of laboratory, age 51-60)</i>
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At this moment in some of the sciences, especially chemistry and biochemistry there is a lack of male scientists. For this reason discrimination of women is not felt in these fields. However, interviewees point out that the existent lack of men in combination with the rapid development of these sciences could open up more career opportunities especially for men.

Lack of men	<i>There is one problem and it is the fact that we do not have men. Mostly we have only girls and it is very hard to find a boy who would study chemistry. We do not have a women problem; we have a problem of finding boy students. (Chemistry, vice-dean, age 41-50)</i>
Male opportunities	<i>Right now there is a quite big male vacuum in science. And now it seems that there are quite big possibilities for development – new laboratories are opened, new groups are formed. And there could be a situation when a man comes to science and he automatically gets the first hand in competition for a leading position. I assume such a situation could arise but I cannot mention any objective examples and objective reasons for it. (Biochemistry, head of laboratory, age 31-40)</i>

All in all in the interviews appeared a tendency: if in most sciences the respondents talked about the lack of women and attracting more women to science, then in chemistry and biochemistry the proportion of genders is vice versa and the women in these spheres would like to see more men colleagues.

As the main reason for the lack of men in sciences the respondents mention the small salaries received by scientists. Women are ready to put up with such small salaries, however, men are not. Also in this context in some scientist's statements appears a support of traditional gender roles where husband is the one who's earning the money but wife's work does not have to be as profitable.

The biggest problem until now is that very few men come here; mostly laboratory work is done by women. The main reason for that is our current salary. (Biochemistry, head of laboratory, age 31-40)

Men have to earn money for the family. Who will come to work in science for mites? The situation in the Institute of Solid State Physics is better; there are also more young people there. Men do not go to biology either. Women are necessary but there cannot be a dominance of women. (Chemistry, senior researcher, age 51-60)

There is science but there is also the real life. A person has to make money. We can talk of high spheres and Euro standards but if you make 200 Lats a month and your partner makes

a 100, it is not realistic. Therefore it is logical if there is a wholesome family where husband makes the money and then wife can work as a lab assistant and elsewhere. She can make money but it is not the most important. (Biochemistry, docent, age 41-50)

Policy actions for encouraging active participation of women in science and HT

Agents

The state institutions are seen as one of the main agents for dealing with inequality. They should cooperate with the scientific institutions to help women-scientists and eliminate discrimination. One of the scientists mentioned “alternative councils” as a possible agent. These councils would give decision making power to scientists (especially women) who are not in power positions at the moment. These people could be the ones who could bring improvements in science administration matters.

State institutions	<i>If there is discrimination, it should be solved by the state. But only the scientific institution can push up the issue. State has to give support and try to solve the problems. (Chemistry, head of laboratory, age 51-60)</i>
Alternative councils	<i>An alternative council should be made to involve those who are not involved yet but work in the field. It would be a great power in any sphere. Women are the ones who not only work quietly but actually do most of the work. [...] The solution could be an alternative council. I am not saying that it should consist only of women, I am not a feminist. [...] The fact is that women are pushed out from several issues where men say: we are the heads. Its stupidity, narrow mindedness and stupidity. (Engineering and electronics, head of department, age over 60)</i>

Especially the women-scientists working in the spheres of engineering and electronics agreed to the view that it is necessary to have public discussions about women role in sciences. These could include experience exchange seminars about inter-gender relations with participants from different sciences. It is possible that also continuous informing and educating society about gender equality matters could improve the career opportunities of women in sciences and in the field of high technologies.

Discussions between sciences	<i>I think that it would be interesting to have seminars with women- scientists from different fields and talk about their experience because in every field a different situation has historically developed. There are some sciences, for example, pedagogy where there are no men at all. The Technical University is the complete opposite. And then there are places</i>
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	<i>where it is mixed, for example biology, geography, everything is on a par there. (Engineering and electronics, associated professor, age 31-40)</i>
Informing the society	<i>I think that men are using the coming forward of women unfairly, women leading and working instead of sitting home with the children. They are abusing this and just imposing more work on women: you are a feminist, so do it! And then you have to work five times more because of that. And you cannot contradict because of all the prejudices. I think it will take several generations and a large and constant informing of the society. Constant not once in ten years for a week and then forgetting it. (Engineering and electronics, associated professor, age 31-40)</i>

Evaluation of policy actions

The respondents mentioned several possible ways of helping women to develop a career in sciences. Most of the suggestions are connected to giving support in combining work and family life. One of the possible variants would be giving an opportunity to keep a domestic servant; other variants are related to various allowances that would facilitate women return to sciences after longer intervals like maternity leave.

The respondents mentioned the possibility for men to have a child care leave as a positive example in helping women to combine work and family life.

Domestic servant	<i>Older people have told me that women academics including doctors and teachers previously had an opportunity to keep a domestic servant. It is one of the variants because house care is extremely work and time consuming. An example: my cousin who lives in the US is the head accountant in a Mid-America Telecommunications company. It is a very high position. She has six children and she has never had breaks in her career. Every day she has had a domestic servant who has cleaned the house and taken care of the six children who are like a tsunami and a tornado at the same time. (Physics, head of laboratory, age 51-60)</i>
For an easier return	<i>It is a good idea to create a friendlier situation for women when they return from child care leave. However this is not a means for career development, it is only a means to make sure that women will return to science at all. (IT, associated professor, age 21-30)</i>
Leave for men	<i>Situation also depends on the state policy. Now fathers can receive compensations for children. The things are going the right way. Greater involvement of both sides of the family should be promoted. (Chemistry, senior researcher, age 51-60)</i>

Grants only for women-scientists are one of the possibilities to support the scientific work of women. The attitude of scientists towards such solution is twofold; some support it while others do not. The problem with these grants lies in the fact that scientists mostly work in mixed-gender teams. However, special grants for women could be useful in situations when a scientist returns to work after a break but lack institutional support for doing research.

Mixed-gender teams	<i>What do grants for women-scientists mean? I think it is absurd. Here it is the Chemistry institute and I cannot imagine having grants only for women. Maybe some humanitarian spheres could attract more women this way; those should be spheres women are more interested in. It is different in inorganic chemistry. (Chemistry, head of laboratory, age 51-60)</i>
Grants for return	<i>It could be nice if there were grants to support those women-scientists who return to work after a break. For example, in cases where the work place's previous management has changed and the colleagues have left, and the women does not have current funding but she would like to do research very much. In such cases support would be very useful. (Physics, researcher, age 21-30)</i>

Another proposal in solving inequality of women in sciences is the introduction of a quota system. This would mean defining the needed proportion of women-scientists in scientific institutions. Only the scientists working in the most gender-unequal sciences (engineering and electronics) support such possibility. Most of the other scientists reject the need of a quota system as an artificial means that is not necessary.

In favour of the quota system	<p><i>Here in Riga Technical University we have scholarships for doctoral and post-doctoral students. It was interesting that one of the criteria to promote women involvement in science was giving 10% more points to women as an addition to the points earned. That is what Europe makes us follow. And it is quite nice considering that males are a majority among RTU scientists. (Engineering and electronics, associated professor, age 31-40)</i></p> <p><i>We have even lost a European project because the gender proportion was not adequate for the requirements. I support having certain proportion for the new scientists like 50:50 women and men. It could be taken into account as a coefficient or points could be added for observing this proportion. It should be observed and advantages should be given for that. (Engineering and electronics, head of department, age over 60)</i></p>
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Against quota system	<p><i>I do not think a quota system is necessary. I am against appointing people to leading positions; it should come as a logical career development, a generation change. (Chemistry, senior researcher, age 51-60)</i></p> <p><i>I do not think that we would need a quota, it is artificial. Only if the current proportion would drastically change, then maybe yes. But right now I think that the division of positions is quite proportional. (Biochemistry, head of laboratory, age 31-40)</i></p>
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One of the scientists pointed out that various policies to involve more women in science are popular at the moment and it is enough with that what has already been done, nothing new is needed.

The actions to involve women in sciences are 'in the fashion' and popular, we hear that more women are needed. For this reason there are no problems. Everything is good concerning both allowances and quotas. (Biochemistry, docent, age 41-50)

The women-scientists mention several reasons why they do not support the implementation of the quota system or giving special grants for women. One of the main counterarguments is connected with fair competition. The respondents believe that the best people should work in sciences and therefore it would be wrong to choose a less skilled woman instead of a more skilled man just because a quota has to be observed. Such actions would hinder the formation of a successful scientist collective. More importantly, exactly the implementation of the quota system would mean dividing peoples because of their gender instead of their skills.

If a quota system is implemented in our faculty that we have to have a proportion of 1/3 of women and 2/3 of men it would mean a competition between men. Competent men would not get into the faculty because we would have to take less competent women. (IT, associated professor, age 21-30)

My idea is that there should not be too much ladies. They do not need any privileges. We need sensible balance because extreme is extreme. (Chemistry, senior researcher, age 51-60)

Quotas certainly cripple the formation of the collective. People are not judged by their skills but by their gender. (IT, researcher, age 31-40)

Women-scientists mention the attitudes of men that would arise if women received explicit privileges as another counterargument. The existence of such attitudes might put women-scientists into a position where they are needed only to receive funding or fulfilling certain norms instead of doing qualitative research work. The result would be discreditation of women-scientists.

Some women-scientists point out that the mentioned mechanisms of "positive discrimination" are not necessary. Moreover, these well meant support actions could turn against women themselves and cause different kinds of discrimination.

Rejection from men	<p><i>If it will be made easier for women than men will think: what to expect from women, they get all the goods and advantages. There will be notion that women get their positions by doing nothing, that their situation is easier. For these reasons men</i></p>
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	<p><i>will have worse opinions about women. I think that everything should stay equal. (Physics, research assistant, age 21-30)</i></p> <p><i>I think that the quota system is a slippery subject. If women get a position only because of a quota there is a big possibility that men will see them as necessary only to make up the right numbers. If I am chosen because of my qualities it is clear why I am here. If I am being chosen just because of a quota that does not satisfy me as well. (IT, researcher, age 31-40)</i></p>
Support as a discrimination	<p><i>Judging a person by their gender not by their skills is in a way discriminating women as well. (IT, researcher, age 31-40)</i></p>

As one of the women-scientists points out, there is no need to implement various artificial actions to promote women participation in science and receiving high positions. Rather, the ways of motivating women should be found so that they try to compete and receive higher positions and overcome society's prejudices by doing that.

Who are the people who want to take leading positions? That should be researched. What are their ambitions? Because it is not easy, it means great responsibility. [...] There is also a question of that how many women actually want to do it and what their motivation is. How to change the existing situation, how to overcome the prejudices. (Engineering and electronics, associated professor, age 31-40)

The benefit of more women making careers in sciences and HT

Several interviewees expressed an opinion that it would be necessary to encourage girls to study sciences and high technologies. The basic argument is that girls should be able to study in the spheres that they are good at and interested in not regarding the widespread ideas about traditional profession division by gender. A very good motivation could be achieved via giving positive examples.

Also it should be mentioned that the scientists working in chemistry find it necessary to encourage not only girls but also boys. A group of scientists needs members of both genders. In addition one of the scientists expressed a view that women-scientists need male leadership.

Encouraging girls	<p><i>Everything depends on a person's wishes and natural abilities. It may be so that there are less science-orientated women but if they are gifted they can certainly be encouraged. (IT, researcher, age 31-40)</i></p> <p><i>It would be necessary to encourage girls. I think it is a leftover from the patriarchal society that men have to hammer in nails and go mammoth hunting. If we divide between exact and humanitarian way of thinking then women</i></p>
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	<p><i>are mostly humanitarian. But just as well I have had woman students with excellent exact thinking. (Engineering and electronics, head of department, age over 60)</i></p> <p><i>A person always hesitates a little and that positive example can inspire many by showing that it is possible to work and have children, that one can do it all. (Biochemistry, senior researcher, age over 60)</i></p>
Encouraging boys	<p><i>I think that more boys should be motivated to study. We have enough scientists and girls can work in science, they are very good because they are precise, accurate and so on. It just takes one boy genius for 10 girls who would come up with ideas and tell them what to do. Girls are great executors. (Chemistry, vice-dean, age 41-50)</i></p>

One of the interviewees mentioned another possible motivation to study natural sciences: the possibility to work in male collective which she finds to be better than a women collective.

One of the motivations could be: do not go to study economy, afterwards you will sit with other women accountants and tittle-tattle. Go study in a sphere where will be more males. (IT, associated professor, age 21-30)

However, there are women-scientists who think that there is no need for additional motivation to study sciences and high technologies. The arguments are alike those against the quota system. If girls start studies in sciences only because of agitation they will never become truly interested and professional scientists. This way they will only strengthen the existing negative stereotypes of women scientists.

I do not think that the equilibrium should be artificially encouraged. An unmotivated student, no matter a man or a woman, would not do much in sphere. And then we will have an absurd situation: agitation will work and we will have more women in the course but if they turn out to be weak specialists we will get the opposite effect. We will promote stereotypes like: see how women cannot handle technology. (IT, research assistant, age 21-30)

There are very different views among women-scientists about that if women could give something to sciences that men could not. Some scientists point out that the differences in way of thinking between genders gives each an opportunity to do something the other could not. There are some questions that are better solved by women and vice versa.

Women tend to have a little different way of thinking, an ability to look at matters differently than the rectilinear way of men. Therefore there is a common gain from something others may not even think about. (IT, researcher, age 31-40)

There are some questions women cannot solve. Men are necessary in sciences, it is a fact. There cannot be just a lady company, diversity stimulates development. [...] A man has a different way of thinking; he does some things faster and sharper. (Chemistry, senior researcher, age 51-60)

A scientist who works in engineering and electronics especially pointed out that in her career she has come across restrictions imposed by men. She feels that the science and the whole country

would have benefited if those restrictions were not there. Not letting women-scientists to put themselves forward creates significant losses for the whole country.

I think I have not been apprized because of male chauvinism. But if I think about it, I do not take it to heart. Have I lost something because of it? No. I think the state has lost because I could have done so much more. But those chairs are now occupied with people who have forgotten long time ago what work is. (Engineering and electronics, head of department, age over 60)

At the same time several scientists do not see any difference between what a man and what a woman could contribute to sciences. They think that human qualities are the most important and that woman scientists have not made a difference also a man could not have made.

I think anyone can do it. [...] It is more related to way of organizing thoughts, for example, there are both men and women who cannot orientate themselves in a room. The cerebral hemispheres work differently for each of them. (IT, associated professor, age 21-30)

Women-scientists? I think everything is equal, there is no difference if a man or a woman gets a position. (Astronomy, researcher, age 21-30)

Could women do something in this science that man have not done? I do not think so. I do not think that there is something only a woman could come up with that would give such a big benefit. Something that no man has thought of. (Biochemistry, head of laboratory, age 31-40)

Nevertheless the best situation is if a scientist group has representatives of both genders. Such a case would improve the common atmosphere and common work.

I think that such work microclimate where are both man and women improves the overall situation and that applies to any institution. Work depends on a lot of social life matters, on the collective. Having both men and women is a precondition of a strong collective. (Chemistry, head of laboratory, age 51-60)

It is good that both men and women work, each one brings his own spark. (Mathematics, lector, age 21-30)

Interim conclusions (summary)

The factors favourable for implementation of various policy actions aimed at solving the problem of gender inequality in sciences and HT field:

- Women-scientists are ready to participate in discussions about the role of women in sciences, they are ready to share their experience with women representatives of other sciences;
- Women-scientists approve policy actions that would be aimed at helping them combine work and family life, including help with returning to work after longer breaks;
- The scientists who have felt strong discrimination in their work careers strongly support introducing such policy actions as grants for women-scientists or the quota system;
- Some women-scientists believe that giving more career opportunities for women would be beneficial for the whole society.

The factors which might have negative influence for implementation of various policy actions aimed at solving the problem of gender inequality in sciences and HT field:

- Women are not ready to take active action to solve gender inequality problems themselves, they await state and institutional support for dealing with these problems;
- Even if policy actions are taken, the existing stereotypes about gender division of professions mean that women lack support from their families and teachers to choose studying sciences and HT field;
- Even though one of the current problems for women scientists is the lack of funding, allocating more funds to sciences could attract more men to this sphere thus possibly reducing the proportion of women in scientific institutions (especially chemistry and biochemistry);
- A lot of women-scientists do not support such policy actions as special grants for woman scientists or quota system because they believe that the science positions should be taken by the best candidates and gender should not influence the choice. Also they believe that policy actions such as these would only deepen the existing stereotypes and create a negative attitude from their men colleagues;
- In general, most women-scientists are not comfortable with seeing formalized preferences for women as a means to fight the existing mostly latent discrimination.

II.3.4. Conclusions

In sciences and HT field there are more men than women students and also more men doctoral students. The only exception is chemistry where more than 50% conferred doctorates are women. The biggest difference in terms of women student proportion exists in engineering, in terms of doctorate proportion in information technologies and engineering. In general men science personnel receive bigger salaries than women-scientists. Women make 84.3% of male earned monthly income.

Scientific career of women in sciences and HT field

The choice of studying sciences and HT is firstly determined by women's abilities and interests in these spheres. Other important factors are the influence of parents, teachers and lecturers, also the popularity and novelty of science has importance. However, a particular field of research is mostly influenced by lecturers and beginning of work in a scientific institution. Also the perspectives and possibilities of themes play a role in their choice.

The main factors that determine satisfaction with occupation for the women-scientists are the characteristics of the science work itself (freedom, creativity, development and challenges). The work collective is also important; it has to be intellectually rich and with little competition.

Some problems can be created because of men's chauvinism but it is more characteristic to particular spheres, for example, engineering and electronics. Other problems are connected with insufficient financing and salaries.

The two main sources of financing are Latvian Governmental Institutions and the European Union Institutions. The respondents pointed out that governmental financing most often is insufficient and it is comparatively difficult to obtain it. Some had an opinion that possibly discrimination exists in the division of these research grants.

EU financing is better however there are negative aspects as well: a considerable competition exists and it is a bureaucratically complicated process. Some of the women-scientists also see improvements in attitude of Latvian government because of the impact of the EU.

Both governmental and EU programs often more willingly are supporting applied, market or practically oriented research and not "purely scientific" research. Because of that institutes often need to make applied research to be able to go in "scientific science".

The women-scientists indicated that they have had opportunities to participate in different international conferences as well as publishing articles in journals of local and international scale. However, these possibilities can also be limited by the problems with financing though in terms of publications the main factors are the quality of work, topicality and originality of the theme and also already established status in the scientific society.

If gender differences in achievements are regarded, then there are bigger differences in possibilities not between men and women, but between doctoral students and more experienced researchers. If discrimination is concerned, it is more evident in the spheres with the smallest proportion of women, e.g., engineering and electronics.

The division of works in research teams is set by abilities and interests of each person and not because of his/her gender. Nevertheless, stereotypes exist of each gender's strengths and weaknesses. The fact that men get works that are more 'appropriate' to their gender could indicate that 'gender-appropriate' work division is made unintentionally. In general, opinions on men and women works are more present among scientists from elder generation.

Women-scientists mostly reject competition and stress the importance of cooperation that is needed to do scientific work.

To the ideal type of a scientist women attribute those skills and characteristics, which have proven as necessary for work in their work experience. Such characteristics are interest of the field, wish to understand and explain, mental abilities, team-work capabilities and others.

An important aspect of women career in science is related to combining work and family life. The main problem here is connected with the lack of time, because science is not only a work, it is a lifestyle. Long work hours are one of the aspects of this problem. The women-scientists, who are married and have children, in interviews were expressing opinion that it is impossible to be an outstanding scientist and a good wife and mother at the same time.

The awareness of difficulties of combining work and family life means that one of the used strategies is to primarily turn to career and achievement of certain position and financial guarantees. When it is achieved, then women are ready to turn more to family questions.

A better combination of career and family life have those women-scientists, who are married to a man, who comes from the same or similar sphere of work. These women receive more understanding and support from their husbands; also if both spouses are scientists, they are able to adjust their work hours to combine work and family.

The dominant viewpoint of gender roles in family means that a woman-scientist cannot fulfil her accordant gender role. There is support to these classical gender roles also amid the women-scientists. Nevertheless there should be remarked that the women-scientists, who really support traditional roles, were not able to form a successful family life and are divorced.

A specific problem area here is the maternity leave, because it means leaving science for a certain period of time and possible difficulties in returning. Although the return from maternity leave can cause problems with return to sciences, there are scientists, who do not consider returning as a problem.

PARTICIPATION IN DECISION MAKING BODIES OF SCIENCE INSTITUTIONS

Women-scientists strictly differentiate between scientific work and research and being in an administrative position and often see the administrative career as an abandonment of research work. This is the reason why women-scientists rather pursue scientific or academic career instead of taking up administrative tasks.

As the main advantage for being in an administrative position women mention more access to information which helps gaining finances. On the other hand, administrative tasks limit the time for doing scientific work and also they are not beneficial in terms of salary.

The possibilities of women to achieve a high position are determined both by professional skills

and informal relationships. The latter means recommendations given by the former leader or the governing body of the institution, also being a long-term employee of the institution is of importance. Still the time-proved skills the person has showed in his research field are more important than informal relations.

However, informal relations can also work as an indirect factor: there is a male majority in high positions in science institutions and among successful scientists. This means that male scientists can form informal relations with their superiors more easily than women. For this reason it can be easier for women-scientists to work as subordinates to other women.

Gender is not a particularly important factor in gaining a high position and woman scientists do not activate this problem. Certain prejudices against women leaders do exist but on the whole the negative stereotypes are more pointed towards women as managerial leaders than women in leading research positions. Both men and women can have objections to work in subordination to a woman.

Several stereotypes exist about characteristics of women as leaders. They are seen as more emotional and soft-hearted yet these are the qualities that make women leaders better than men when it comes to solving situations where individual feelings and interrelations of the scientists group are concerned.

Another quality that is typical to women leaders and women-scientists in general is their accuracy and precision. But it can be difficult to notice these work qualities from aside therefore women who do administrative work are not always appreciated.

There are certain sciences and institutions where women never or only rarely have taken high administrative positions. But all in all, the obstacles a woman scientist has to overcome in achieving a high position make her a better and more independent leader.

SOLVING THE PROBLEM OF GENDER INEQUALITY IN SCIENCE

Women scientists do not acknowledge the existence of discrimination publicly. But they do see some differences in gender positions; the main one is connected to family. Other difficulties are connected with maternity leave, which usually means that women are withdrawn from science work for a certain period of time and their possibilities to follow newest science developments are limited.

The existing stereotypes about men's and women's professions are a reason for lack of women in exact sciences and high technologies. If women-scientists want to overcome stereotypes they need a lot of hard work and to prove they are worthy again and again.

There is a lack of male scientists in some of the sciences, especially chemistry, biochemistry and mathematics at this moment. Discrimination of women is not felt in these fields for this reason. However, this situation in combination with the rapid development of these sciences could open up more career opportunities especially for men.

The small salary for scientists is the main reason for the lack of men in science. Women are ready to bear with such salaries however men are not. A support of traditional gender roles appears in this context, where husband is the one who's earning the money but wife's work does not have to be as profitable.

Women-scientists do not support the implementation of the quota system or giving special grants for women for some reasons. Women think that only the best researchers should work in science therefore it would be wrong to choose a less skilled woman instead of a more skilled man just because a quota has to be observed.

Especially women-scientists in spheres with the lesser proportion of women feel career restrictions imposed by men. Some of these scientists feel that not letting women-scientists to put themselves forward creates significant losses for the whole country.

There is a necessity for indirect popularization of women success in science because of

unappreciated contributions of women-scientists. Another point of view is that human qualities are the most important and woman scientists have not made a difference also a man could not have made.

The best situation is formed if the scientist group has representatives of both genders. Such a case would improve the common atmosphere and common work.

II.3.5. Recommendations for the common Baltic States strategy to increase women participation in Sciences and HT

More information has to be given in secondary schools about career and achievement possibilities in various sciences. The people who carry out this activity would be expected to hint at the fact that possibilities to work in sciences are not gender-dependent.

Much more attention has to be paid to education of both girls and boys in exact sciences at school. Children of both genders should meet with the same expectations from their teachers.

Organizing “Open days” or periodic field trips in science institutions especially for school age children to promote interests and to increase their knowledge about work in sciences.

Large-scale public science promotions like above-mentioned should be carried out to ensure as wide insight as possible to choose career path correspondingly interests and skills.

Such means of motivation and trying to promote women participation in sciences gradually and indirectly are preferable over such artificial means as introducing the quota system. The quota system would be in contradiction with wishes and needs of most women-scientists and could result in the increase of prejudices.

A very good motivation could be achieved via giving positive examples, e.g., publishing of women scientist research results, awarding prizes and others.

Important tools for supporting women in sciences are related to various allowances that would facilitate women return to sciences after longer intervals such as maternity break. As well as possibility for men to have a child care leave as a positive example in helping women to combine work and family life. Other variants would be giving an opportunity to keep a domestic servant.

A special attention should be paid to awarding research grants at the state level. This is related to the institutions whose functions include elaborating granting procedure and awarding grants. It would be advisable to create an independent system of control, for example, in the form of alternative councils.

It is necessary to have public discussions about women’s roles in sciences. These could include experience exchange seminars about inter-gender relations with participants from different sciences.

Strategies have to be chosen accordingly to certain sciences or research fields because the situation is different in career possibilities related to gender inequality. Sciences with higher gender dissimilarities need other strategies.

II.4. ESTONIA: Country Report

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Introduction

The aim of the BASNET project survey is to compare and evaluate the existing policy measures, to develop synergies between the national and the regional actions and policies, and to formulate a new standpoint in the Baltic States. To make a clear distinction between the current survey and the former survey results, here will be used 'BASNET survey'.

The main assumptions for carrying out a study about women in sciences in the Baltic States:

- We assume that there are barriers for women.
- We assume that there exists gender inequality in sciences and HT field.
- We assume that the comprehensive sociological analysis of factors determining underrepresentation of women in sciences and HT field has never been conducted in the Baltic States.
- We assume that the problem of underrepresentation of women in sciences and HT field is slowly getting recognition as a "problem" in the Baltic States.
- We assume that there exist factors, that have negative influence on participation of women in sciences and HT field, hinder development of an effective strategy for dealing with the problem.

Evidence from the former research

The research results show facts that:

- There is a large gender disproportion in sciences especially on the highest academic and science management levels¹⁰.
- There are no signs that the situation is improving particularly in sciences (S) and High Technology (HT field) (EC 2004¹¹).
- There have been carried out few sociological research projects on factors determining social discrimination of women in sciences.
- Although findings of the research shed some light on the reasons of underrepresentation of women on higher levels of the academic ladder in the Baltic States, no research has focused specifically on the obstacles faced by women-scientists in the field of sciences and HT field.
- The "women in sciences" problem is rather new for all Baltic countries.

Laas has studied answers to short interviews carried out in 2003, 92 women-scientists responded from Estonia. According to Laas (2004), almost all respondents were satisfied with their research field, in spite of the fact that different obligations (bureaucracy, teaching) were taking the majority of working hours. Many respondents have reconciled to the fact that research could be done in the evenings, weekends and during vacations due to women's '*shorter time*'.

Survey results showed that women have to prove constantly that they are good and they have to be better than men to achieve the same position. Rigid gender roles are produced in daily practice and discursive practices. The educational system and media produce a stereotypical image of women and conservative gender roles.

Every fifth respondent has experienced discrimination. In many cases discrimination was denied,

¹⁰ Survey from in 2000 shows that in the Baltic States and Poland

¹¹ ENWISE Report 2004

but cases of discrimination were retold in the same answer. Discrimination was not felt or perceived as a case of discrimination. Quotas were not seen as being possible measures to improve women's share in sciences (Laas 2004).

In 2005-2006 there took place the EU project called 'Tackling Stereotypes in SET'¹². The main findings of the survey:

1. Women face obstacles to their scientific work simply because they are women (women have to prove and extend themselves twice as much as men), and as a result, are under-represented in sciences and in the decision-making bodies concerned with scientific issues.
2. In Estonia, institutional arrangements that create and reinforce gender-based constraints, are not seen as a precondition for gender inequality. Different gender roles and a gender-segregated labour market are seen as a 'normal' gender system and not perceived as gender inequality.
3. Socio-cultural attitudes determine women's and men's roles, responsibilities, and decision-making functions. At the same time socio-cultural attitudes reflect a persistent 'old-fashioned' gender and power system in Estonia today. In a rapidly changing society some stability is expected and welcome.
4. There exists male-norm in all high positions, also in academia. Usually men are those, who apply to professor, senior researcher or docent vacancies, women feel themselves uncomfortable and inconvenient in same positions, they feel like, they do not belong 'here'.
5. Women do not get return investment into their human capital. Women outperform men in education, but they earn a quarter less from men's pay. Compared with other educational levels the pay and position gaps are deepest in higher education. Due to preference of men at the labour market, the remuneration received by women with higher education for their efforts is lower than that received by men with the same level of education. Women's capabilities are unused and underestimated.
6. Commercial enterprises and academia in Estonia are compatible only to a small extent. Investors see Estonia as a country with cheap work force, cheap natural resources, and relatively low taxes, at the same time having relatively stable political, monetary and tax system. This type of industry with the present ownership has target only to get profit, not so much to develop the country in general. The Academia is professionally strong in research and even in development, however, lacks experience and partners in commercial use of the inventions.
7. Most of the leading scientists in Estonia have been trained during the Soviet time. According to data from 2003 from Statistical Office 500 scientists are below the age 30, 800 between 30-39, 875 between 40-49, 850 between 50-59 and 720 are over 60. In total, 42% of scientists are over 50. This reflects also very much the mentality and mindset of people working in sciences.

According to the 'Tacking Stereotypes in SET' survey results 13 barriers for women were identified:

1. Lack of gender inclusive evaluation of scientific excellence
2. Male dominated funding bodies and academic committees
3. Under-representation of women at senior levels in industry
4. Male dominated organizational environment (language, dress code, office physical working environment, interior design, jokes)
5. Lack of work-life balance policies
6. Feelings of isolation and lack of self confidence /acknowledgement
7. Issues for women returning to work after a career break

¹² <http://www.tackling-stereotypes.org/>

8. Gender biased recruitment policies (selection process, job ads, job profile)
9. Gender biased promotion policies – lack of training and development for women.
10. Promotion evaluated based on the dominant culture values
11. Remuneration policies – pay gap between men and women
12. Women's negative image of SET professions
13. Representation of women in the media

Studies (Enwise report 2004; Marschke et al 2007; She Figures 2006) have shown importance of Equal Hires and Equality Policies. These actions work effectively to improve women's representation in the academia, and universities must endorse simultaneously policies or practices that ensure gender equality in recruitment, hiring, retention, and retirement while continuing to make progress in the increase of women PhD-s in all fields. Right action is better than waiting for the market to correct itself or merely hope that demographic changes will continue in the same direction to achieve equity many generations from now.

Quimby and Desantis (2006) have studied 368 woman undergraduates and examined their self-efficacy and **role model** influence as predictors of career choice. for this study they have elaborated former research and refer the main results:

1. Role models may be especially important to women because of a lack of women role models in non-traditional careers (e.g., engineering, science) has been identified as a barrier for women who choose to enter these professions (Basoc & Howe, 1979; Betz, 1994; Betz & Eitzgerald, 1987; Hackett, Esposito, & O'Halloran, 1989; Nauta et al., 1998).
2. Indeed, researchers have shown that women-students perceive role models to be especially important for women who want to pursue non-traditional careers (Gilbert, 1985; Smith 8c Erb, 1986).
3. Exposure to role models through video or written materials increased students' likelihood of considering non-traditional careers (Greene, Sullivan, & Beyard-Tyler, 1982; Savenye, 1992).

Study findings from Quimby and DeSantis (2006) showed that levels of self-efficacy and role model influence differed across Holland types (Realistic, Investigative, Artistic, Social, Enterprising, Conventional)¹³. They state that special gains can be achieved if attention is paid to Realistic and Investigative types. Quimby and DeSantis (2006: 303-305) convince about need for gender sensitive mentoring and career counselling in universities:

/---/ mentoring programs that focus on women's career development could be established in high schools and universities. Incorporating job shadowing and small-group mentoring programs would be a creative way to connect female adolescents with successful women who are engaged in a variety of careers. Moreover, mentoring programs and professional women's groups could encourage young women to consider career-related issues such as multiple-role planning (McCracken & Weitzman, 1997) and role conflict. Many high school girls and college women may feel inspired to pursue a non-traditional occupation after meeting women who successfully manage their career and family responsibilities. Likewise, career counsellors could also use the Internet as another way to connect women to inspirational career role models. For example, a database could be created to include successful women who volunteer to correspond with female students about their career-related concerns and aspirations.

Quimby and O'Brien (2006) have studied 209 women **students with children** and call them non-traditional students (over the age of 25 years, often referred to as "adult" or "re-entry" students). They have made recommendations to enhance counselling services for non-traditional women students with children.

¹³ 6 RIASEC types was worked out by Holland in 1997.

The situation country by country is very different. It seems, that in the Baltic countries a situation in science and with image of scientist is not so bad compared with Russia. Gvozdena and Vysotskii (2006) have studied incentives to work in Russian science. They found out that during the transition period in Russia the position of scientists worsened, and the attractiveness of science as a sphere of professional activity declined drastically.

The problem is how to attract people who are still ready to put up with low income, but interesting work. According to Gvozdena and Vysotskii (2006) some young people express sympathy for someone working in a scientific research institute, science is not associated with a hard life and suffering. Young scientists consider that their work offers discovery and is challenging, but with poor income Gvozdena and Vysotskii (2006: 9):

The activity does not yield power, nor, sadly, material prosperity. At the same time, for many it offers the opportunity to travel around the country and go to other countries. But not every talented and creative young person can afford to labour for the benefit of science. Unless a young science associate receives material support from relatives, it is unlikely that after five or ten years work in science will provide a decent standard of living.

Gvozdena and Vysotskii (2006: 18) argue, that the majority of the young scientists are not satisfied with their housing conditions, they are looking for opportunities to improve current living conditions and trying to earn as much as possible to get an apartment. Working in another country and having supplementary employment, outside of the sciences, are viewed as their main ways to solve their housing problem.

These problems with need for affordable living space are problems in the Baltic too. Here are quite similar strategies to combine work and studies. Scholarship during the doctoral studies has increased, but still many doctoral students try to find some job in some project or outside university.

Statistical data

National statistics about women researchers in different sectors is presented in Table II.4.1.

Table II.4.1. Share of women researchers by sector in Estonia, in 1996-2003

	Researchers*						Researchers*	
	Higher education sector (HES)		Government sector (GOV)		Private non-profit sector (PNPS)		Business enterprise sector (BES)	
	Total	% of women	Total	% of women	Total	% of women	Total	% of women
1996	2794	39.1	1564	46.0	23	39.1
1997	3294	39.9	893	49.4	21	33.3
1998	3210	40.7	765	51.4	15	33.3	468	31.0
1999	3134	41.4	758	50.5	20	35.0	651	35.6
2000	3347	42.8	675	51.7	41	53.7	507	32.3
2001	3469	43.3	610	59.2	48	52.1	676	28.1
2002	3707	43.4	605	60.0	52	53.8	725	23.4
2003	3762	45.1	637	59.5	72	54.2		

*Headcount, not FTE (full-time equivalents), Source: Statistical Office of Estonia

A feminisation of higher education is a pattern in Estonia also (Table II.4.2). A sector of higher

education is highly gender segregated; there can be seen horizontal and vertical gender segregation. The ENWISE report had documented a situation in 2004 and it is discussed about unused resources, waste of talents and gender aspect in the science in the Central and Eastern European countries and in the Baltic States.

Table II.4.2. Share of women students in Estonia

	Higher education	General education
	% of F	% of F
1996	53,0	
1997	54,7	
1998	56,6	
1999	58,3	49,9
2000	60,4	49,8
2001	61,5	49,9
2002	61,5	50,0
2003	61,8	50,0
2004	61,5	49,9
2005	61,6	50,2

Source: Statistical Office of Estonia

In recent years in Estonia in HES, a share of scientists in medical sciences has declined and in natural sciences the share has increased (Table II.4.3 and Figure II.4.1). Unfortunately a share of researchers in engineering has fallen, in spite of willingness to develop engineering and knowledge based entrepreneurship and society.

Table II.4.3. Researchers in higher education sector by field of science, 1996-2005

	NS	Eng	MedSc	Agr	SocSc	Hum
1996	21,6	22,3	13,6	6,4	19,9	16,2
1997	29,4	21,1	11,6	7,3	18,2	12,5
1998	30,0	20,0	10,6	7,2	19,1	13,1
1999	30,4	20,1	10,4	6,3	17,9	14,9
2000	28,5	19,3	10,5	5,9	19,7	15,9
2001	29,5	19,6	10,2	6,1	20,3	14,3
2002	29,0	21,3	8,8	6,1	19,6	15,1
2003	29,6	19,6	8,0	5,7	20,9	16,2
2004	31,2	17,5	7,6	5,5	23,3	14,9
2005	33,6	18,4	7,9	5,0	20,8	14,2

Source: Statistical Office of Estonia

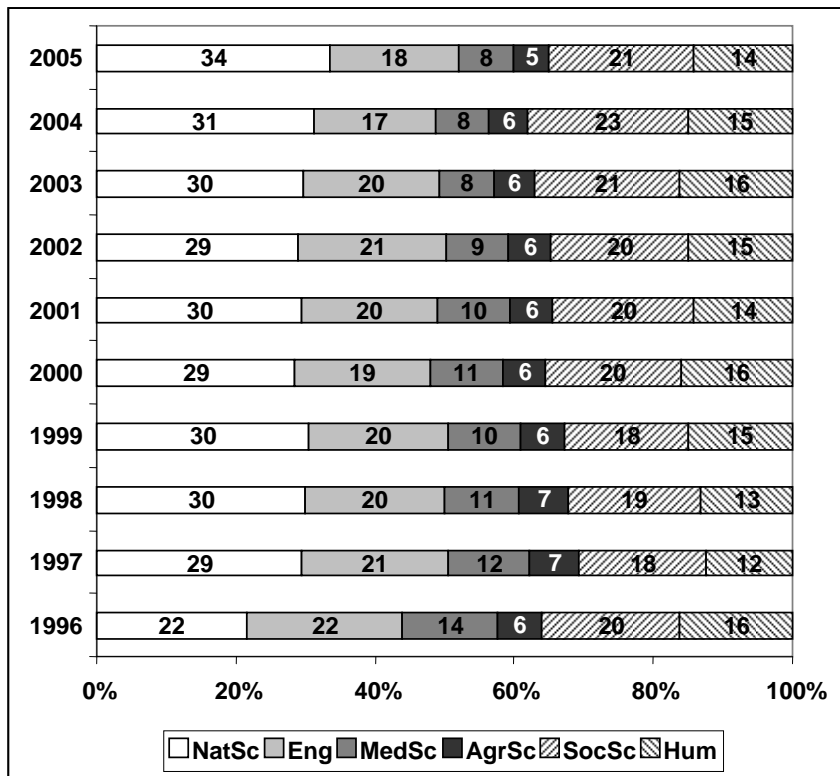


Figure II.4.1. Researchers in HES by year and field of science

A share of women in exact and natural sciences with doctoral degree has increased during the recent decade in Estonia (Table II.4.3 and Figure II.4.2).

Table II.4.3. Share of women researchers with a doctoral degree, 1996-2005, %

	Total	NatSc	Eng	MedSc	AgrSc	SocSc	Hum
1996	26,0	22,2	8,6	37,0	10,4	38,0	38,7
1997	27,0	25,1	10,1	37,9	24,1	35,7	36,6
1998	30,9	26,8	10,5	40,9	23,6	54,0	40,8
1999	27,8	23,6	12,5	42,9	25,7	37,6	42,6
2000	29,9	24,6	11,9	47,1	36,7	37,9	39,5
2001	28,9	25,5	11,9	42,9	35,4	37,8	41,8
2002	29,5	25,2	10,3	48,3	33,6	39,1	42,9
2003	29,7	26,7	11,6	46,7	29,9	38,6	43,7
2004	31,2	27,6	12,4	49,6	30,5	42,1	45,1
2005	31,6	28,9	13,4	48,3	34,0	42,3	43,5

Source: Statistical Office of Estonia

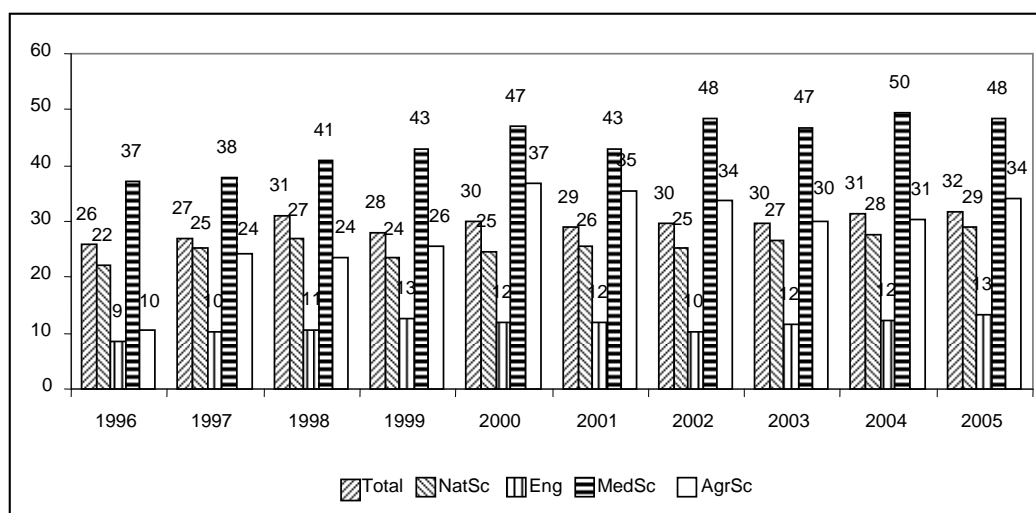


Figure II.4.2. Share of women researchers with a doctoral degree, 1996-2005, %

Databases

ERIS (www.eris.ee) is a research information system that intends to consolidate the information on R&D projects in Estonia. ERIS consists of 3 main elements: the database of researchers, projects and research institutions. Data on 3921 research projects and grant applications, 5825 persons and 233 research institutions have been registered in ERIS.

www.eris.ee was changed to www.etis.ee in 2006. ETIS is the Estonian Research Information System. The Estonian Research Information System concentrates information on research- and development institutions, researchers, research projects and various research results. The Estonian Research Information System is also an information channel for submitting and processing grant applications and for submitting and confirming project reports.

Research Funding in Estonia

State funding of research and development is organized through:

1. financing basic research (targeted research, *sight finantseerimine* in Estonian)
2. research and development grants,
3. maintenance of the infrastructure,
4. national research and development programmes, and
5. support programmes for innovation.

The aim of targeted financing is to ensure a competitive basic structure for scientific research and the continuity of research necessary for Estonia. Financial means are planned for developing new research areas and to obtain the information resources needed for research. The targeted financing of research and development institutions is the responsibility of the MoER.

Total expenditure on Estonian R&D in 2001 comprised 0.75% of GDP. In 2001, research and development activity was financed from the state budget to a total of EEK 430.9 million (1.4%). It is intended that by 2006, total expenditure on RD&I will be 1.5% of GDP. The strategic principles

for financing research and development will include a significant increase in the state financing and more active participation of private and foreign capital.

The Ministry of Education and Research (MoER, www.hm.ee) is responsible for the organization of research and education policy. Institutions advising the MoER in research and educational issues include the Estonian Academy of Sciences and the Research Competency Council (TKN). The main task of the Estonian Research Foundation (ETF), which functions under the jurisdiction of the MoER, is to support research projects by means of the allocation of grants. The MoER is assisted in carrying out its research and development functions by the Archimedes Foundation which organizes evaluations of Estonian higher education and research, acts as the national contact point for the EU's Framework Programme, coordinates the creation of Estonia's research and development information system, and implements specific projects, with the aim of raising Estonia's capacity for innovation. The Foundation also coordinates exchange programmes for young researchers and students (e.g. Marie Curie grants, ERASMUS).

Promotion of gender equality in sciences

Gender Equality Act (RT¹⁴ I 2004, 27, 181) entered into force 1 May 2004. Purpose of the Act is to ensure equal treatment arising from the Constitution of the Republic of Estonia and to promote gender equality of men and women as a fundamental human right and for the public good in all areas of social life. For the given purpose, this Act provides for the prohibition on discrimination based on sex in the private and public sectors; the obligation of state and local government agencies, educational and research institutions and employers to promote gender equality of men and women; the right to claim compensation for damage. The State and local government agencies are required to promote gender equality systematically and purposefully. Their duty is to change the conditions and circumstances, which hinder achievement of gender equality (§ 9).

According to the Act (§ 10) educational and research institutions and institutions engaged in the organisation of training shall ensure equal treatment for men and women upon vocational guidance, acquisition of education, professional and vocational development and re-training. The curricula, study material used and research conducted shall facilitate abolishment of the unequal treatment of men and women and promote equality.

An employer shall collect statistical data concerning employment which are based on gender and which allow, if necessary, the relevant institutions to monitor and assess whether the principle of equal treatment is complied with in employment relationships (§ 11, 2).

A gender sensitive science policy can be introduced through science institutions and government. There is very weak gender knowledge, lack of gender experts and low political and organisational willingness to tackle gender inequalities.

More and better quantitative and qualitative data is needed for gendered implications of national policies. Lack of data means poor knowledge about the real situation and the problems, and deepens the inability to set policies and priorities. In Estonia, gender analysis is widely ignored and gender mainstreaming (GM) is an almost unknown concept, and people who are expected to 'mainstream gender' (to integrate the gender aspect into policies and action plans) feel quite lonely in their intention and activities (Laas 2003; Klefeld 2004).

¹⁴ RT = *Riigi Teataja* = *State Gazette*

Attitudes towards gender equality

Teaching gender mainstreaming (GM) to the civil servants has carried out since 1997 in Estonia. GM means a strategy for analysing the origins of gender inequalities, designing and implementing policies to eliminate them in order to reach the goal of gender equality.

The recent bigger project of such type was Phare Twinning Project 'Development of Administrative Capacity of National Authorities in the Field of Gender Mainstreaming'¹⁵, which took place from July 2004 – December 2005. The aim of this project was to promote GM as one strategy to achieve gender equality.

The Twinning Project report is available in Internet (Kirch et al 2005). According to Kirch et al (2005: 6, 51) in the pre-training study 1012 civil servants, and in post-training study 141 civil servants from national, regional and local administrative bodies in staff and managerial positions had been interviewed to assess the potential capacity of the Estonian civil service to implement GM and to detect possibilities of enhancing the capacity building in this field.

The civil servants were asked to give their opinion on the present situation of equality between men and women in Estonia. According to Kirch et al (2005: 29), nearly three quarter of the respondents named the need for gender equality policies. They saw some fields, where equal opportunities for men and women are still a problem (44%) or they agreed that there is much to do to guarantee equal opportunities (29%). The others thought that in general men and women are equally valued (about 16%) or didn't know (11% of respondents). While significantly more men saw equality already reached, significantly more women saw the necessity to guarantee equal opportunities.

The respondents, civil servants, were asked to estimate the importance of different explanations for the statistically proved fact, that in higher education there are more women than men. Roughly 8 from 10 respondents rejected the statement that basic and secondary schools programs are more suitable for girls (77%) (Kirch et al 2005: 35).

Civil servants were sensitive to concrete incidents of discrimination and reject explanations on a structural level, like blaming or devaluating women as a group (pay gaps) or the system (education) for it. Instead reasons for unequal gender relations are mainly sought on individual level (Kirch et al 2005: 37).

In average 62% of the respondents saw as possible outcomes of gender equality (Kirch et al 2005: 40):

1. better use of human resources (70%),
2. free development of personality (human rights) (69%),
3. economic and social welfare (63%),
4. improvement of life quality (56%),
5. social cohesion (53%).

¹⁵ Phare Twinning Project EE/03/IB/SO/02

Sample

R No.	Field of work (Science)	Position	Duties	Age	Name
Women-scientists					
1	BioCh	Associate Prof 0,5	expert	65-69	Adele
2	Ph	Sen Res	coordinator	65-69	Anna
3	Ch	Res Fellow		45-49	Ellen
4	IT	Lecturer, PhD Student (4)		35-39	Emilie
5	Ph	Sen Res	member of the council	50-54	Emma
6	Ch	Res Prof	leader of subtheme, expert and referee, member of boards	55-59	Erika
7	Ch	Res Fellow	head of res group	60-64	Leena
8	Ph	Sen Res	member of councils, coordinator	60-64	Lydia
9	Agr	Prof	head of the department, member of councils	40-44	Liisa
10	Ph	Res Fellow	member of board, editor	40-44	Mai
11	BioM	Res Fellow	coordinator	20-24	Mall
12	Ph	Lecturer		50-54	Mari
13	BioM	Prof	member of boards, head of res group	35-39	Maria
14	Ph	Res Fellow	coordinator, council member	55-59	Olga
15	Ph	Sen Res	coordinator	50-54	Piret
16	Math	Associate Prof	member of boards	35-39	Rosalie
17	BioM	Project Chief, PhD student (3)	coordinator	25-29	Teele
18	BioM	Res Fellow, Lecturer, PhD Student (4)	coordinator	30-34	Viire
19	Ph	Res Fellow		30-34	Ira
20	Ph	Res Fellow		20-24	Nadja
Total				Av: 45,5	

II.4.1. Women's Scientific Careers in Sciences and HT

A Path to Science

Motivation for studying sciences and HT

According to Smith & Herb (1986), the factors influencing sciences attrition are:

- interest in science
- impact of female role models
- science ability
- impact of classroom learning
- parental influence
- impact of 'out of school' science experiences
- impact of peer network
- impact of media
- traditional science stereotypes (scientists are men)

The most of respondents were **curious people** and have spoken about **scientific interest**. The most of them have mentioned about the importance of the process, and the position in the end of process was not so important for them. These stories were not epoch specific. The only difference was in selection opportunities in connection with the science history. Such subject as gene technology and information technology were not taught in the 70s and 80s.

Interest and **good results in mathematics and physics** where the basis for selecting to study natural science in the university. According to the respondents, the main motives of their studies was willingness to know more about the secrets of nature, to discover the world, but was taught by an attractive teacher.

A personality of the teacher has played a crucial role in a career choice of many women scientists. The respondents have said, that dedicated teachers can actually better discover children's talent than their parents. Negative attitudes from the teacher can harm students' interest or create disgust:

In schools there is often an attitude, that mathematics is not girls' business. And the proper girl is not interested in it. (Math, Docent, 35-39)

Many respondents had very good memories about their own teachers. Some respondents have worked in school for a short period. Some respondents do a lot of teaching, in spite of researcher's position in the university.

In some cases there were also sad stories about 'accidental' teacher. Such people are not interested themselves in their teaching.

It is often a case, that people who study mathematics, physics or biology, have also had talented in humanities. Therefore graduates of natural sciences can be found among writers, philosophers, and social scientists.

Some of respondents pointed out the fact that **contributing to the society**, giving their impact to the society, was very important for them in career selection process. Some of the respondents stressed that opportunity to **use their knowledge** was very important for them. This was the reason why a couple of respondents have chosen to study medicine. But their curiosity has lead them to research. Now they are active in one gene technology.

No one of the respondents has mentioned further income or about dream making money, when they have chosen to study science.

Choosing a research career does not mean quick and lots of money. (Math, Docent, 35-39)

Thoughts about money have appeared in later period.

Choosing research career and having a family requires thinking about income. It is additional responsibility to meet ends of family budget. (BioM, Project Chief, 25-29)

Women researchers are quite careful when talking about money. For them it is an inconvenient topic, but from the other side one can guess that it is not an issue out of interest. But money was not influencing factor in career choice.

Factors that determined the choice of current field of research

A teacher as a role model and an inspiring personality is a very good promoter of study field. Teachers can support or to hamper career choices of young people. The respondents had examples of both cases:

My daughter had to select in which subjects she should give the final examination. She wanted to choose mathematics, and I have supported her choice. And her teacher was very much against, and wanted that the boys will choose mathematics. And then my daughter has chosen the chemistry, where my knowledge is very low. And chemistry was very wrong choice, and the result was bad. And my daughter is much better in mathematics... It is really strange how teacher has an attitude that boys are better in mathematics. Teachers are interested in the best results, and these teachers wanted the only boys would choose mathematics. (Math, Docent, 35-39)

The respondents have also mentioned a negative practice about peer's impact or choosing the study field in following somebody's friends. Some people have chosen their study field without analysing their own interests, but have chosen a study field in university in companionship. The main criteria in selection of study field should be interest, and need for intellectual work. Interest and good results in mathematics and physics

Encouragement in school is very important. The teachers should not say that boys are smarter, there are more sophisticated tasks for boys. It should be said that everybody who is interested should try to solve the problem. It is really very wrong attitude that girls and the mathematics do not fit together. We had a specialised class in mathematics, and there were girls in majority. /---/ Today more girls have came to the university to study physics. In nowadays it seems that there are much more girls in physics, engineering and mathematics. (Math, Docent, 35-39)

An occasion has a place in making career choice. It happened more to people with multiple talents. There was even a story about last minute choice, when a bureaucratic obstacle has appeared and one more day was left to deadline. Instead biology a medicine was chosen by respondent, who has said, that medicine doctor has some very concrete skills, but in some other sciences, it seems, that it is hard to use acquired knowledge.

Independence in studying research problems. Questions come to scientist one by one and a researcher just follows these challenges.

There is a gap between reality and stereotypes, and a wrong image of physicist is not a rare understanding:

It is a tradition that the girls are choosing to become headdresses, but the study results all the girls are not worse in physics, chemistry and mathematics compared with the boys. But maybe there is also a wrong image about physicist. The physicist is seen as repairman and

maintenance of white goods. I think that the physicist is seen also like technician. (Ph, Lecturer, 50-54)

Scientific Achievements and Work Environment

Job satisfaction

There were no respondents who had negative attitude to their work and to what they are doing in general. The most of people were very satisfied with their speciality. Some respondents have said that they do not like administrative work and some of respondents have said, that they try to avoid administrative tasks.

In a career of scientist a personality and dedication of a supervisor is very important. For the young researchers there should be a possibly to go step by step:

I had a supervisor who has given to solve a problem. He was a boss himself. He has moved to administrative work and has distanced from sciences. So, I had no idea about possibilities to solve the task what he has given to me. I have tried in many ways, and then I have chosen to ask advice from another scientists. And we have worked together six years or more with this 'small' task, what the supervisor has given to me. (Ph, Sen Res, coordinator, 65-69)

It was asked about what do you like in your current job. Some said that they liked the subject, some liked to look for answers and study enjoyed the study process. It was said that the researcher's work is interesting and academic freedom gives possibility for time management:

I have always enjoyed to study mathematics and physics. (BioCh, Associate Prof, 65-69)

I have always enjoyed studying mathematics. (Ph, Res Fellow, member of board, 40-44)

I have always enjoyed studying biology. (BioM, Prof, 35-39)

I have never liked to study literature. (BioCh, Associate Prof, 65-69)

I had a problem because beside biology I liked language studies, and history. I like to study history through personalities and life histories. (BioM, Prof, 35-39)

I like to co-operate with the international scientific community, to go to conferences. And I like academic freedom. It is very important for me to take days off, and I tend make longer working hours in some other day. (Ph, Res Fellow, member of board, 40-44)

I have put my hobbies and work together. (Ph, Res Fellow, member of board, 40-44)

I think I'm a very happy person, because I have done things what I have enjoyed ... (Ph, Res Fellow, member of board, 40-44)

I like to study and solve some research problem, I don't like to be a manager. (BioCh, Associate Prof, 65-69)

I like intellectual intensification and challenges. (BioM, Prof, 35-39)

And I like my colleagues, I have the inspiring supervisor, and I enjoy reading articles. (BioM, Res Fellow, coordinator, 20-24)

I like the idea that with my research I can contribute to the people. (BioM, Res Fellow,

coordinator, 20-24)

Part my work is very routine, it is work and procedures in laboratory. (BioM, Res Fellow, coordinator, 20-24)'

I like to work with people and I like teaching. (Ph, Lecturer, 50-54)

I like the idea that I'd have my own research team. (BioM, Prof, 35-39)

I like that my research field is connected with nature and environment. (Ph, Res Fellow, council member, 55-59)

Dislikes in being a researcher were connected to administrative work and additional obligations:

I don't like administrative career and if somebody does, I think that 'go ahead' and you don't need any encouragement. (Math, Docent, 35-39)

I don't like politics in science and subjectivity. (Math, Docent, 35-39)

I do not like organizational restructuring. Something is put together in something is separated. All these things take you away from the work, are work constraints. (Math, Docent, 35-39)

I do not like to work at home because I can't concentrate. With one eye you are looking to screen and with other eye you look at children and talking to them in same time. (BioM, Prof, 35-39)

I don't like that there is too little cooperation in Estonia, and collegiate thinking in research, and sometimes you can feel yourself very lonely, and it is hard to find support. (Ph, Res Fellow, council member, 55-59).

Scientific achievements

It was said that in evaluation process **a number of publications** is very important. At the same time, it was said that it is not the single measure and cannot always be the best:

All scientific community is in trouble. In Estonian science system, it is unfair from the side of university to take ISI¹⁶ and all these systems. Because we have appeared to the space of international science landscape from totally different situation and science language. And then all these journals were available also to us. And now this ISI-something, some family firm has started to count citations and references, and there are so many fields of science, where there are no journals, and only some journals... And social sciences are losers, for exact sciences situation is a bit better and there are many journals available. (BioCh, Associate Prof, 65-69)

¹⁶ Thomson has acquired Institute for Scientific Information (ISI), a leading provider of information for researchers. ISI citation index - a citation is a reference published with a scholarly journal article. ISI includes all these citations in its citation databases, and this unique compilation makes possible cited reference searching. In the '60s there was invented the journal 'impact factor.'

The measurement of scientific achievements is complicated:

Measurement of results of intellectual work is very subjective. Maybe attempts to solve the problem of inequality are so hopeless and lost labour? (BioM, Prof, 35-39)

Women scientists pointed out a lot of work, what should be done, but is not acknowledged. These activities were: writing research results in national language, popularisation of research and own research field, and teaching. All these activities include work for future. It is communication with society and attracting young people to come to study the same specialities.

Women's careers can start later. Women can start with turbo 'at their 40s, when their children are big enough'. This is a time for a woman, when 'her psychology is ready, she is a mature person with good basis and capacities' (Ch, Res Prof, member of boards, 55-59). But there was also told that it is time to enjoy being scientist, but it does not certainly mean about doing the career. Research institutions are flat organisations and there are not so much possibilities to get higher step by step. Sometimes superior in this stage is typically a man in the fifties and plans to work until retirement at least for 10 years.

There are some problems with this later departure, because young researchers fight for their place. Sometimes their supervisors can ask:

Should we give to her this position, she is already so old, but I have young guys coming. (Ph, Sen Res, 60-64)

There was also said that it is not easy for young people to compete with older colleagues:

Competition among older colleagues is small, because younger researchers do not have such a number of publications, such a work experience and responsibility. They just cannot pass. Experience and publications is extra asset for older researchers, in this sense younger are in real trouble. /---/. Everybody can understand that there should be some work done and to wait. Because we also did not get anything immediately, we also worked to capacity to get the position. (BioCh, Docent, 65-69)

The role of a team in scientific career

A team is said to be very important from two perspectives. On the one hand, a team is a precondition to grow as a scientist, a team can offer intellectual discussions and support from colleagues. On the other hand, leading own research group or team is a precondition for excellent scientist. Respondents have said, that a good team is a great luck.

Research groups are resource dependent. If there are resources, to establish a team is possible. In experimental research there should be equipment and raw material (sample, tissue culture etc), often there is some part of shared resources. Therefore a good cooperation between research groups is an extra asset.

Competition between research groups is quite a serious issue. This has a positive and negative impact. The positive side is encouraging of competition. The negative side is hiding information and not sharing resources.

Gender of the team leader does not play a crucial role, more importantly seem to be personality traits and different skills. For example, good communication skills, effective manager's skills are important. But gender plays a role. Men tend to have to take more free time for lobbying and participating at the meetings of governing and political bodies. It is connected to traditional gender roles, that men are seen more responsible for their work and women's primary responsibility is

connected with their family.

Questions about funding are mainly known to everybody, who is interested. Universities have salary schemes and levels. The employment contract is mostly agreed with the head of research group and consulted with head of department or institution management. Personnel departments follow procedures and legal aspects. So actual recruitment agreement is made between the head of research team and researcher. Research and team leaders out of respondents were much more worried about science policy and about funding science, while other respondents just have said that 'I do not know exactly who gets how much' and 'I am not interested in it'.

Funding is a problem for 'excellent scientist' who has a group or institute. Leader spends a lot of time in application process and later on reporting and financial management is time consuming. A dedicated scientist is misused by national policies, because the dedicated scientist will put her/his maximum efforts to get funding from different resources and international funds.

Researchers are not so much worried about colleagues' income and they try to do their best to earn as much as possible themselves. In some answers and tone of the answers there was possible to detect some bitterness, but it is more about the question of interpretation. People who have salary, are not interested to contribute to better financing, because everybody knows, that this is time-consuming process:

I get my salary and I am satisfied and therefore not interested in how money is distributed. (Ph, Lecturer, 50-54).

If somebody has some small grants, then there are some contradictory expectations. Team leader is expecting some personal monetary contribution and is not interested to pay the whole money.

If somebody has some project money, then management is expecting that you will fund your travel yourself. (Ph, Lecturer, 50-54).

But some young researcher were accepting that writing research proposals is not a work, they want to do, but it seems that they also should learn it and to start to write own proposals:

Yes, to apply and get funding for research is a serious issue, you should have some 'sexy theme' to get funded. It is really sad, that such dull things should be done. (BioM, Res Fellow, 20-24.)

But there was also a respondent, who was a team member, and she was ready to write proposals. Her logic was about different roles and capacities in the team. She convinced interviewer that their team leader is a 'very intellectual and has good academic record and is full of inspiration'. But he was not able to write applications in a proper form and to tackle with bureaucracy. And she was ready, as a team member, to make this work instead of the head. And she was not frustrated that she is doing work of somebody else's:

I should write our research project proposals. Our male professor is too academic, applying for money is very distasteful for him. (Ph, Res Fellow, 40-44)

Many people were satisfied with distribution of money and with the fact, that the more experienced people get a bit more and junior research fellows get a bit less:

Our budget in general depends on the number or projects. We have some basic money (sihtfinantseerimine in Estonian) and grants, but we should all this money to apply

ourselves and to pass the competition on national level. And mainly 'grant holder'¹⁷ is a manager of resources and finances. And there are very fixed rules about wage setting policies and possibilities. /---/ and head of laboratory or department is keeping a eye on it. And there is analysed and tried to make decisions as objective as possible, and to look on somebody's contribution, publications etc. But also a number of publications are not the right measurement basis.... But there is an attempt to be fair. (Ph, Sen Res, coordinator, 64-69)

The positive side in resource distribution and funding was that the regulations and rules are quite clear. Some people have told about a need for bigger freedom in resource allocation process:

I think that every head of the research unit should have more freedom to evaluate her/his employees and to distribute and redistribute the money according to the contribution of people. (Ph, Lecturer, 50-54)

There have been some stories about unfair money distribution, but it was more about some cases:

I have also experience, where a male superior has decided that young men need money than young women researchers. (BioCh, Associate Prof, 65-69)

An understanding exists that men 'just need more money' or 'men are main breadwinners of their families'. At the time there are also other social groups, who should have more resources. There was told that 'doctoral students need monetary and emotional support. Team support is needed.' (BioCh, Docent, 65-69)

Scientists are quite honest to each other, but still many of them have more economic ambitions than others. Poor funding causes unfair resource distribution. Therefore temptation to 'give more money to closed friends' is very human:

It is thought that there are resource shortages. But in this sense of 'staying together' we have enough. We have got some money. But of course, there is a space for improvement of funding. (Ph, Res Fellow, member of board, 40-44)

The idea about having special grants for women was not so strongly supported by the respondents. Most of them have thought, that supporting only women, means discrimination and discrimination is prohibited. It was said that men also could support women applicants, when it helps to reach to resources:

Women applicants are an extra asset; men support women's involvement, when such terms are set for getting money. (Agr, Prof, 40-44)

Serious issues in connection with money and resource distribution were:

1. Money shortage, distribution
2. Evaluation, measurement, criteria
3. Undervaluation of activities of 'excellent scientist'
4. Mixed money of research and education/teaching

¹⁷ Grant holder is the principal investigator of the research or the holder of a career development award in the Institution for which a research grant has been awarded by the Estonian Science Foundation (ETF, www.etf.ee)

The Concept of an Excellent Scientist

In the connection with the concept of an excellent scientist the following aspects were discussed:

1. Scientific interest
2. Charismatic leader
3. Inspiring personality
4. Research school
5. Publicity and impact to the science and scientific community

To an excellent scientist was attributed a peculiar thinking, thinking in one's own way and to see new relations and systems. Such a researcher should have a clear thinking and a clear expression, making ground for understandability.

Two types of excellent scientist's were figured out. These should be person with extraordinary talent, being a genius, and a charismatic researcher and leader, creates own research at school:

An excellent scientist by my mind is a person who has one's own research school. This means that he/she has an ability to encourage other people to study the research problem what was attractive to himself/herself. This mean ability to heat people up with scientific ideas. And there should be added also an ability to give an impact and contribution to some intellectual discussions in this research area. (Ph, Res Fellow, council member, 55-59)

About sex in science was mostly expressed that there is no difference being a woman or a man in science. Some respondents have stated about ambitious men and supportive women's nature:

I think that women are more science oriented and dedicated than men. Men think more about money. (BioM, Project Chief, 25-29)

Work and family life

In Estonia, it is possible to use 36 months job protected parental leave. Out of that 15 months are dependent on former earnings. If there was no money, then it is possible to get only the minimum amount of parental benefit.. Most of doctoral students should get only this minimum of parental benefit. Such monetary punishment puts doctoral students under pressure not to create a family and get children during their studies.

On the other hand, women scientists, who have been in good and supportive relationships can cope with many hardships. To get into happy marriage cannot be solved with state policies, but public services can support couples with children and lone parents as well:

I haven't been at home with my children longer than a year. /---/ I have a need for intellectual intensification. (BioM, Prof, 35-39)

Doctoral students get only the minimum i.e. the lowest rate of parental benefit (lasts for 15 months after the childbirth), and this is unfair. Therefore I did not apply for this money and I try to avoid career break. (BioM, Project Chief, 25-29)

My youngest child went to school and due to child in preschool age, the idea about going abroad has been excluded for me. I had many proposals and there was even funding available, but it is unaccepted idea to me. (Math, Docent, 35-39)

If a woman scientist lives alone with a child, close relatives are far away, then reconciling work and childcare is a serious issue:

This is very painful question, I hardly see my son...(Ph, Res Fellow, 30-34)

Single persons can plan their time easier, but it was told that somebody stayed alone with the aim to avoid troubles with time management. But some people have stayed alone, because they had all the time too much to do and did not find time and the right person to take them away from science. All the respondents have said that there is a need for taking into account women's career breaks and also to give support in making parental leave period psychologically easier and to support comeback after leave. Many women have said, that they actually have been with the child at home less than a year and sometimes maternity leave was used and working at home was made possible by the team.

Also there was expressed an idea, that pregnancy is not a disease and after a normal delivery and in case of healthy child surrounded with relatives' network, a woman scientist can stay with the research team almost without taking time off. Therefore to make some common regulations which will limit such combining possibilities is not expected by woman scientists. But there should be an understanding that not all women have supportive relatives around them.

II.4.2. Participation in Decision Making Bodies of Scientific Institutions

Administrative position and scientific careers

It was asked about administrative position and ability to influence scientific community. The respondents have said that the main decision makers are in boards and councils. There was told, that it means a lot of meetings and work without contributing to one's own publications. There was talked also about worries with funding and it is a serious constant struggle to get funded. This means a lot of extra work of writing proposals and reports. Therefore many respondents have said that are ready to contribute as members of the team, but not to be in leading positions.

Getting funding is one problem, but another is also to keep the team together and to find a possibility for investments and development. It means also inventing every day actual playground with the existing amount of money and combining different sources, for example, mixing money of research and teaching. This means a lot of extra work to run all these schemes. University support structures could have more capacity to help with all these practicalities.

It was said that in sciences an administrative position without being a good scientist is not a dream. Nobody identifies such an administrator as a researcher. It should go hand in hand, that you are a good scientist and then you get elected to hold some office.

It was said about male competition. Ambitious men do not want to have male competitor near to him. Negative with male superiors is that they are very self centred. Male superiors are bad in praising people. It should be somehow recognised when somebody has done something well or got some national or international attention.

There was also talked about gender of the superior and some suspicion about gender differences were expressed:

Women tend to be more flexible and person oriented, I think. And men may be a bit more formal and rigid, but of course, it is dependent on a person. Sometimes a woman boss is really crazy, they have worked hard for the position. And they are more persons to elbow one's way, and they are more egocentric. (BioM, Prof, 34-39)

Gender and Administrative Work

Men are used to be seen in administrative positions. Some men feel bad and inconvenient if they have a woman superior. It was mentioned only by some respondents that there are men, who do not have ambitions to become a boss. But it was said that at least then they have ambition to do research and to be serious actors in their field.

The contemporary society has changed life patterns and women can be good administrators, and they can cope well with sharing themselves between work and family. It is still very convenient for men if women take and accept to be primary caretakers in their family:

There are examples of divorced couples, where men found that too occupied, career oriented and intelligent wife does not fit his life. (BioCh, Associate Prof, 65-69)

But gender roles are changing and more women are visible in society and more men take care of their children on daily basis.

Leading a team means to be a good manager. This requires discipline, delegation, control, giving inspiration and creating inspiring work climate in research team. This means also to take a responsibility:

Our head of lab is really supervising us 24 hours per day and she has a research plan, what we negotiate and agree with and we try to be in schedule. She does not practice in lab herself any more, because she has a such workload and other things to do... She has a master plan, and sometimes she has consulted with the whole team. And she is deciding about wages and scholarships in own research group. (BioM, Res Fellow, coordinator, 20-24)

Respondents have said about importance on gender balance. There was said that it is not true that only women are said to be emotional, also men could be very emotional. And it was said that it is bad, when only men are deciding and acting together. It has positive influence to the context of discussions, when women are participating. Therefore women should be in parliament and state offices:

Women can be like stabilizers. Due to women's participation also men's behaviour is changing. (BioCh, Associate Prof, 65-69)

There was a respondent who has said, that it is OK for her, when she can contribute to the research team with her work, where she has a talent and she is better than others, for example writing research grant proposals, reporting etc:

My bosses are smarter and more talented than me. They are deserving superior's position. And myself, I really don't have any ambitions. I think that women in general are not so interested in making the great career. (Ph, Lecturer, 50-54)

Many respondents from time to time try to convince the interviewer, that gender issues and gender equality, or actually inequality, is not an issue to talk and waste time, but at the same time, there is also said that gender inequality appears:

I think, that this women's and men's issues are overdone, other things are still much more important. (Ph, Lecturer, 50-54)

I do not know about importance and acuteness of gender inequality in science and we should deal with this issue. By insight the problem of inequality appears in pay and career. (BioM, Prof, 35-39)

II.4.3. Solving the Problem of Gender Inequality in Sciences

Recognition of gender inequality problem in scientific community

The respondents have said about inequality, but the most of respondents have rejected that this was a serious problem in sciences in Estonia. The main arguments against gender inequality recognition is a support to the fact that people cannot be equal and *'if women really want, they can be good scientists and in good positions'*. Gender inequality as a serious problem is rejected as unimportant and artificially created problem.

Structural inequalities are not discussed, women's reproductive role and reconciling work and family life is explained as a personal and subjective problem.

There are so many important things besides doing science. For example, emotional ties with the family and children... and therefore of many women dedicate themselves to the family, and the science. (Ph, Res Fellow, member of board, 40-44)

It is very nice to stay for three years at home [parental leave – AL] with the child. This is very unique period in one's life. And one can have a doctoral degree, but the competence is lost. (BioCh, Associate Prof, 65-69)

There was no gender equality in the Soviet Union. The woman tractor driver has have appreciated and made as a role model. Women were expected to be hard working equally with men at work and home. (BioCh, Associate Prof, 65-69)

There are so many opportunities. I think that a decisions that women have equal rights with men to study and to find interesting work. (BioCh, Associate Prof, 65-69)

Being equal in results, means to have equal resources. I think that if women could have the same resources and time, like men do, then women and men can be equal in results. (Ph, Lecturer, 50-54)

People do not have equal abilities and talent. People can't be equal. (Ph, Lecturer, 50-54)

Policy Actions for Encouraging Active Participation of Women in Sciences and HT

Agents

The change agents can be persons, government, science foundations, and international foundations. In nowadays Estonia European Union's policies have a huge impact.

Among respondents it was discovered a special scientists group. Mature scientists are ready to contribute changes in favour of young women scientists. It is very interesting to see changes in general understanding and also changes in thinking of one person during the life course.

The respondents had many novel ideas. For example, revising gender traits attributed to women and men. It is clear now that men are also very talkative and they also take part in creating different gossips. Also it is interesting how women's attitude to men is changing if they get older.

if women are younger, they accept and support masculine thinking and behaviour.

If women get older, they become more critical. There appears some serious resistance. (BioCh, Associate Prof, 65-69)

Most of respondents were not sure in willingness to participate in debates about promotion of women in research. Some women scientists agreed to participate in discussions for gender equality and obstacles in the career of women:

I am ready to participate in such debates. /---/ I do not afraid them. (Math, Docent, 35-39)

It was not clearly stated who are 'they'. But there are popular and less popular themes under public discussion. Not popular themes mean also labelling of discussants. Maybe in this case 'they' were media figures, which possess an incredible authority in labelling people. And gender issues and equality issues are unpopular themes or 'not a real topic' for discussion. Some respondents have said that this is much easier for them to discuss, when it is 'not their problem' any more, which makes labelling more indirect:

In spite of the fact that this is not my personal problem, I think that for women who enter to science should be done something. To avoid interruption of career. They need encouragement and self-esteem if peer group has run faster. Young women need security to make decision for getting children and not to get a frustrated woman scientist living alone and to think back about wrong decisions in their life. I think that people should not choose between career and family, but both opportunities should be used. (Math, Docent, 35-39)

Evaluation of Policy Actions

In Estonia gender sensitive research policy is missing. It refers to the missing GM in Estonia in general. GM training to civil servants from the different ministries and from local governments has carried out in 2005, but it takes some time to the unaccustomed understanding of essence of the gender equality principle.

But there exists one very positive gender sensitive measure, which was introduced by Estonian Science Foundation (ETF in Estonian). This is 'My First Grant Scheme' awarding most promising young scholars. 'My First Grant' is a call for project proposals by young researchers up to 35 years of age, from all fields of scholarship, who have not been supported by the ETF previously, the aim of this scheme is to support good projects by young scholars who would find it hard to compete with renowned scientists, and thus help them to start their academic career, the scheme was first launched in 2002, and in 2005 23 young scholars received their "first grant"¹⁸.

Negative with this grant scheme is that women, who have decided to have a couple of children and stayed at home with them, have lost time and they cannot compete due to age limit. If there will be taken into account the number of children of the applicant, then age limit could be adapted.

As **gender policies are almost unknown**, women scientists have no idea about opportunities and results of such policies. Therefore there was expressed some suspicion about effectiveness of gender policies by some interviewees:

I do not know about importance and acuteness of gender inequality in science and we should deal with this issue. By insight the problem of inequality appears in pay and career.

¹⁸ Source:

<http://cordis.europa.eu/erawatch/index.cfm?fuseaction=org.document&uuiid=7D87CAEF-E0C5-B22B-CA67A116634DBD09>

I see some solution in changing framework policies and accepting woman's singularity in connection of women's life and family commitments. Tackling these problems is a task of policy makers, financiers. But solving and issue of gender inequality in every single institution is very complicated. Measurement of results of intellectual work is very subjective. May be attempts to solve the problem of inequality is so hopeless and lost labour. (BioM, Prof, 35-39)

It was asked about the change in sciences, when there will be at least **one third of women**.

I don't know, and I do not believe that a sex of scientist is playing any role. But it is important to support individual's interests, to encourage interested person. It is important not to kill this interest. It should be said that if you are interested, go ahead, it is a right thing to do. (Math, Docent, 35-39)

There has been done a lot in promotion of physics. Physics has not been so popular during the last decades. But I think that there is nothing to do with gender equality. (Ph, Res Fellow, member of board, 40-44)

I think that to prefer a woman candidate, is the right thing only in case if there are equal candidates. To give preferences for a weak woman candidate and low achievements, is unfair. (Ph, Res Fellow, member of board, 40-44)

Quotas were seriously debated, because it is a measure, what is used in some countries in some policies and there was a question about possible measures to promote women in sciences:

Using quotas is certainly wrong solution. (BioCh, Associate Prof, 65-69)

It is artificial introduction of numbers and quotas. (BioCh, Associate Prof, 65-69)

Quotas are humiliating. (Ch, Res Prof, member of boards, 55-59)

If you will be selected under quota system, you can be labelled as a quota-researcher, and nobody wants to be devalued. (5)

It is the topic of discussion, because when there is so small number of women in physics, there is also so small number of men in philology. I think that quotas we make more harm and no gain for science institution. It is very hard for institutions where a hundred percentage are women or men. (Ph, Sen Res, coordinator, 50-54)

The only thing what has discussed for promoting women in science and technology is introducing a quotas. I should say that whatever measure it will be, but definitely no quotas. (Ph, Sen Res, member of councils, 60-64)

If we will introduce quotas and promoting somebody only for being a woman, the, we will promote a second-rate scientists. Maybe there will be second-rate scientist also among men. (BioCh, Associate Prof, 65-69)

To promote women is certainly positive, but all these quotas..., I don't think that it is the right thing. I think that we will get another discrimination end of the process. (Ph, Res Fellow, member of board, 40-44)

I think that a quota system is a basis for very strange things. (BioM, Prof, 35-39)

In discussion about quotas the rhetoric about 'I have worked hard to get a the position and now everybody can enter and to discredit position of women' has appeared:

I think that there are quotas, because we have smarter and less intelligent people. (Ch, Res Prof, member of boards, 55-59)

I do not like the quotas, because the quotas can have two-sided effect. (Ch, Res Prof, member of boards, 55-59)

If we make quotas, then everybody would then become a scientist. This is horrible. (Ch, Res Prof, member of boards, 55-59)

There were some opinions, when the introduction of measures to promote women was approved, but to have quotas was not a solution. These people have thought about quotas, but they are not supporting quotas in spite of need for supporting women:

I think that a quota system is a very complicated issue, and to make generalisations about that is very sophisticated. I think that quotas are not the right things to do. But to prefer a woman candidate in a situation where there are two equal candidates, I think it is the right thing to do. And they also support different grants for young and grants for woman candidates. And to create more opportunities for the young women candidates. (Ph, Res Fellow, council member, 55-59)

I've heard the quotas exist, but there was nothing to do, I mean, I am representative of such philosophy, that I will be never..., I hate quotas. I don't like quotas, but is there will be two candidates, one male and another woman candidate, and we are quite equal, then I will prefer a woman candidate. But I want to be very sure in it, because giving the advantages for weaker candidate, is discrediting all women. I shouldn't devalue myself. (Ph, Sen Res, member of councils, 60-64)

I think that we should not talking about quotas, but one should bear in mind, that at least some women should be in . (Ph, Sen Res, member of councils, 60-64)

Not supporting quotas, but supporting women. (Ph, Sen Res, member of councils, 60-64)

There was a suspicion, how these quotas should be introduced and fixed:

I can't imagine, how such general and wise quotas should be specified. I think it is very hard to define. I think it is unwise. (Ph, Res Fellow, council member, 55-59)

All these discussions about quotas... I have participated in such meetings. I think that I was invited only for some formal reasons. I'm sorry, that these discussions were somehow promised to continue, but the continuation of these discussions never happened. I am really sorry for that. (Ch, Res Prof, member of boards, 55-59)

Only some respondents have supported quotas:

For supporting the women in science. Grants for women and also quotas for women.(Ch, Res Fellow, head of res group, 60-64)

In connection with a small number of women in science, introducing gender quotas is the right thing. And there were quotas during the Soviet period.(Ch, Res Fellow, head of res group, 60-64)

I think that it is important to introduce gender quotas in high decision-making bodies. (Ph, Sen Res, coordinator, 50-54)

The Benefit of Women Presence in Sciences and HT

The benefit from women presence in sciences and HT field is a more balanced thinking. There are many studies about masculinity, femininity and androgyny. It means studies about behaviour and thinking. Representatives from both sexes can contribute to diversity, bring added value into science due to gender differences.

The respondents expressed negative thoughts. There was expressed an idea, that too many women in science and HT field can harm sciences in general, because women and men tend to be interested in different problems.

Interim conclusions

Gender inequality problem is not recognised in Estonian society. Gender Equality Act was adopted in 2004, there are defined terms like 'discrimination', 'equal treatment', 'sexual harassment'. The respondents were not familiar with the Act, some of them have heard about discussions on gender equality through media.

There is one positive support scheme for beginners in sciences. It is Estonian Science Foundation (ETF) grant 'My First Grant'. The scheme is popular among young scientists and also among woman scientists who are returning from maternity leaves.

Quotas were not supported, but there was an idea that women should be somehow supported. There was expressed an idea, that women are good enough and they do not need unfair competition. The respondents were afraid that quotas discredit women as scientists and persons.

More women in sciences can contribute to the balance in knowledge and society. Gender balance was not so strongly stressed.

II.4.4. Discussion and Conclusions

Laas (2004) has found that the **main problems** by women scientists were said to be the attestation of women, the lack of or short career ladder in research institutions, rigid gender roles, the role of family as supporter and resource consumer (time, energy, money etc), women's time constraints in everyday life and due to their life course, accepting discrimination and gender pay gap.

The attestation of women was not so widely discussed in BASNET survey. Laas (2004) has found a wide support to the idea that women have to 'prove' herself and every fourth respondent said that women should be **twice as good** compared with men to achieve a goal (position, recognition).

In HES, the hierarchical structure of titles/ranks (bottom to top) offers some possibilities for career development, but in BES and GOV the **hierarchical structure is flat**. The scientific career choices are limited by academic staff grades, and organization structure. The latter is dependent on resources and investments into R&D. In Estonia there are many scientists with academic grades enabling holding a professorship, but due to poor resources the position is not available. Due to these hindrances the formal position gives a wrong picture about human resources in sciences (Laas 2004). In BASNET survey interviews did not point these problems out.

Some interviewees said that **the family** is an obstacle on the one hand, but on the other, a great support for a successful career for women (Laas 2004). The BASNET survey results are very similar. Behind a successful woman researcher are supportive family members and a social network or a missing family. Also the fact that men in sciences were seen more 'alone' dedicating

themselves to research and they were not seen as primary caretakers in their own family. But the BASNET survey showed patterns for two career family opportunities and some researchers have described egalitarian relations in their families.

Interviews from 2003 have showed that women have **time constraints** in everyday life and due to their life course. Time management skills are very important for goal-oriented women. It was said that women have to do very important and time consuming things in a 'shorter' time in order to compete with their male colleagues of the same age. Staying home with children for some years means a loss in competence, which is dependent on the research field (Laas 2004). The BASNET survey results and rhetoric in interviews is very similar. The problem of competing with men in the same pace was brought up and a need to introduce gender policies in this respect was widely shared by respondents. It was also expressed an idea about revising age limits for women and men in many policies and programs.

In 2003, it was asked if the respondent has felt herself **discriminated**. Discrimination as a new issue was widely denied, but there was told several real discrimination cases. It shows dubiousness in connection with the term 'discrimination', which is rather new in Estonian political rhetorics. Feelings about discrimination were more often experienced and sharply expressed by researchers in the age group 36-45 (every second).

It was asked about measures for increasing women's share in research. **Quotas** were slightly supported by a small number of respondents (Laas 2004). Positive discrimination was not mentioned. There was a fear to be '*a quota-professor*', in spite of many opinions that in the case of equal candidates mostly a man is selected, not a woman. In the BASNET survey idea about quotas was not supported, but there was many answers that in case of equal candidates if a man and a woman, a woman should be preferred.

In 2003, many respondents stated the problem of low pay as an obstacle for **fulfilling their potential**. Poor funding was also expressed with ideas about '*small country as an obstacle*'. Probably the recruitment problems in research institutions can be attributed to the tarnished image of science and research. Small resources put budgeting, recruitment, and pay under pressure. The weaker and more modest gets less and a hidden practice is that men are paid more (Laas 2004). In the BASNET survey pay was not so often under discussion. Women researchers acknowledge poor funding of research and they are very cooperative to share small resources among research group, they are ready to try to find funding from other sources and they think that good colleagues and interesting work is helping them to pass all budget constraints and to invest into future for better salaries.

Learning from the best practices from other countries and institutions is very important. There is no excuse to ignore European equality policies, Gender Equality Pact, and results from former studies.

Tips for **career counselling** of women students should be based on research (Quimby and DeSantis 2006, Quimby and O'Brien 2006, Marschke et al 2007, Smith and Erb 1986). In the Baltic States, this knowledge is also useful to adapt existing knowledge to our societies. Career Counsellors should be aware about the wide spectrum of students.

For attracting young people to choose a career of researcher, some positive and **secure future** prospects should be ensured. As Gvozdena and Vysotskii (2006) have stated that '*Young scientists' dissatisfaction with their position is obvious, but what worries them most is the unpredictability of their prospects.*'.

II.4.5. Recommendations for the common Baltic States Strategy to increase women's participation in sciences and HT

Recommendations made by women scientists

Many contradictory opinions and uncertainty was expressed in the interviews about recommendations to the national gender sensitive research policy. There were discussed grants only for women, quotas for underrepresented sex, flexible working hours.

There was a change in research culture in general under discussion. Here a rhetoric like 'use of woman potential' and 'women can bring additional resources' appeared.

Only some scientists have participated in international discussions about gender equality. In Estonia these topics are poorly discussed and presented in media. Therefore it is understandable, that women scientists did not produce ideas of international gender equality policies. But women achieve with their ideas very close to international policies of gender advancement policies. In making national gender equality strategies for science, women's voice should be combined with the best practices and best GM implementation.

Grants only for women

It was said that women may need a special support when they have children. And women scientist need special attention after maternity leave period, and careful team leaders never leave their woman researchers 'alone at home'. On the other hand women scientists themselves should be ready to communicate with the research team during their career breaks. Many women scientists did not know about ETF 'My First Grant' scheme. Many women were happy that there exists some grants only for women, but to have it in own country made them suspicious.

Avoiding grants only for women is connected with fear of labeling:

I think the grants o only for women is not a proper solution. A person himself or herself should be valued, and not to have advantages for being a woman. These measures should not have a positive impact for becoming a scientist, such administrators are not taken seriously. (Ph, Lecturer, 50-54)

Quotas

Main reason for rejecting quotas was a fear to get excuse for being 'not so good', but women think, that there are so many excellent women, who can achieve high position anyway:

To use some rigid quota system is certainly not a proper solution. The most important thing is to look at capabilities. I think that capable women are able to fight for the position. (BioCh, Associate Prof, 65-69)

A thought about 'if women really want' was stressed a lot. Willingness was highlighted, but obstacles were not. The need for fight was mentioned.

Flexible working hours

Organising flexible daily work routine for scientists with small children is very important.

Relationships in research units are very important. There should be understanding from both sides. In a bad relationship the researcher with a small child can be a real troublemaker. The days off are hard to predict, but research reports have a deadline. An employee with a small child can stay at home and be fully paid. Such job protection and employees' rights on can cause a lot of problems and insecurity to the whole research group, because contracts should be fulfilled:

When I had small children, I had an opportunity to choose the working time. And then they tried to do my work even when my children were ill./---/ Without flexible working hours a woman researcher can say any time about accepting sick leave, because there is no other option. (Math, Docent, 35-39)

I think that's the most important thing is to do research, but not only just career. The encouragement is very important. And to give more opportunities. /---/ I don't know how it should be done. May be flexible working hours can contribute? Yes, flexible working hours would be fine. (Math, Docent, 35-39)

Taking into account career breaks due to maternity/parental leave was stressed. Also discussion about increasing or removing age limits for women was a burning issue. These proposals should be integrated into legal framework.

An issue of discrimination has not discussed in scientific community:

Once I had one public proposal. It was in connection of degree studies. I have proposed to look through upper age limits for woman scientists and to connect these limits with limits with the number of children. I have said that those 35 years the discrimination of the women. Woman researchers should not be punished for having children. (Math, Docent, 35-39)

During the Soviet period, two years were added to the record of service for the one child. It is quite realistic time you cannot work and should take care of your child. /---/

Organizational culture should take into account the need of parents with small children. Special advantages are not needed when children are grown up. I think that we should not develop woman science; we do not want to work with this label. We want to support women in science and science in general. (Math, Docent, 35-39)

Use of women potential

Using feminine thinking and women's capacity is important. Women have many traits that can contribute to science and society. Women seem to have better abilities for team work and cooperation:

I'm not sure in changing quality of science if there would be more women. I think that change can be occurred, and a quality can be improved, if we can to bring to science women with the brilliant brains, to replace second-hand male scientists. It would be positive. But there is also a negative side in bringing more women to the science. It is connected with the choice of research topic. I think that there are masculine and feminine topics in science. By my mind women tend to choose different topics. And I think that women will choose more feminine research topics. /---/ I think that there should be one third of women among scientific community. (BioM, Prof, 35-39)

I do not see any significant change. Maybe more proposals will be written. I have an

impression that women have been in grant proposal writing more active than men. And I also think that would relationships and a cooperation can be improved. I think that women are better team workers than men. But in the first place there is a better use of human resources. I think that this is not wise to let the best school graduates to study specialities were their full potential is not used. Such specialities do not give enough challenges to talented girls. (BioM, Prof, 35-39)

Women can bring additional resources

The most of respondents have not participated in gender equality debates and they were not aware about actions in promoting women and making women more visible. Therefore it is very interesting to follow ideas of respondents, which go in line with the international gender equality policy:

I don't know exact statistics about the sex of grant applicants. It should be interesting to know. But they tend to think that it is not 50-50, and I can only guess that the majority are men. But I think that if the priority is given to women under special conditions, then men are very supportive. If women applicants can bring more money to the research unit, everybody can appreciate it. People have learned to see additional possibilities, they have learned to use the additional resources. (Agr, Prof, member of councils, 40-44)

I do not know about importance and acuteness of gender inequality in science and we should deal with this issue. By insight the problem of inequality appears in pay and career. I see some solution in changing framework policies and accepting women singularity in connection of women's life and family commitments. Tackling these problems is a task of policy makers, financiers and donors. But solving an issue of gender inequality in every single institution is very complicated. Measurement of results of intellectual work is very subjective. May be attempts to solve the problem of inequality is so hopeless and lost labour. (BioM, Prof, 35-39)

Cooperation between different sectors

Different policies and actions can contribute for greater gender equality. Better cooperation between industry (BES) and science (HES) can create a stronger basis and give additional value. This cooperation can be in so many spheres beginning from production process and internships to researchers:

One of constraints in a national science system is the distance from applications. In physics, chemistry and material science, research results can be applied in abroad. And therefore it is complicated to find a job. I know graduates from material science, who are working in water park. /---/ Another obstacle is a weak link between science and industry. For that reason, it is for students of material science very complicated to find a place for internship. Often owners of these firms are international companies, and there is no interest to use local knowledge. Into first-hand, these firms expect the cheap labour force from Estonia. (Ph, Lecturer, 50-54)

Better cooperation with private firms, firms can pay for travel etc. (BioCh, Docent, 65-69)

Additional recommendations

The main problems of research and development in Estonia:

- Inadequate human resources
- Unattractive investment environment, lack of interest among international science community.
- Low knowledge-based entrepreneurship, low investments into R&D in business sector
- Poor cooperation between businesses and universities.
- Inadequate knowledge about innovation as an engine for promotion of competitiveness and productivity.
- Research themes are not serving needs of business sector, low innovation capacity in universities.
- Rigid educational system and its support systems.
- Brain drain and a lack of skilled workforce.
- Lack of textbook in Estonian.
- Rigid teaching methods, adult training and innovative training methods are needed (e-learning etc).

Key areas for increasing gender equality in science are connected with opportunities, image of scientist, and policies of work-family balance.

Opportunities

In Estonia gender impact assessment (GIA) has not done, but it is urgently needed. It is also basis for gender mainstreaming (GM), which should incorporate gender into all policies and practices. Positive is that some surveys about gender equality attitudes are completed¹⁹, and give to Estonian society the tool to make right decisions to move towards inclusive, fair and unbiased society. Gender monitoring reports are made twice, but are weak tool for gender equality officers and enthusiasts. Sex segregated data gathering regulations remain inadequate. Government decrees and other legal instruments should avoid reproduction of basis for poor gender analysis, GIA and GM. Unfortunately there is not experience of gender equality monitoring and the first reports in this field are weak tool for civil servants in their work. In 2005, scientists prepared the gender equality monitoring and the report was ordered by MoSA (Soolise võrdõiguslikkuse monitooring 2005). This monitoring had aimed to gender inequality mapping and is based on survey (N=1000). Negative side of this report is that it is reflecting views and attitudes on gender aspect in current 'policies', but statistics is not analysed. The monitoring points out also different values of Estonians and non-Estonians.

The report has highlighted the following problems in Estonian society:

- women's low political representation lead to exclusion from decision making,
- high labour market segregation by gender leads to lower income of women
- traditional gender roles in work environment and families is affecting negatively men at work and women in domestic sphere;
- gender stereotypes are an obstacle.

Departure from John Rawls, the report has discussed about reasonable and unreasonable gender inequalities and was concluded that in Estonia 'time for unreasonable inequality is over'.

¹⁹ Soolise võrdõiguslikkuse monitooring 2005

Feeling of insecurity is incorporated into employment relations. Temporary employment contracts tend to be the main practice in higher education sector. The most contracts are made for three or five years.

Somebody can say that there is no gender aspect in such employment relations. There is. It is connected with women's reproductive role and law enforcement practice. To discriminate somebody due to pregnancy or maternity is banned, but from the other side gender equality act and EU directives have poor implementation practice. Women are used to be silent. Only in 2006, there appeared the first case to Gender Equality Commissioner's Office²⁰ about discrimination due to pregnancy.

There is a possibility to analyse gender aspect in employment contracts and to take actions towards gender equality and equal treatment. For example, in case of being elected to rector's office, and existing employment contract will be stopped and continues after the end of period of high administrative position. In case of maternity or paternity leave, research positions contracts will be not stopped in some universities. This practice should be changed, and people on parental leave should be treated equally with other people elected to higher temporary positions.

There is also possible to analyse funding and support schemes from gender perspective. The first positive practice is the ETF 'My First Grant' scheme, but there should be more possibilities to have more programs, measures, targeted actions.

Gender sensitive career counselors and mentors are needed to encourage more women students to choose career in science and have successful career. Career counselors are in a good position to assess the availability and influence of role models on clients' career choices. Career counselors need special training and more information in order to assist women in identifying and achieving their vocational and career goals.

The image of a scientist

The image of a scientist is still quite stereotypical. Male scientists are more visible in society. Main reasons for that lie in understanding of traditional gender roles. Women more than men are seen to be primary caretakers of the families, and men are seen as primary breadwinners of the families. In the interviews it was often said that men are oriented 'naturally' towards work and career. Men take more time for making lobby and PR, which takes time and actually they do it often from the time, which should be given to their families. Among women are less lobby-makers, because they give up to their voice of heart and prescribed social norms. Women more than men, want to be perfect in their family career's role and in scientist's role.

Acceptance of work and career orientation gives more possibilities for men to work with public relations and to get more attention from society. The women-scientists have said that they didn't have time to participate in many meetings, 'walk on carpets', to make lobby with decision makers. The women-scientists say, that it is very important for them to be brilliant in their work.

For achieving greater visibility, women-scientists should cooperate and support the creation of new role models of scientist. Also better-organised public services can help women and men, giving more time to professional work.

Making a new image of a scientist as a person with hobbies, relatives, family is an important issue. Portrayals of well-known scientists in family roles, showing them as fathers and grandfathers creates new ideas and ideals in society.

²⁰ Gender Equality Commissioner was nominated in 2005.

Prime Minister Andrus Ansip had a speech in November 2006 in the University of Tartu²¹ and tried to define who is a doctor:

A doctor should have doctoral degree. But I believe that in same time the doctor is an active citizen, promoter of Estonia. The doctor should have high intellectual baggage, the doctor should have diverse and the first class knowledge, doctor is able to participate in international research and to produce new knowledge. The doctor has a crucial role in development of future generations. Doctor's work should be appreciated and he or she should be acknowledged, in spite of the old fashion expression. The doctor, who promotes international research and Estonia, is contributing to all of us.

The women scientists have pointed out the importance of personality traits, which are preconditions for becoming excellent scientist. Therefore, beside scientific achievements there should be also a caring person. Today many people are satisfied, when an excellent scientist cares about research and society, but a changing image of male scientist should also include a care for his own family and women scientist should be allowed to be more active in public discussion.

Reconciling work and family

Job protected parental leave is possible for 36 months in Estonia and period for parental benefit (100% paid leave is 15 months). Parental benefit is salary dependent. As doctoral students are mostly not employed, but they have scholarship (not equal with wage because there is not paid taxes out of that), it means, that doctoral students will get only a minimum level of parental payment, which is near three times lower than their scholarship. The rest of time (21 months) is paid a monthly allowance (about 38 EUR in 2005).

In Estonia, activities improving childcare have been fragmented and poorly planned. Practices and problems with childcare are studied by initiative of the Minister of Population Affairs. According to survey results by Unt and Krusell 2004, the main problems by parents were seen a shortage of vacancies in nurseries (childcare under 3-years old), cost for childcare, inflexibility of existing services (open hours etc) and small space for individual approach. The most expensive services were said to be nannies' service.

Training programs and better industrial relations to avoid tensions between different parties should support this. In some other spheres some additional training is offered on renewal of skills and to enhance employment opportunities for women distanced from the labour market. But these principles should be put on sustainable level and parenting should not be considered as losing position, skills and competitiveness. Such training for returnees in sciences is also needed, but it is solved case by case in every research group and personal support is very important in this period.

The national strategy for the implementation of the Principles of Population Strategy for 2005-2008 includes measures to promote the reconciling of work and family life. These include different activities:

1. Informing the public about necessity and possibilities of combining work and family life, encouraging men to participate more actively in family life.
2. Developing proposals and conceptions concerning alternative childcare possibilities.
3. Creating a study module for child minding.
4. Offering possibilities of re-training through the Labour Market Service.

²¹ Ansip, A. (2006). Doktorid Eesti tuleviku arengumootoriks. A speech from 01.11.2006. <http://www.valitsus.ee/brf/index.php?id=272193>

Unfortunately, these activities seem not to tackle problems with childcare, what was told in interviews. It means, that more concrete measures and actions should be taken for better care services (childcare, care for elderly).

Promotion of gender equality

The general gender equality strategy is missing, some strategies with tighter scope have been prepared or in preparation²². It should be decided, whether to work out general gender equality strategy or to continue work with field-by-field, but in systematic way and holding in a mind a whole picture.

Estonian progress report²³ is poor reporting about promotion gender equality and GM, because it has not been clearly set as a goal. However, in programming papers (OPs) are stressed in many places that *'gender equality is reflected under the horizontal goal 'equal opportunities'*. The fact that women in Estonia, similarly in other countries, are still likely to have shorter or interrupted careers and, therefore, fewer rights than men, should not be ignored any more. Students in high schools and universities, single parents, older women and women working in family business, men and women with preschool age children are still risk groups.

Public discussion on concept about gender equality strategy is needed. GM should be incorporated into national programs and policies. Sex segregated data should be gathered and systematic analysis of gender gaps should be done. Looking critically through the MoSAs regulations about need for labour market statistics, activation gender equality bodies' activities and visibility, cooperation with gender experts and social partners.

Creation of sustainability of accessible and diversified childcare and training for returnees to the labour market (parents etc) is needed. Promotion of men's family roles should create contemporary image of men. Social innovation in society should be supported. In existing measures success is estimated in monetary growth only.

The three procedural issues in relation to implementation of GM should be prioritised:

- Elaboration of national gender equality strategy, regulations for implementation (in addition to Gender Equality Act). Assessment of gender equality recommendations (decrees), to update gender equality (<http://gender.sm.ee/esileht.php>)
- Sex segregated statistics and other data.
- GM in planned programmes and projects.
- Better education in different forms (attractive and practical) in all ministries and local authorities in GM in cooperation with gender experts in academia.
- Gender studies should be mainstreamed into curricula (public administration, social policy, social work, economics etc).

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²² Promotion of women entrepreneurship, tackling violence against women

²³ NPR

Forms of Discrimination against Women submitted by the Republic of Estonia under Article 18 of the Convention. Ministry of Foreign Affairs. Ministry of Social Affairs. Tallinn

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II.5. POLAND: Country Report

Elżbieta Czerwosz and Aleksandra Leliwa-Kopystyńska

Polish Physical Society

Present status of women scientists in physics and chemistry in Poland

Recently, thanks to the grant obtained from Polish Ministry of Science and Higher Education (contract no 241/6PRUE/2006/7); we could undertake a study performed by the institution specialized in searching the public opinion, i.e. by Research International Pentor. The study was based on the questionnaire prepared by the Polish Group of BASNET project under the supervision of prof. dr. hab. Renata W. Siemieńska-Żochowska from Warsaw University. The idea of the questionnaire was the same as of that prepared previously by the Lithuanian partner of BASNET project.

The study was carried out in between 14 May and 14 June 2007 and the questions were addressed to 73 women and 69 men in range of age 33 – 55. All respondents work in experimental physics or chemistry in universities or polytechnics in 6 biggest towns of Poland: Warszawa, Krakow, Wrocław, Poznań, Toruń and Łódź. The complexity of the enterprise illustrates Table II.5.1.

Table II.5.1. Respondents according to the institution and to the intention of planned study.

Number of responders										Total number
In Physics					In Chemistry					
	Polytechnic		University		Polytechnic		University			
	planed	realized	planed	realized	planed	realized	planed	realized		
Wo-men	18	9	18	14	18	15	18	35	73	
men	18	11	18	14	18	15	18	29	69	
Total	38	20	36	28	36	30	36	64	142	

The results show that the women's situation is worse in comparison with men's situation in their scientific and administrative careers. Most women reach PhD at the end their scientific career, which is not the case for men, especially at the universities. Most women occupy positions of tutors while men are professors or full professors (see Fig. II.5.1).

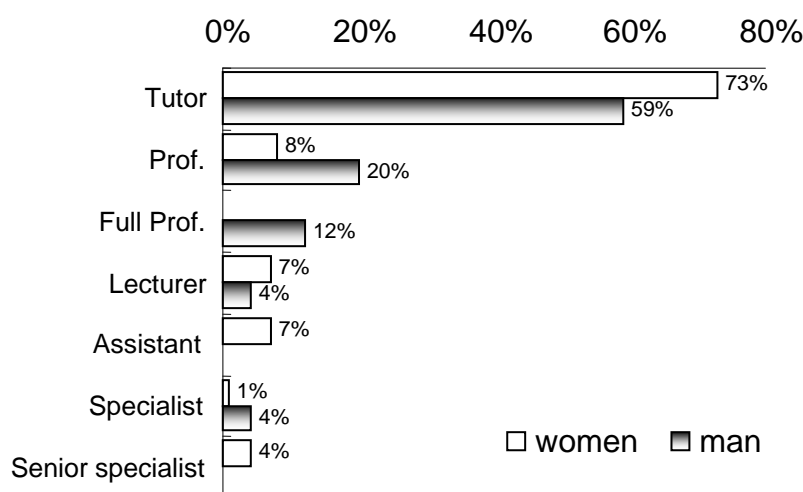


Fig. II.5.1. Academic positions of men and women scientists

Other interesting result shows that more men are married and more of them have children (see tables II.5.2 and II.5.3 below).

Table II.5.2. Respondents according to their family status

	Up to 39		40-49		50+		M.Sc./Ph.D.		Dr hab./prof.	
	women	men	women	men	women	men	women	men	women	men
Single	32	42	30	10	9	10	26	27	10	7
Couple	68	58	62	85	73	87	67	68	67	93
Divorced	0	0	0	0	14	0	2	0	13	0
Widowed	0	0	8	0	4	3	5	2	0	0
No answer	0	0	0	5	0	0	0	2	0	0

Table II.5.3. Respondents according to the number of children they have

Number of children	Up to 39		40-49		50+		M.Sc./Ph.D.		Dr hab./Prof.	
	women	men	women	men	women	men	women	men	women	men
0	11	9	10	4	5	4	23	13	3	4
1	8	3	7	4	8	8	17	9	6	6
2	5	5	8	10	7	13	15	13	5	15
3	1	2	1	1	2	4	3	5	1	2
more	0	0	0	1	0	1	0	1	0	1

To improve this situation both, men and women, say that the most important is to organize a kind of help for women returning to science after maternity. Least of all agree with radical solutions, such as parity or another special preference for women working in sciences. This should be a natural process of fighting with stereotypes. It is also worth to notice that about 14 % of men (mostly older) responded that there is no discrimination of women and so it is not necessary to do anything in this field (Fig. II.5.2).

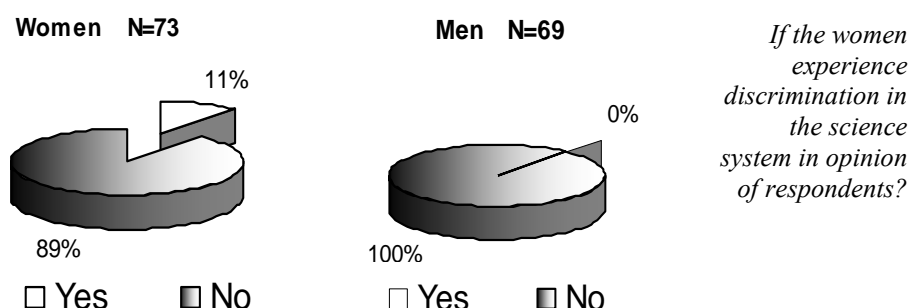


Fig. II.5.2. Recognition of the problem of discrimination

We also found differences depending on gender in the answers obtained from the question how often respondents confront an opinion that women are not good in leadership because of the lack

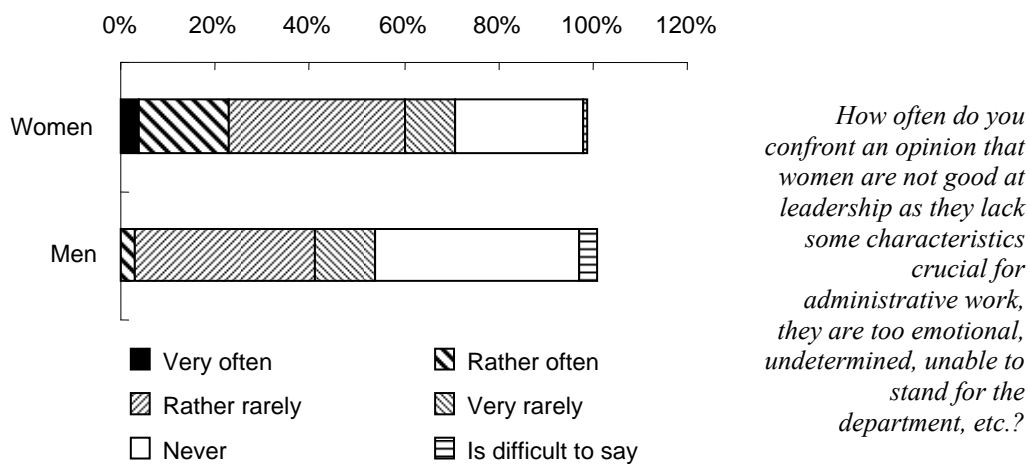


Fig. II.5.3. Women and men opinions about women’s ability to take administrative position

of some characteristics, which are crucial for administrative work. According to this opinion, they are too emotional, undetermined, unable to stand for the department, etc. It is also shocking that women encounter problems more than men due to their marital or family status (Fig. II.5.3).

The answer distributions shown above emphasize the problem connecting with women ability (or disability) to make a real statement about their situation and position in external world, where they should be treated as partners.

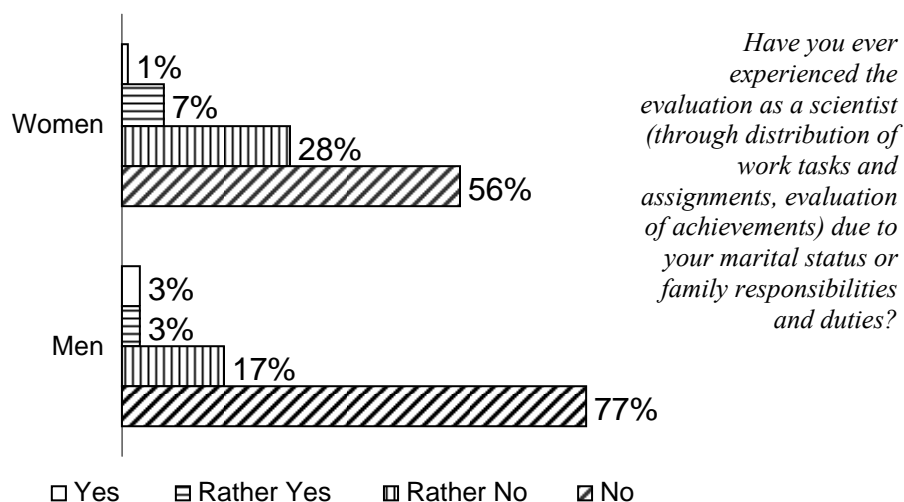


Fig. II.5.4. Sense of discrimination due to family responsibility

II.6. ROMANIA: Country Report

Ana Emandi

Bucharest University

Introduction:

The University of Bucharest was involved as the 10th partner in the project “Women in Science and High Technology in the Baltic States” (BASNET) founded by EC in the FP-6 Program.

In this project the University of Bucharest was represented by professor chemist Ana Emandi from the Faculty of Chemistry, as chair of the Romanian Group (GR). The main objective of this project has dealt with the implementation of good practices in improvement the representation of women in exact sciences in high positions and in decision making body in the University of Bucharest.

The project BASNET can be well related to the conclusions of the ENWISE (Enlarge Women In Science to East) Expert Group chaired by Professor physicist Ene Ergma. This report investigates the situation of women scientists in the ENWISE countries (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia), providing an insight into the situation from a historical, as well as a contemporary perspective:

1. **the communist regime**, included the equal right to and the obligation of full- time employment, as well as access to education regardless of gender, the availability of childcare facilities, legal protection and state support for the working mother;
2. this formal gender equality was achieved and sustained through political censorship, and the suppression of women’s movements and freedom of speech;
3. **the consequences of the transition** period have left women scientists in a more vulnerable situation;
4. 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;
5. **even** if the overall **presence of women and men as researchers is fairly balanced**, there are gender differences in the concentrations across the various R&D sectors and fields of science, whereby women are squeezed out of competitive, high-expenditure R&D systems, **but absorbed into struggling low-expenditure systems as a kind of back-up human resource**;
6. women are still under-represented at the top positions in Academies of Sciences and in Universities;
7. women constitute the majority of teaching staff (54%), but tend to be **concentrated in the lower academic positions**;
8. 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**;
9. this report **reveals the large proportion of highly qualified women scientists** who are currently working in the research institutions of the ENWISE countries in very poor conditions, **representing a real waste of talents** for both their national scientific communities and the European Research Area;
10. should the situation not be improved, there is the additional risk that these underutilised skills will have **a negative impact on the younger generation** and deter them from entering science, which is something that European research cannot afford;
11. the gender equality issue is a complex one. This report shows that while **formal legislation** is an **absolutely necessary** condition, it is **not sufficient to guarantee equality**;
12. the report also calls for changes in mentalities and in working conditions;
13. **institutional role in supporting or encouraging these changes**, by questioning norms, setting new standards, monitoring progress in order to allow women scientists to take full advantage of and contribute to the European Research Area. „ (Philippe Busquin

II.6.1. General presentation

In this era of acute competitiveness the negative consequences of gender stereotypes are difficult to ignore, as they severely affect the professional sphere. Studies conducted in different countries indicate a problematic situation for female working in male dominated environments, especially fields traditionally perceived as suited for man (e.g. Inzlicht, Ben-Zeev, 2003; Steele, 1997; Heilman, Wallen, Fuchs, Tamkins, 2004; Brown, Josephs, 1999; Schmitt, Opre, et al 2003).

A close look at the academic setting reveals that most chairs/departments are dominated - both numerically as well as in which leading positions are concerned- by men.

Women are underrepresented numerically, and their presence in leading positions is insignificant (Opre, 2004). This asymmetry leads to a pressure upon female teaching personnel, expressed in what Steele (1997) labeled as the "stereotype threat" (ST). A stereotype threat is a socio-psychological threat that arises when one is in the situation of doing something for which a negative stereotype about his/her group applies. This greatly increases the levels of occupational stress and anxiety, which in turn account greatly for decreases in performance (Steele, 1997). The repercussions of this fact are detrimental to women in these departments.

Being subjected to increased stress, they have to work harder to achieve the same level of performance as men. This adds up to other pressures they have to deal with, such as family responsibilities or the pressure to conform to an acknowledged "feminine" stereotype in order to be liked (Kierstead & al, 1988). The consequences extend further on, to the young women that are aspirants to an academic career in a domain and that can easily be discouraged, through the lack of successful career role-models (Nauta & al, 1998).

The stereotype threat should be considered with great attention, as the theories imply that it affects precisely the valuable women in a field. These women, who are competent and skilled, are field identified, and thus more determined to be successful and to overcome the stereotype. But this determination to overcome the stereotype often leads to the mere activation of the stereotype.

According to Albert Ellis paradigm, the stereotype can be considered a cluster of irrational beliefs that initiate and maintain the high levels of anxiety. Or, it is well known that if a high level of anxiety is present, performance decreases.

So far, solutions to overcome this stereotype threat refer to either changing the environment (Steele, 1997) or conforming to the general stereotypes associated with women (Kierstead, D'Agostino, Dill, 1988) - women in male dominated fields should act as „feminine" as possible (consistent with stereotypes) to avoid social disapproval.

II.6.2. Women and the powerful scientific community

Socio-economical development depends, essentially, on a powerful scientific community. In order to ensure the development of such a community, it is necessary:

first of all, to get young people attracted towards a scientific career and to encourage them, by all possible means, to consider choosing such a career;

secondly, it is imperative to ensure some requirements for those already engaged in a scientific career. The scientific environment should, therefore, provide them with the necessary conditions to preserve their enthusiasm and motivation, as well as with the opportunities of personal development and the possibility of reaching the highest level in their field;

thirdly, one must accept the fact that a powerful scientific community should be open to all citizens.

However, in most countries, including Romania, the scientific community, particularly academic, has remained dominated by men. Despite the fact that the number of women that graduate from a university is significantly higher, and in the last years the tendency is obviously ascendant, in most scientific domains, especially those that envisage research and scientific development, the disparity in the favour of men remains blatant.

Women still remain ineffectually represented in domains that have traditionally been dominated by men, such as **exact sciences and technological sciences**. For example, a statistical analysis carried out in many European states at the end of the 90s revealed the fact that women represent only a percentage of 8-12 % in the technological domain and approximately 20% in the Physics domain of the total number of the teaching personnel (Nauta et al. 1998). Even though we can observe a slight increase in the presence of women in the fields of Biology and Chemistry, other fields such as Physics, Mathematics and the technological sciences prove to be less accessible in this sense.

Another matter at least as important and likely controversial, the aforementioned study shows, is represented by **the much reduced presence of women in leading positions of departments or faculties**. For instance, **in the technological field**, the number of women leaders doesn't go over **4 %**, and this percentage **doesn't exceed 25 %** not even when all the academic domains are added up. The majority of studies that have focused on elucidating the factors that can explain the reduced presence of the women teaching staff in these fields seem to lead to the same conclusion.

Consequently, they have proved that, regarding the teaching-research responsibilities and the managerial ones, the main cause behind the reduced presence of women in the aforementioned domains consists of **the gender stereotype**. The gender stereotype, as we have mentioned above, refers to a set of categorical beliefs regarding the characteristics attributed to a person (man or woman), based on its belonging to one of the two sexes and that later fundaments the expectancies regarding the abilities of the stereotyped person.

One can invoke, of course, numerous attempts to reduce the damaging effects of this kind of stereotype on women's professional opportunities. Unfortunately not so many have been successful. In fact, the majority of the situations in which modest or nil results were obtained converge to the same conclusion: **the gender stereotype is the main cause of this discrimination**, but its effects are harder to remit. It is still very little about the psycho-social mechanisms that favour the development and sustainability of the stereotypical ideation and even less, the way it influences the behaviour and the performances of those who are the object of stereotypes. **One idea clearly resulted from all these studies, specifically, that the negative effects of the stereotypes on the targeted person are dependent on the degree she identifies with her activity field**. Thus, the more the person identifies herself with the work field, the more the effects of stereotypes on her professional performances are increasingly destructive (Inzlicht & Benn-Zeev, 2003).

II.6.3. The good practices proposed to be implemented in the University of Bucharest

In order to elaborate the good practices for improvement the representation of women involved in exact sciences in high professional positions and in decision making bodies, GR (Romanian Group) studied the following aspects:

- i. Romanian legislation for equal opportunities;
- ii. The academic environment of the University of Bucharest;

- iii. Romanian academic environment (studies & intervention strategies in Babes Bolyai University of Cluj Napoca);
- iv. Good practices in the European Countries –Germany – University of Berlin;
- v. Conclusions and future actions in promoting the good practices of gender issues in the University of Bucharest (BU).

i) Romanian legislation for equal opportunities

Romania's National Agency for Equal Opportunities for Women and Men (ANES), established on 1 January 2005, commenced operations on 1 March. The new 2004 Equal Opportunities Law, whose regulations give employer and trade union organisations the necessary capabilities to promote a gender policy and to resolve cases of discrimination, provided for the setting up of this ground-breaking institution. On 19 August 2004, the government of Romania passed Ordinance no. 84, which modifies the 2002 law on equal opportunities for women and men (Equal Opportunities Law). In February 2005, a revised version of the Equal Opportunities Law was published, including all amendments and additions.

The newly created legal framework transposes EU Directive no. 76/207/EEC of 9 February 1976, with the amendments and additions brought about by European Parliament and EU Directive 2002/73/CE of 23 September 2002 on implementing the principle of equal treatment for women and men in the field of employment, professional training and working conditions.

The law defines the terms of direct and indirect discrimination, harassment and sexual harassment. It promotes and regulates the principle of equal opportunities and equal treatment between women and men in three broad areas:

- in the workplace;
- in access to education, healthcare, culture and information;
- in terms of participation in decision-making.

The innovative quality of the law is reflected predominantly in its emphasis on employment, as it stipulates additional responsibilities on the part of employers:

- company rules and regulations must include disciplinary sanctions for employees who violate the dignity of other employees;
- all employees must be informed that harassment and sexual harassment are prohibited in the workplace;
- public authorities must be notified immediately of any claim that the regulations have been infringed.

According to the Equal Opportunities Law, an employer may not dismiss an employee, nor unilaterally change working conditions or the employment relationship, if the employee takes a legal action for infringement of his/her right to equal opportunities for women and men. The law offers protection not just to the employee lodging the complaint but also to trade union members and employee representatives who provide support in resolving the situation at the workplace. The above restrictions imposed on the employer remain valid even after the court has issued a final ruling.

The University of Bucharest signed on the 15th of January 2007 a protocol with Romania's National Agency for Equal Opportunities for Women and Men (ANES) in promoting and disseminating our results within the BASNET project.

ii) The academic environment of the University of Bucharest

Winthin the BASNET project GR group has developed assigned activities belong to the project's tasks regarding the representation of women in exact sciences (Mathematics, Physics, Chemistry)

in the high positions and decision making bodies in the University of Bucharest. The results are presented in the following figures.

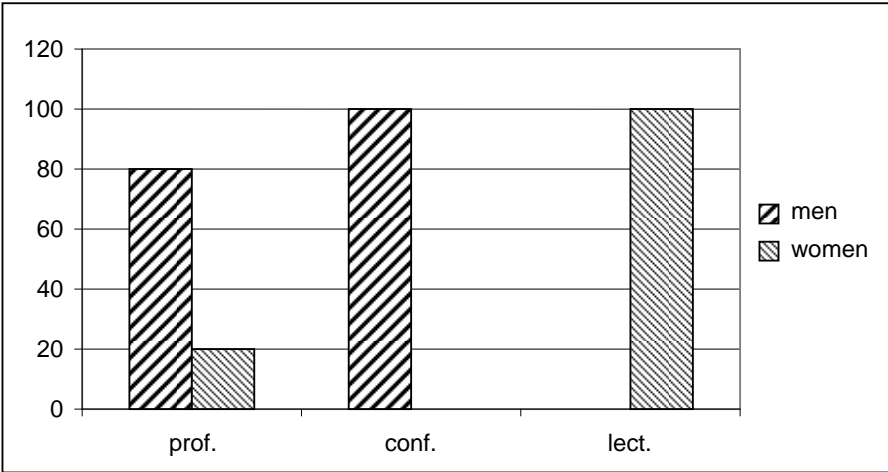


Figure II.6.1. The percentage in participation in decision making bodies of science institutions

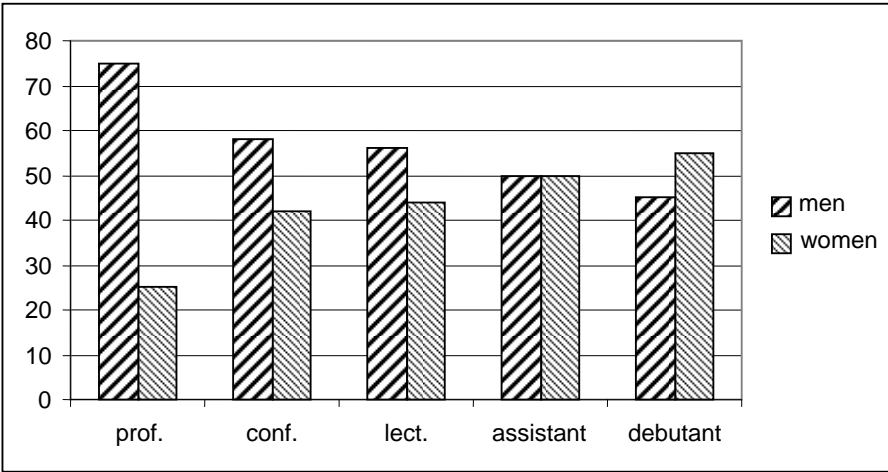


Figure II.6.2. The percentage of women representation in exact sciences

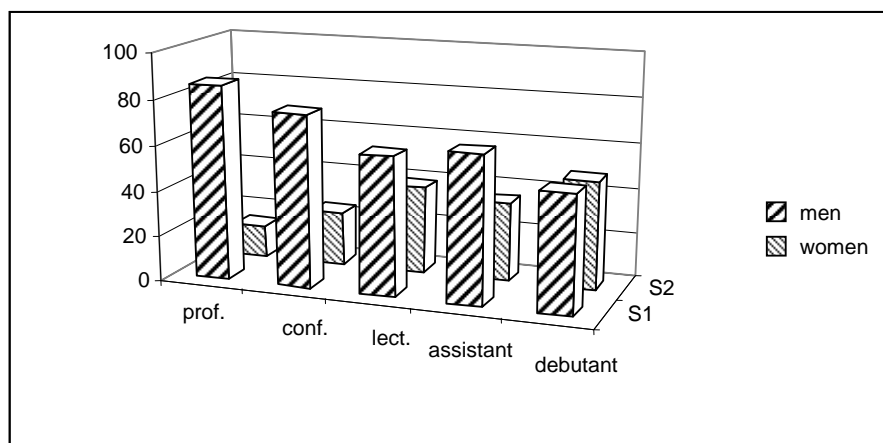


Figure II.6.3. The percentage of women representation in Mathematics

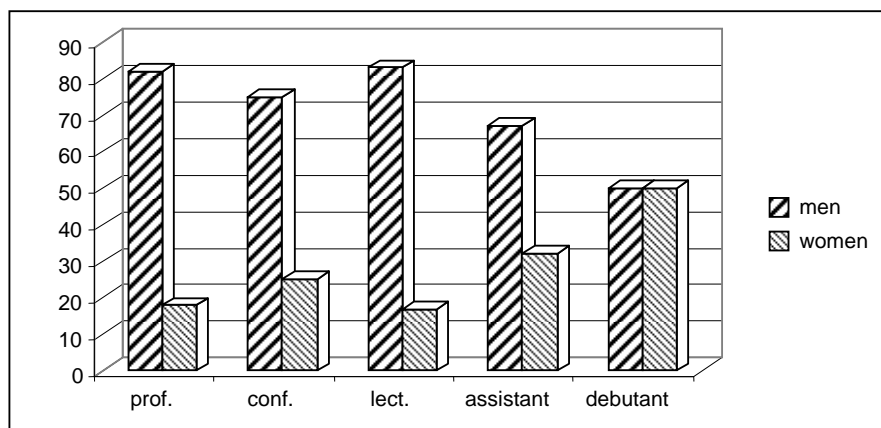


Figure II.6.4. The percentage of women representation in Physics

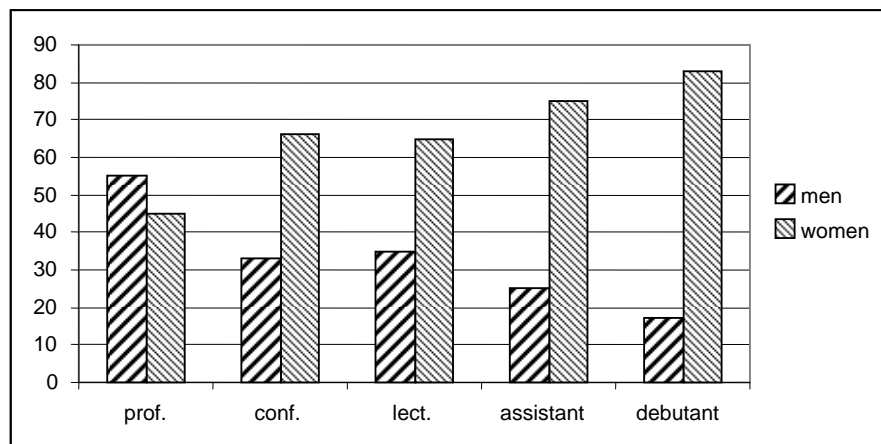


Figure II.6.5. The percentage of women representation in Chemistry

All data about the composition of the University's staff and the representation of women in the high positions as a percentage of male/female were purchased from the Department of Human Resources of the University of Bucharest.

The results of the survey in the Bucharest University provides that even in the faculties where the overall presence of women and men as researchers is fairly balanced (ex. Faculty of Chemistry) there are gender differences in the concentrations across the high positions (professors, Ph.D.). Women are absorbed into low positions (assistant, lecturers) as a kind of "back-up" human resources. The ratio of men/women in all of three faculties (Mathematics, Physics, Chemistry) showed **that men are five or six times more likely** to reach senior academic positions than women.

It is necessary to encourage girls to study sciences and HT at higher education institutions. Because the research needs open women to collaboration not only selfish men to compete. The participation of women in sciences and HT is very important for science [society, state] in keeping peace and a positive sense of the research.

The results obtained from Human Resources Department were analyzed and discussed at the meetings of women involved in mathematics, physics, and chemistry of BU (Bucharest University) as two main problems:

- a) Barriers faced by women in exact sciences in the University of Bucharest
- b) The future actions proposed by women scientists in the University of Bucharest

a) Barriers faced by women in exact science in the University of Bucharest

- Barriers women face in their career in the University of Bucharest were discussed in the view of the main conditions for job satisfaction. The results were synthesized as follow:
- there is not an institutional support for participation in international conferences, international research projects, publication of research results in prestigious international journals;
- low transparency of evaluation/rewarding procedures;
- there is no attempt of women to solve problem of unfair treatment;
- there are no criteria based on the gender problem and encouraging women scientists;
- lack in motivation, low equipped lab, low salaries and few future perspectives.
- only few women choose a career in sciences and HT, because the work is very hard and needs a lot of time; the salaries are low to substitute the domestic activities;
- there is an under representation of women but it is not caused by a discrimination it is caused by the **aggressive world of men** and;

b) The future actions proposed by women scientists in the University of Bucharest

- First of all women must be organized in a network.
- The institution might to promote a good practices.
- The introduction of the quota system, defining proportion of women and men in decision-making bodies of science institutions and preference of women over men when qualification characteristics are the same;
- A better support for women that return to science after the maternity break in scientific career.

iii) Romanian academic environment (studies & intervention strategies in Babes Bolyai University of Cluj Napoca)

a) studies

Hence, a detailed study was done for the representation of women scientist in the Babes Bolyai University of Cluj Napoca, Romania, and in order to compare our results with another academic environment from Romania we will briefly present some aspects regarding studies & intervention strategies in Babes Bolyai University (BBU) of Cluj Napoca.

This University (BBU) is a statistically proven male-dominated environment (75% men), if we include all faculties, with most departments consisting of and being conducted by men. The results of these comprehended studies are the following:

- Although when entering the college the number of female students is usually higher than that of male students, when it comes to pursuing an academic career in the chosen field, the number of female students is significantly lower than those of men.
- A preliminary study carried out in the BBU's four departments revealed a higher level of occupational stress (as measured with O.S.I.) in the case of women working in the male-dominated department than for those working in the gender-balanced department.

It is clear that such a gender unbalanced environment is detrimental to its members because of:

- **First, it is** discouraging to a female undergraduate who might be thinking about pursuing a career in the field. Thus, the environment may be preserving itself in some cases, by indirectly discouraging women's participation.
- **Second,** women who already work in the field are under a lot of pressure.

The inherent stress of the current job and of, possibly, extra family responsibilities, is doubled by increased self evaluative anxiety.

Women in these fields are constantly under the pressure of proving themselves, even long after their career achievements shouldn't be questioned anymore.

Even more, empirical studies have shown that, when women in these fields have been acknowledged as successful, they are often perceived as breaking some kind of societal norms and thus, they are "punished". This punishment translates into social difficulties in the working environment, as they are perceived as hostile, cold, unwilling to socialize with others; in a word they are disliked.

This leads to even more difficulties, as the same study shows that liking or disliking a person is a strong bias in the evaluation of those person's performances. Thus, vertical segregation of the male dominated fields is preserved, as it is more and more difficult for women to advance in their career, regardless of their abilities and performances (Heilman, Wallen, Fuchs, Tamkins, 2004).

b) Intervention strategy

- The teaching activity will be assessed by using a student rating form, video records and semi structured interview with the assessed faculty. We must mention here that the student rating form and the faculty staff interviewing protocol are already created.
- The research performance will be assessed on the bases of certain objective criteria widely recognised at the national and international level such as: the number of publications in relevant scientific journals, the number of research projects (as coordinator, research member), the number of inventions, prizes for the scientific performances.
- The managerial component will be correlated with the leading activities effectiveness: taking risk attitude, the communication skills, sensation seeking need, self-efficacy, task orientated and employees oriented (in hypothetical situations).

- The identification of present or implied gender stereotypes irrational believes.
- The improvement of the teaching competencies by reducing the female faculty level of anxiety.
- The improvement of the research abilities by organising workshops with an average length of 20 hours. The workshops will be conducted by members of the project team with training abilities and specific field expertise.
- The improvement of the managerial competencies by increasing the managerial competencies: time management, responsibility delegation strategies, communication abilities optimisation (assertiveness training), and subordinates motivational techniques.

iv) Good practices in the European Countries – Germany,

At the Workshop of BASNET – Riga – Jurmala 8-11 July, 2007, professor Barbara Sandow presented some main aspects of the good practices that the University of Berlin experienced along 15 year. These good practices were summarized as follow:

- Since 1992 meetings of Women in Physics every year,
- 1997 Conference of Women in Physics in Berlin, with 200 participants,
- meeting with the president of the DPG (German Physical Society) and in the end of this year a new Working Group was founded: Committee for Equal Opportunities
- scientific prize for women,
- 2003 Physic Journal about: Women in Physics,
- 2004 Flyer and Poster,
- Projects every year,
- German Conference for Women in Physics,
- Sessions during the Spring meetings of the DPG,
- Women Research Prize “Hertha Sponer”
- Workshops: Soft Skills; Projects for Girls,
- High school student programs,
- Committee for Equal Opportunities

v) Conclusions and future actions in promoting the good practices of gender issues in the University of Bucharest

- a. Conclusions
- b. Future actions in promoting the good practices of gender issues in the the University of Bucharest .

a) Conclusions

The direct consequences of the communist regime are the gender equality for low positions (assistant), (figures 3, 4, 5). The consequences of the transition period produced the final part of the figures above and for the high positions (professor), men are five and six times more likely to reach professor positions and in decision making body than women, hence 2-2.5 times greater than the ENWISE report in 2004.

On the other hand, the depicted barriers in the University of Bucharest are in agreement with the points 13) of the ENWISE report and claim a very weak support of the University of Bucharest and the point 11) the existence of the formal legislation monitoring by Romania’s National

Agency for Equal Opportunities for Women and Men (ANES) is absolutely necessary but not sufficient to guarantee gender equality.

The remarks of women in exact sciences from the University of Bucharest, such as the underrepresentation is caused by the aggressive world of men could be related to the gender stereotype and occupational stress mentioned in chap. 3 while a low transparency of evaluation/rewarding procedures could be related to the “stereotype threat”.

b) Future actions in promoting good practices of gender issues in the University of Bucharest

The future actions in improvement the representation of women in exact sciences in the University of Bucharest could be summarized in two directions:

assessment methods:

- the teaching activity would be assessed not only by using a student rating form but also by using teaching by research criteria;
- the research performance would be assessed not only like a researcher. A good ratio would be established between teaching and research activities, probably good would be 3/1;
- the managerial component we will be correlated with the leading activities effectiveness: taking risk attitude, the communication skills, sensation seeking need, self-efficacy, task orientated and employees oriented (in hypothetical situations);

improvement actions:

- women in exact sciences (Mathematics, Physics, Chemistry) from the University of Bucharest might become a powerful scientific community like a network or a committee for monitoring the implementation of the formal legislation and the experienced good practices from EU countries - Committee for Equal Opportunities;
- the improvement of the managerial competencies by increasing the managerial competencies: time management, responsibility delegation strategies, communication abilities optimisation (assertiveness training), and subordinates motivational techniques;
- the introduction of the quota system, defining proportion of women and men in decision-making bodies of science institutions and preference of women over men when qualification characteristics are the same;
- a better support for women that return to science after the maternity break in scientific career;
- meetings of women in exact science every year;
- a conference of women in exact science;
- a scientific prize for women in exact science;
- Physics & Mathematics & Chemistry Journal about: Women in exact science;
- projects every year;
- Women Research Prize;
- Workshops: Soft Skills; Projects for Girls;
- High school student programs.

II.6.4. Potential impact for the future period in the University of Bucharest

- At a proximal level, our intervention is intended to significantly increase the representation of women in exact science in the high positions and in decision making body in our

university.

- Thus, female teachers will be better role models for female students, who will notice the possibility of succeeding in a field traditionally dominated by men.
- In time, this will lead to a constant increase in the number of women working in the field, so the environment will be different in its structure and will ensure gender equality in the field.
- Should other Universities be interested in implementing this programme, we will be open for a future collaboration with the institution.
- We intend to raise the public awareness on the issue of gender stereotypes and their detrimental effects through advertising our project and its results (posters, handouts etc.). Many studies show that parents' stereotypes affect their children's choice of both line of study and career; therefore, the beneficial effects of changing gender stereotypes, on the long run, become clear.
- The policy makers in the area will be informed on both the results of the program and on our availability to collaborate in order to implement the results in other fields of activity.
- In case the paradigm we develop in the present paper will confirm its anticipated efficiency, we express the availability to extend its implementation in the Romanian universities at least. Moreover, we can prove that by supporting the gender equality by the present program through increasing women participation to the scientific and technological development, eventually social and economical benefits will be obtained.

APPENDIX

IN-DEPTH INTERVIEW A LIST OF QUESTIONS FOR THE MAIN GROUP OF RESPONDENTS

“WOMEN’S CAREERS IN SCIENCES AND HIGH TECHNOLOGY”

The interview should be done not in the workplace of the respondent, but in other informal surroundings. In that way we should guarantee that the respondent can talk openly, without fearing of anybody to enter the room during the interview and diminish a chance of listening to the interview by colleagues. We should also ask the respondent to have her CV during the interview in order to talk smoothly about her career trend (dates, positions).

PERSONAL INFORMATION

- When and where did you receive your degree(s) in sciences or high technology?
- How long are you in science?
- How long have you been working in this scientific or HT institution?
- Did you work somewhere else? Where?

Career trend: In what position did you start your career in science? How has your position, field of research (activity sphere) been changing over time? What is your position (tasks) now?

- What is your age?
- What is your family status?
- Children
- Spouse (education, specialty, position)

SCIENTIFIC CAREER

- Why did you choose to study [physics, chemistry, etc.]?
- What factors determined the choice of your current research field or academic activity?
- What do you like in your current job? And what don't?
- Does your institution distribute any financial resources for the scientific research? How would you evaluate the transparency in the distribution of financial resources for research?

- What are the possibilities to take part in the international research projects?
- How often do you participate in the international conferences? How do you get the financial resources for the participating in the international conferences?
- As scientist, do you work individually or in a team? If in a team, describe your team (positions, gender).

How could you evaluate the working atmosphere in your team? Is it favourable for your scientific research?

How work tasks are allocated in the team? Could you indicate any tasks that are better carried out by women or that are more often delegated to them in your team? Who has the power to decide how to allocate tasks and assignments in the team? How much are you satisfied with the allocation of work tasks in the team? Who are the main idea generators in your team?

How the contribution of each scientist to a team work is usually evaluated in your team? How much are you satisfied with evaluation criteria? Are work results and achievements of scientists openly discussed in the team? Have you ever experienced an unfair evaluation of your achievements or contribution to the team work? (If yes, did you discuss it with someone at your institution? What were the results of this discussion? If not, why?) How did you feel?

Is there a strong competition among colleagues in your team? What is it based on and what means are used for the competition? Who are the main competitors (men, women, men with women)?

- In your opinion, what are the characteristics of an “excellent scientist”? (Traits, position, working habits)
- Do you publish your research results individually or as co-author? What factors determine the number of publications and possibilities to publish results of individual research in prestigious, international editions (journals) with high citation index?
- Is number of publications a good indicator of achievements in science?
- Is there a practice in your institution to include scientists in administrative positions into the list of co-authors although they contribute to the scientific research relatively little? How would you evaluate such a practice?
- What else has to be evaluated as the achievements of a scientist?

How is the practice of working overtime widespread at your science institution? Does working overtime per se have influence on the evaluation of scientist’s achievements?

How much is it important for you to make a career? Why?

Do men and women-scientists have equal opportunities to make a scientific career at your science institution?

- Did you have any breaks or slow downs in your science career (due to maternity leave, health problems or other reasons)? If yes, when and for how long?
- How do you organize your family life to combine work and family?

Have you ever experienced the devaluation as a scientist (through distribution of work tasks and assignments, evaluation of achievements) due to your marital status or family responsibilities and duties? Did you ever resign a position/work for the family? Would you resign a position for the family?

- How much scientific career is connected to administrative position?

PARTICIPATION IN DECISION MAKING BODIES OF SCIENCE INSTITUTIONS
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Questions for women in Senior positions (heads of departments, deputy deans, deans of faculties, members of scientific boards, etc.)

- How did you achieve this position?
- How much was the support and encouragement of colleagues important in achieving the leading position? Did you have to compete with men for this position?
- What advantages do you see in administrative position in scientific research? What are the disadvantages?
- How are you getting along with administrative work?

Are there any men-scientists in the department under your supervision? How does gender matter in you?

How often do you confront an opinion that women are not good at leadership as they lack some characteristics crucial for administrative work, they are too emotional, undetermined, unable to stand for the department, etc.? In your opinion, can such statement be regarded as true? Do women-scientists support women in leading positions at your science institution? Why?

- Do men and women have equal opportunities to achieve an administrative position at your science institution?

How much are informal networks, spending leisure time together and friendship important for career of men and women at your science institution?

Why women would be better leaders than men? What character traits of women would be disadvantage in leading positions, compared to men?

Questions for women who are not in Senior positions

- Would you agree to take part in the competition for an administrative position at your science institution if you were offered to?

If not, why? What about other science institutions? Science institutions abroad? Would you take part in the competition if there were any women competitors, not only men? Would you take part in the competition for an administrative position on your own, without any offer?

- Do men and women have equal opportunities to achieve an administrative position at your science institution?

How much are informal networks, spending leisure time together and friendship important for career of men and women at your science institution?

Why women would be better leaders than men? What character traits of women would be disadvantage in leading positions, compared to men?

How does gender of the leader matter in your institution?

How often do you confront an opinion that women are not good at leadership as they lack some characteristics crucial for administrative work, they are too emotional, undetermined, unable to stand for the department, etc.? In your opinion, can such statement be regarded as true?

SOLVING THE PROBLEM OF GENDER INEQUALITY IN SCIENCE

- What features of the state science system would you consider as creating obstacles for making scientific career?

Could you indicate any barriers that women-scientists face in their careers which are not, or to the lesser extent are encountered by their male counterparts in the field of exact sciences and high technologies?

- Why, do you think, only few women choose a career in sciences and HT field?

In your opinion, do women experience discrimination in the science system? What forms of discrimination could you indicate?

Are there any open discussions about discrimination of women in your institution? If yes, does your science institution implement any strategy for the prevention of discrimination at work place and in the recruitment process?

- Who has to solve the problem of gender inequality in sciences (women themselves, science institutions, state)?

Why women are often evasive about becoming organized with other women for the problem solving of gender inequality in science?

Could women trust each other on the gender inequality solving issue or would they join the opponents under the circumstances of pressure?

- How would you evaluate the implementation of such policy actions which encourage women-scientists to make career in sciences or seek administrative positions in science system:

Grants only for women-scientists;

Introduction of quota system, defining proportion of women and men in decision-making bodies of science institutions and preference of women over men when qualification characteristics are the same;

Better support for women that return to science after the maternity break in scientific career.

Would you consider such means as discriminating men? What would be more efficient – temporary introduce the above mentioned means or publicly discuss and debate about the problems of women and slowly change attitudes of men and women-scientists to the problems of gender inequality in sciences?

Would you agree to take part in such discussions, debates with men-scientists, seeking to solve problem of gender inequality at your science institution or science system? If not, why? According to you, how high is the risk of earning the label of “victim” or stereotypical “feminist loser” in such discussions?

- Do you have any ideas, proposals how to encourage women to participate in decision-making in science institutions and to pursue their scientific career more actively?
- Is it necessary to encourage girls to study sciences and HT field at higher education institutions? Why?
- In what respects participation of women in sciences and HT field is useful for science [society, state]? Would it make any difference if women comprise more than one third of work force in sciences and HT field?

SAMPLING

Estonia, Latvia, Lithuania

Main group of respondents	Number of respondents
Women-scientists pursuing career in sciences in HT field	20

Sampling criteria for main group of respondents:

Work experience: at least two years in science and HT field

Institutions: public science institutes, universities.

Positions:

	%	N
Professor, chief research fellow:	16 %	3
Associated professor, senior research fellow:	30 %	6
Assistant professor, lecturer, research fellow:	30 %	6
Assistant, junior research fellow:	24 %	5

Leading position:

Women in senior positions (heads of departments, deputy deans, deans of faculties, members of scientific boards) – 20-25 %

10 % - sciences with the lowest percentage of women in senior positions

10 % - sciences with the highest percentage of women in senior positions

Age:

	N
25-30	3
31-40	5
41-50	5
51-60	4
60 and more	3

Sciences:

	Same institution; deferent departments; deferent positions	Other institution
	<i>N</i>	<i>N</i>
Physics	2	+1
Chemistry	2	
Astronomy	2	
Biochemistry	2	
Mathematics	2	
Informatics, IT	1	+1
Engineering, electronics	2	+1

IN-DEPTH INTERVIEW

A LIST OF QUESTIONS FOR MEN IN SCIENCES AND HT

“CAREER IN SCIENCE AND HIGH TECHNOLOGY”

The interview should be done not in the workplace of the respondent, but in other informal surroundings. In that way we should guarantee that the respondent can talk openly, without fearing of anybody to enter the room during the interview and diminish a chance of listening to the interview by colleagues. We should also ask the respondent to have her CV during the interview in order to talk smoothly about her career trend (dates, positions).

PERSONAL INFORMATION

- When and where did you receive your degree(s) in sciences or high technology?
- How long are you in science?
- How long have you been working in this science or HT institution?
- Did you work somewhere else? Where?

Career trend: In what position did you start your career in science? How has your position, field of research (activity sphere) been changing over time? What is your position (tasks) now?

- What is your age?
- What is your family status?
- Children
- Spouse (education, specialty, position)

SCIENTIFIC CAREER

- Why did you choose to study [physics, chemistry, etc.]?
- What factors determined the choice of your current research field or academic activity?
- What do you like in your current job? And what don't?
- Does your institution distribute any financial resources for the scientific research? How would you evaluate the transparency in the distribution of financial resources for research?
- What are possibilities to take part in the international research projects?
- How often do you participate in the international conferences? How do you get the financial resources for the participating in the international conferences?
- As scientist, do you work individually or in a team? If in a team, describe your team (positions, gender).

How could you evaluate the working atmosphere in your team? Is it favourable for your scientific research?

How work tasks are allocated in the team? Could you indicate any tasks that are better carried out by men than by women or that are more often delegated to them in your team? Who has the power to decide how to allocate tasks and assignments in the team? How much are you satisfied with the allocation of work tasks in the team? Who are the main idea generators in your team?

How the contribution of each scientist to a team work is usually evaluated in your team? How much are you satisfied with evaluation criteria? Are work results and achievements of scientists openly discussed in the team? Have you ever experienced an unfair evaluation of your achievements or contribution to the team work? (If yes, did you discuss it with someone at your institution? What were the results of this discussion? If not, why?) How did you feel?

Is there a strong competition among colleagues in your team? What is it based on and what means are used for the competition? Who are the main competitors (men, women, men with women)?

- In your opinion, what are the characteristics of an “excellent scientist”? (Traits, position, working habits)
- Do you publish your research results individually or as co-author? What factors determine the number of publications and possibilities to publish results of individual research in prestigious, international editions (journals) with high citation index?
- Is number of publications a good indicator of achievements in science?
- Is there a practice in your institution to include scientists in administrative positions into the list of co-authors although they contribute to the scientific research relatively little? How would you evaluate such a practice?
- What else has to be evaluated as the achievements of a scientist?

How is the practice of working overtime widespread at your science institution? Does working overtime per se have influence on the evaluation of scientist’s achievements?

How much is it important for you to make a career? Why?

Do men and women-scientists have equal opportunities to make a scientific career at your science institution?

- How do you organize your family life to combine work and family?

Have you ever experienced the devaluation as a scientist (through distribution of work tasks and assignments, evaluation of achievements) due to your marital status or family responsibilities and duties? Did you ever resign a position/work for the family? Would you resign a position for the family?

- How much scientific career is connected to administrative position?

<i>PARTICIPATION IN DECISION MAKING BODIES OF SCIENCE INSTITUTIONS</i>

Questions for Men in Senior positions (heads of departments, deputy deans, deans of faculties, members of scientific boards, etc.)

- How did you achieve this position?

How much was the support and encouragement of colleagues important in achieving the leading position? How many competitors did you have?

- What advantages do you see in administrative position in scientific research? What are the disadvantages?
- How are you getting along with administrative work?

Are there any men-scientists in the department under your supervision? How does gender of the leader matter in your institution? In your opinion, is it important for men-scientists to work under supervision of men in your science institution? What about women-scientists?

- Do men and women have equal opportunities to achieve an administrative position at your science institution?

How much are informal networks, spending leisure time together and friendship important for career of scientists at your institution?

Why men would be better leaders than women? What character traits of men would be disadvantage in leading positions, compared to men? Why women would be better leaders than men? What character traits of women would be disadvantage in leading positions, compared to men?

Questions for men who are not in Senior positions

- Would you agree to take part in the competition for an administrative position at your science institution if you were offered to?

If not, why? What about other science institutions? Science institutions abroad?

- Do scientists have equal opportunities to achieve an administrative position at your science institution?

How much are informal networks, spending leisure time together and friendship important for career of men and women at your science institution?

Why men would be better leaders than women? What character traits of men would be disadvantage in leading positions, compared to men? Why women would be better leaders than men? What character traits of women would be disadvantage in leading positions, compared to men?

In your opinion, is it important for men-scientists to work under supervision of men in your science institution? What about women-scientists? How often do you confront an opinion that women are not good at leadership as they lack some characteristics crucial for administrative work, they are too emotional, undetermined, unable to stand for the department, etc.? In your opinion, can such statement be regarded as true?

SOLVING THE PROBLEM OF GENDER INEQUALITY IN SCIENCE

- What features of the state science system would you consider as creating obstacles for making scientific career?
- Why, do you think, only few women choose a career in sciences and HT field?

In your opinion, do women experience discrimination in the science system? What forms of discrimination could you indicate?

Are there any open discussions about discrimination of women in your institution? If yes, does your science institution implement any strategy for the prevention of discrimination at work place and in the recruitment process?

- Who has to solve the problem of gender inequality in sciences (women themselves, science institutions, state)?
- How would you evaluate the implementation of such policy actions which encourage women-scientists to make career in sciences or seek administrative positions in science system:

Grants only for women-scientists;

Introduction of quota system, defining proportion of women and men in decision-making bodies of science institutions and preference of women over men when qualification characteristics are the same;

Better support for women that return to science after the maternity break in scientific career.

Would you consider such means as discriminating men? What would be more efficient – temporary introduce the above mentioned means or publicly discuss and debate about the problems of women and slowly change attitudes of men and women-scientists to the problems of gender inequality in sciences?

- Is it necessary to encourage girls to study sciences and HT field at higher education institutions? Why?
- In what respects participation of women in sciences and HT field is useful for science [society, state]? Would it make any difference if women comprise more than one third of work force in sciences and HT field?

SAMPLING

Lithuania

Additional group of respondents	Number of respondents
Men-scientists pursuing career in sciences in HT field	7

Sciences:

	N
Physics/Astronomy	2
Chemistry/Biochemistry	3
Mathematics/IT	2

3 men-scientists in leading positions:

1. head of the department comprised only of men-scientists
2. head of the department comprised of men and women-scientists
3. head of the department comprised only of women-scientists.

4 men-scientists:

1. works under supervision of a women-scientist,
2. young scientists (doctoral student, postdoctoral researcher).
3. senior research fellow/associated professor
4. works many years in science institution, but does not have a scientific degree

III. BASNET strategy and supporting documents

III.1. BASNET Strategy for Women in Sciences and High Technology in the Baltic States

Preamble

The BASNET Strategy “*Women in Sciences and High Technology in the Baltic States*” (the Strategy, hereinafter) is an outcome of close collaboration of international team of scientists, researchers and officers under **FP6 Project No 017170 Baltic states network: Women in sciences and high technology (2006 – 2007)**²⁴.

The members of the national teams, which took active role in creation of the Strategy:

LITHUANIA:

Assoc. Prof. Dr. Dalia Šatkovskienė, project leader, expert, Vilnius University;
Ričardas Ališauskas, Ministry of Education and Science;
Aušra Gribauskienė, Ministry of Education and Science;
Dr. Aurelija Novelskaitė, expert, Institute for Social Research, Vilnius;
Dr. Nijolė Vasiljevienė, expert, Vilnius University.

ESTONIA:

Reesi Lepa, Ministry of Education and Research;
Tiia Raudma, Ministry of Education and Research.

LATVIA:

Maija Bundule, Ministry of Education and Science
Gita Revalde, Ministry of Education and Science;
Ilze Trapenciere, expert, Institute of Philosophy and Sociology, University of Latvia .

POLAND:

Prof. Elzbieta Czerwosz, expert, Polish Physical Society.

ROMANIA:

Prof. Ana Emandi, expert, University of Bucharest.

The Strategy is the recommendatory document, which could serve as a background for development of national strategies targeted at promotion of women’s and men’s equal opportunities in sciences and higher technologies field²⁵ (S&HT, hereinafter) in the Baltic States.

²⁴ <http://www.basnet-fp6.eu/>

²⁵ Physics, chemistry, mathematics, informatics, and engineering.

Introduction: the problem

1. The main problem, which is tackled by the Strategy, is different and unequal women researchers' and scientists' status and possibilities in different fields of professional²⁶ activities and on different levels of organizational hierarchies in S&HT. The problem has three multipartite sides:

1.1. Women are a minority among researchers and scientists in S&HT. Moreover, women are almost absent on the highest levels of S&HT administration and policymaking. Such gender imbalance on all levels of S&HT organizations significantly restrains the countries from reaching the Lisbon Strategy goals²⁷ and confronts the main principles of creation of the European Research Area²⁸.

1.2. Women-researchers' and scientists' possibilities to realize self-potentials and their talents independently and creatively are considerably more restricted than men's in all fields of professional activities in S&HT by such structural barriers as access to organizational positions and to influential social networks, and, consequently, to human and material resources. Women's disadvantageous position in S&HT hierarchies reflects violations of and *The Code of Conduct for the Recruitment of Researchers*²⁹ and challenge actualization of EU affirmations conveyed in the series of European Commission's (EC, hereinafter) working papers, resolutions and declarations³⁰.

1.3. Women researchers and scientists are placed in disadvantageous position by the dominance of strong traditional patriarchal gender order in the societies in general and, in particular, in S&HT. The unequal women's condition in everyday situations undermines principles of gender equality, which is "a fundamental right, a common value of the European Union (EU, hereinafter), and a necessary condition for the achievement of the EU

²⁶ Here: education (including students' supervision), research, administration, and policy making.

²⁷ *Working together for growth and jobs A new start for the Lisbon Strategy*. Communication from President Barroso in agreement with Vice-President Verheugen. Brussels, 02.02.2005, COM (2005) 24 http://ec.europa.eu/growthandjobs/pdf/COM2005_024_en.pdf; Resolution of Seimas of Lithuanian Republic 2005-11-22, Nr. 1270 *Dėl Nacionalinės Lisabonos strategijos įgyvendinimo programos įgyvendinimo*. http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=266311

²⁸ GREEN PAPER. The European Research Area: New Perspectives. {SEC(2007) 412} Brussels, 4.4.2007, COM(2007) 161 final, http://ec.europa.eu/research/era/pdf/era_gp_final_en.pdf; Resolution of Government of Lithuanian Republic 2003-12-22, Nr. 1646 *Ilgalaikė mokslinių tyrimų ir eksperimentinės plėtros strategija*, http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=292705.

²⁹ *The European Charter for Researchers and The Code of Conduct for the Recruitment of Researchers*. Luxembourg: Office for Official Publications of the European Communities, 2005, ISBN 92-894-9311-9

³⁰ Comprehensive Collection of EC documentation related to women's status in science can be found on website of *European Platform of Women Scientists* at www.epws.org

objectives of growth, employment and social cohesion”³¹ and puts into question the implementation of the main principles of *The European Charter for Researchers*³².

2. Hence, tackling the problem of gender equality in S&HT, the Strategy is created responding to recent challenges and requirements which are verbalized in EU directives and echoed in national legislation, but have not been receiving sufficient attention either from national political institutions and government(s), or from academic organizations.

III.1.1. The Mission

The mission of the Strategy is to epitomize consistent and comprehensive roadmap for promotion of gender equality in research and/or educational and/or policy making institutions in all fields of S&HT by (re)formulating underlying strategic aims and objectives, and (re)synergizing existing as well as introducing innovative political, legal, administrative and personal actions, procedures and processes.

III.1.2. The Vision

The vision of the Strategy is gender-sensitive and women-friendly system of S&HT as well as gender-balanced and gender-aware academic community, where each woman and man scientist has equal opportunities to develop and fully exploit her/his talents of researching, teaching, administrating, and policy making at all levels of institutional hierarchies in S&HT.

III.1.3. The Aim

The main strategic aim, leading to materialization of the vision, is two-fold.

1. Consolidation of gender equality in S&HT *de jure*; that is (further and continuous) development and elaboration of legislation, which would assure gender equality in S&HT in terms of juridical liability.
2. Establishment of gender equality in S&HT *de facto*; that is, in addition to implementation of the juridical regulations into everyday practices on macro-institutional, meso-organizational and micro-individual levels in S&HT, initiation and consolidation of gender equality oriented policies and practices, as well as amplification of gender-consciousness among scientists and administrators in the fields of S&HT, and among major stakeholders (e.g. politicians, officers, etc.).

³¹ *A Roadmap for equality between women and men 2006-2010*. {SEC(2006) 275} Brussels, 01.3.2006, COM(2006) 92 final, http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0092en01.pdf

³² *The European Charter for Researchers* and *The Code of Conduct for the Recruitment of Researchers*. Luxembourg: Office for Official Publications of the European Communities, 2005, ISBN 92-894-9311-9

III.1.4. The Objectives

The successful achievement of the aim is directly predetermined by the efficient accomplishment of the strategic objectives, which are highly interrelated, but, simultaneously, possess different underlying significance. The objectives, in order of impact strength based priority, are:

1. *Integration of gender equality mainstreaming approach* into legal regulation of all activities in the fields of S&HT both on the national and on the organizational levels by consolidating existent policies, procedures and initiatives as well as by actuating new legal tools targeted on promotion of gender equality in S&HT.
2. In addition to alterations in organizational bureaucracies, which will be challenged by the newly introduced legal regulations, *implementation of gender equality mainstreaming approach* into organizational cultures of S&HT institutions by (re)defining professional ethics and by warranting prevention of gender based discrimination as well as by the assurance of equal treatment of women and men scientists.
3. Furthermore, definitely, to be efficient, any national and/or organizational effort has to be supported by individual members of the society/organization; the most difficult and long-lasting (but unambiguous indicator of the level of establishment of gender equality in the field) objective is *consolidation of continuous promotion of gender equality mainstreaming approach* among all social actors in S&HT. In other words, it is important to increase gender-consciousness of individual women and men scientists in general and, in particular, to empower and encourage women scientists to strive for career, to realize their ambitions in various fields of S&HT by establishing special institutional measures and practices, organizing targeted educational and mentoring programs, development of networking, etc.

The objectives are directly targeted onto women's empowerment and on strengthening women's position in S&HT, which, believably, will suppress women's retreat from S&HT and will attract new young women scientists to S&HT.

III.1.5. The Implementation Actions, Activities, Procedures, and Tools

The Baltic Countries are "fast-tracking on [gender] equality"³³. That is, the general equal treatment legislation and commitment to gender mainstreaming already introduced, National Committees on Women & Science established, and gender studies at universities and research institutions developed already in these countries³⁴. However, actually, there is an obvious need for stronger political and social initiative in the field still. Hence, three contrasted policy approaches -

³³ Rees, Teresa. 2002. *Gender Mainstreaming: Misappropriated and Misunderstood?* Paper presented to the Dept. of Sociology, University of Sweden.
<http://www.sociology.su.se/cgs/ReesPaper.doc> // p.5.

³⁴ *Women and Science. Excellence and Innovation – gender Equality in Science*. 2005. Working document. EUR. 21784. Luxembourg: Office for Official Publications of the EC. ISBN: 92-894-9905-2. p.11.

gender mainstreaming³⁵, adaptation of *positive actions*³⁶ and establishment of *gender equality*³⁷ into the practice - are considered in this Strategy. Thus, using evaluations and descriptions of good experiences and successive cases of integration of gender mainstreaming, adaptation of positive actions and establishment of gender equality into the practice and following EC report³⁸ and professional recommendations³⁹, the three groups of strategic activities, actions, procedures, instruments, tools and measures are suggested by this Strategy.

1. *Gender equality mainstreaming* is not only an analytical term⁴⁰; also, it should appear as a political priority⁴¹ and embody real action⁴². Gender mainstreaming implies that all the actors are routinely involved in designing, implementing and evaluating policies. That is,

³⁵ *Gender mainstreaming* approach is the systematic integration of gender equality into all policies and programs, and into organizations and their cultures (*National Policies on Women and Science in Europe*. Brussels: EC, 2002, p.6). Gender mainstreaming moves far beyond a concern with numbers and processes, and is “a new way of doing things, rather than an add-on or an extra” (Rees, Teresa. 2002. *Gender Mainstreaming: Misappropriated and Misunderstood?* Paper presented to the Dept. of Sociology, University of Sweden. <http://www.sociology.su.se/cgs/ReesPaper.doc> // p.5).

³⁶ *Positive action measures* target special needs of women and can “contribute significantly to promoting good practice and unstopping blockages” (Rees, Teresa. 2007. Pushing the Gender Equality Agenda Forward in the European Union. // In M.A. Danowitz Sagaria, ed., *Women, Universities, and Change. Gender Equality in the European Union and the United States*. New Yourk: Palgrave Macmillan, pp. 7-22. // p. 8-9).

³⁷ *Genderequality* or *principle of equal treatment* is an essential human right and means that women and men should be treated as equal, but not as the same (Rees, Teresa. 2007. Pushing the Gender Equality Agenda Forward in the European Union. // In M.A. Danowitz Sagaria, ed., *Women, Universities, and Change. Gender Equality in the European Union and the United States*. New Yourk: Palgrave Macmillan, pp. 7-22. // p. 8).

³⁸ *Gender Mainstreaming. Conceptual framework, methodology and presentation of good practices*. Final report of Activities of the Group of Specialists on Mainstreaming (EG-S-MS). EG (99)3. Strasbourg, 1999.

³⁹ Rees, Teresa. 2002. *Gender Mainstreaming: Misappropriated and Misunderstood?* Paper presented to the Dept. of Sociology, University of Sweden. <http://www.sociology.su.se/cgs/ReesPaper.doc>

⁴⁰ See e.g. Lombardo, Emanuela and Petra Meier. 2006. Gender Mainstreaming in the EU: Incorporating a Feminist Reading? *European Journal of Women's Studies* 13:151-166.; Stratigaki, Maria. 2005. Gender Mainstreaming vs Positive Action: An Ongoing Conflict in EU Gender Equality Policy. *European Journal of Women's Studies* 12:165-186.

⁴¹ EC. 1996. *Incorporating Equal Opportunities for Women and Men into all Community Policies and Activities*. Communication from the Commission COM (96) 67 final.

⁴² See e.g. Rees Teresa. 2002. *National Policies on Women and Science in Europe*. The Helsinki Group of Women and Science. Luxembourg: Office for Official Publications of the EC. ISBN: 92-894-3579-8; Verloo, Mieke. 2000. *Gender Mainstreaming: Practice and Prospects*. EG (99)13. Strasbourg.

close and continuous collaboration between politicians and officials, academic specialists and experts, NGOs and interest groups, media, etc. might assure efficient implication of gender mainstreaming in the field. Three sets of main activities, tools and techniques are suggested here:

1.1. Seeking to create steady and realistic foundation for elaboration of national gender equality policy(ies) as well as to enlighten interested stakeholders and members of the community, the first step should be the evaluation of existing and generation of the new necessary data and information, and their adaptation for analysts' and policy-makers' usage. Such *analytical techniques, tools, and procedures*, as development of national gender equality indicators systems and their implementation into S&HT organizations, generation of detailed gender-disaggregated statistics and assurance of its availability as well as permanent screening of all policy proposals, aiming to assess gender impact, continuous monitoring of gender equality establishments efficiency in S&HT organizations, and continuous evaluation and auditing of actions and achievements in the field should be undertaken.

1.2. Aiming to elaborate the realistic system of gender proofing legislation and gender equality oriented policies and actions, the number of *consultative and participatory techniques and tools*, which make gender equality experts and other experts work together, should be initiated. These are introductions of special practices, which would be aimed to ensure participation of women in work of decision-making bodies, establishment of think-tanks, working and steering groups encouraging interdivisional collaboration in the field of gender equality in S&HT organizations, organization of special seminars and conferences, and integration of gender equality related questions in other seminars and conferences.

1.3. Striving to transfer gender-enlighten knowledge and raise gender-awareness among the stakeholders and the scientists, such *educational techniques and tools*, as organization of special gender awareness-raising and training courses, and special lectures at schools and universities for different target groups (i.e. pupils, researchers, etc.), establishment of special units/incumbencies responsible for education of staff in field of gender equality in S&HT institutions and organizations, publication and dissemination of special educational materials, manuals, handbooks, leaflets should be employed.

2. *Positive action measures* are the most powerful and efficient tool in short-term. As the measures, even after they dislodged, can stimulate long-term processes, at least some of them should be established in national S&HT institutions. Concretely, it is recommended to launch (at least) three types of positive action measures:

2.1. Seeking to assure gender balance in decision making, there should be established *gender balance targets* at national S&HT institutions, Councils and Senates at universities and research institutions of S&HT, launched special trainings for women in development of leading skills, comprehension of science policy and science system, and career in science structures and criteria, and seated practices of positive (women's) discrimination in selection/nomination procedures.

2.2. Striving to equalize existent gender (dis)balance in recent S&HT research institutions, there should be established *practices of positive (women's) discrimination in hiring procedures* giving priority for a female candidate then all other criteria are equal, established practices of positive (women's) discrimination in distribution of resources for research (including fellowships, grants, etc.) giving priority for a female applicant then all other criteria are equal, and formed special funding schemes for women's (teams) research

in S&HT.

2.3. Aiming to facilitate professional and personal life reconciliation there should be foreseen and planned such permanent and systematic organizational efforts, as development of *special institutional supportive measures* for women/men researchers who return after maternal/paternal leaves and creation of special facilities for those who have young children.

3. As it was already mentioned above, the general equal treatment legislation and commitment to gender mainstreaming already were introduced in the Baltic countries⁴³. However, as statistical data⁴⁴ and research materials⁴⁵ demonstrate, the legal definition of gender equality is rather weak in the countries still. The following initial amendments of national legislation are recommended by the Strategy:

3.1. Aiming to consolidate gender equality policy and prevent discrimination based on gender, it should be conducted *gender proofing of legislation* targeted onto S&HT.

3.2. Striving to foster gender equality in S&HT institutions and organizations, it is recommended to *legally define positive action measures* (e.g. requirement to establish gender balance targets and to elaborate gender equality plans) as compulsory establishments at national S&HT policymaking institutions, universities and research organizations⁴⁶. In addition, legal system of penalties/incentives for poor/good achievements of S&HT organizations in field of gender equality should be elaborated.

III.1.6. The Key Actors in the Process of Implementation

The accomplishment of the above defined tools, measures, procedures and activities stands on close and active cooperation between and contribution of Strategy owners, partners and stakeholders, which should undertake and realize numerous functions.

1. The owner of the Strategy – BASNET – should take main responsibility of elaboration of implementation plan, and supervision and monitoring of the implementation of the Strategy. In addition, members of BASNET should take the key role in promotion of the Strategy and in all implementation related activities.

2. The main partners of the Strategy – national Ministries of Science (and Education) should actively involve in elaboration of the Strategy implementation plan as well as in promotional activities. Additionally, it would be insistently recommended for the national

⁴³ *Women and Science. Excellence and Innovation – gender Equality in Science*. 2005. Working document. EUR. 21784. Luxembourg: Office for Official Publications of the EC. ISBN: 92-894-9905-2. p.11.

⁴⁴ *She Figures 2006. Women and Science. Statistics and Indicators*. 2006. Luxembourg: office for Official Publications of the European Communities. ISBN 92-79-015664.

⁴⁵ FP 6 BASNET project Baltic States network “Women in sciences and high technologies” // Sociological research “Career of women in science and high technologies in Baltic States”. Final report. <http://www.basnet-fp6.eu>

⁴⁶ *Women and Science. Excellence and Innovation – gender Equality in Science*. 2005. Working document. EUR. 21784. Luxembourg: Office for Official Publications of the EC. ISBN: 92-894-9905-2. p.11.

Ministries to consider establishing of such special institutions or organizational units, as Women & Science subdivisions and national gender excellence center(s)⁴⁷.

3. There are a number of the substantial stakeholders in process of implementation of the Strategy; their involvement and, in general, their disposition towards gender equality as a value are of crucial importance. These are:

3.1. The main stakeholders on the policy making and policy formation levels are, correspondingly, national politicians and key persons at national Ministries, the highest representatives of national Science Councils, Universities and research institutions - the stakeholders who frame and model national S&HT policy in the countries. Their gender-consciousness and political farsightedness and aspiration to take right, fair and legitimate decisions, definitely, will predetermine success of implementation of the Strategy. The main function of these stakeholders should be promotion of gender equality policy and integration of gender-mainstreaming approach into all political decisions in general and, in particular, into the decisions, which relate to S&HT.

3.2. National policy implementing level institutions should take responsibility of supervision, control and monitoring of implementation of gender-sensitive political decisions (e.g. elaboration of positive action measures) and, depending on S&HT organizations' achievements in the field of gender equality, distribution of resources (e.g. grants, funding, etc.).

3.3. Stakeholders – administrators at S&HT organizations should take role of initiators and supporters of positive action measures in their organizations. In addition, administrators should promote gender mainstreaming by indoctrination of gender equality foundations into all internal documentations, processes and procedures in their organizations.

3.4. Finally, each woman and man scientist can be treated as a stakeholder in the process of implementation of the Strategy: a success depends on gender-consciousness of each member of the community. Namely, personal women and men scientists' courage, initiative and real action combating with unfair gender biased behavior can make the vision of this Strategy real.

4. Women top level scientists should take a key role in Strategy implementation related activities by acting as role models and involving into networking, mentoring and support for other women scientists.

III.1.7. The Indicators of Implementation

Three sets of qualitative and quantitative indicators will define efficiency of the Strategy implementation process.

1. The main quantitative indicator is changing numerical distribution of women and men in S&HT; i.e. abundantly increased numbers of women among scientists, administrators and policy makers in S&HT.

⁴⁷ *Women and Science. Excellence and Innovation – gender Equality in Science*. 2005. Working document. EUR. 21784. Luxembourg: Office for Official Publications of the EC. ISBN: 92-894-9905-2. p.11.

The source of information: statistical data.

2. The main qualitative indicator is growing women's career ambitions and accumulation of women's satisfaction with the status in present positions in S&HT organizations.

The source of information: targeted surveys in S&HT.

3. A set of additional indicators – numbers and efficiency of gender equality mainstreaming tools, measures and actions taken in the S&HT organizations, quality and scope of integration of gender equality mainstreaming approach into national legislation targeted onto S&HT – will provide information on factual implementation of the Strategy on organizational level and on the level of legal regulation of S&HT. On another hand, this information also will ground statistics and research based evaluations (10.1. and 10.2. article above).

The source of information: reports from S&HT organizations, expert groups' reports.

III.1.8. The Closing Remarks

The owner of the Strategy is the Baltic States Network: Women in Sciences and High Technology (BASNET) linking up women scientists' working groups, professional organizations and science policy makers from three Baltic States Estonia, Latvia and Lithuania as well as representatives of scientific communities of Poland and Romania.

The strategy will be reckoned as fully implemented unless and until gender balance will be reached at all levels of S&HT system and, substantially, equal treatment of women and men scientists will become matter-of-course and gender mainstreaming will be fully integrated in and considered at all levels and in all realms of S&HT fields and organizational hierarchies.

III.2. Good practice of advanced countries: role of the state ensuring gender equality in Germany, Austria, UK and Nordic Countries

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Women and science

Gender equality means putting men and women on an equal footing. In an ideal world, this would mean no specific allowances for women would need to be made in research agendas. However, given the substantial gender imbalance in the sciences – women make up half the student population, but hold only 15% of senior academic positions – clear allowances need to be made to promote a healthier gender equilibrium.

The current disequilibrium jeopardises Europe's bid, in the context of its landmark Lisbon Strategy, to forge the world's leading knowledge-based economy. The EU is moving ahead to boost investment in R&D to 3% of its collective gross domestic product (GDP). This is likely to involve the creation of some 700 000 new research-related jobs by 2010 – which Europe will have trouble filling as long as half of its population remain sidelined in the S&T field.

Traditionally, research agendas have not taken the specific needs of women into account. However, if society is to develop a better understanding and acceptance of the developments in science and technology, specific measures must be taken to address both the under-representation of women in science, and the lack of attention paid to gender differences within research.

There has been growing concern at European Union (EU) level about the issue of women and science, and more specifically, the under-representation of women in scientific careers. There is considerable wastage of women's skills and knowledge as a result of the 'leaky pipeline', whereby women drop out of scientific careers in disproportionate numbers at every level.

In the EU-25, the percentage increases in the numbers of female graduates were higher than for women in the EU-15 — 28.4% for science and 30.8% for engineering. Women accounted for 43.7% of overall growth in science and 35.6% in engineering graduates. These figures are initial evidence of some closing of the gender gap for graduates in *hard* science disciplines, although parity cannot be envisaged in the short to medium-term.

Women researchers more likely work in sectors with lower R&D expenditure

Despite women representing a greater proportion of overall graduates women researchers are still a minority in the Government and Higher Education Sectors, a trend that is accentuated in the natural science and engineering fields. Women researchers show a greater tendency to work in medical sciences or social sciences. In all countries, except Latvia, R&D is more likely to be conducted by a male than a female researcher. On the whole, the new Member States have a larger proportion of female researchers than high R&D funding countries such as Germany, where only two in every ten GOV or HES researchers are women. In almost every country for which data are available, women account for a greater proportion of the technician jobs than they do for the research posts. Women form the majority among technicians in 11 out of 21 countries. The Government and Higher Education Sectors nevertheless have higher proportions of women

researchers than in the Business Enterprise Sector. Often representation in the BES is around half of that in the GOV and HES sectors. In Austria, where the lowest proportion of employed researchers in the BES is women, less than one post in ten is held by a woman. This situation does not look like it is improving. Looking at researchers in the BES, women have only enjoyed higher growth than their male counterparts in 6 out of 16 countries. It is worth noting, however, that in most countries, the total number of researchers in the Business Enterprise Sector has been increasing at a rate exceeding overall employment growth. The same is true for growth in the number of women researchers (8 of 15 available countries).

In the EU-15, the scientist and engineer (S&E) growth was higher for women (15.7%) than for men (13.0%), but it was lower for women (4.2%) than for men (4.9%) in the EU-25. This is a signal that the gender gap is widening for S&E in the EU-25 although it is narrowing at a higher rate for the EU-15. In fact this is the main area of scientific employment where the prognosis for women is discouraging. Growth in the numbers of scientists and engineers is significantly lower in the new Member States and particularly for women. Much of this lower level of growth is due to a 9.3% decrease in the numbers of women S&E in Poland, where the numbers of men S&E increased by 9.7% over the same period.

III.2.1. Review of the situation in Germany

A second Equal Rights Act (1994) recognized the need to tackle structural inequality in the ranks of the Federal Administration itself. Beginning in 1989, all 16 *Länder* have meanwhile enacted Equal Opportunities or Equal Rights Acts. Some of these laws are also applicable to the science sector in a supplementary fashion; in some *Länder*, regulations that are to bring about an implementation of equal rights and actual non-discrimination in the sense of structural equal opportunities have been incorporated in higher education laws.

The Federal and *Länder* laws oblige authorities on all administrative levels (Federal Government, *Länder*, municipalities, higher education institutions as well as all other public authorities) to appoint commissioners for women's affairs and, in general, to involve them in all staff-related, social and organizational measures which may affect women's affairs. By means of the work of the commissioners for women's affairs on these levels, public awareness of, and opinion on, the issue of equal opportunities and equal rights have taken a sustained turn for the better. The proportion of women (15 to 65 years of age) of the working population in 2000 was 64.0% for the entire Federal Republic of Germany (in the new *Länder*, former GDR it was 72.2%; in 1991 it was still 77.2%, in the old *Länder*, former FRG, it was 62.1%). The unemployment rate of women in 1999 was higher with 8.5% than that of men (7.7%). In the new *Länder*, women are still affected by unemployment to a considerably greater extent than men (1999: 18.8% vs. 15.9%) are.

With its "Women and Occupation" programme (1999), the Federal Government intensified the public debate and took up the aims and interests of the EU Employment Guidelines. Specific focuses in the education and research area are set with targeted programmes for an increased participation of women in leading positions at higher education and research institutions in order to reach the target of 20% participation by 2005. At the same time, the principle of gender mainstreaming is being established for the Federal Government. In addition, a "Man-and-Family" programme is being planned.

The Equal Rights Act of the Federal Government, which entered into force in 1994, did not bring about the necessary results for the fulfillment of the constitutional mandate and will therefore be amended by a law, which provides for gender-mainstreaming plans by means of binding guidelines. A new Equal Rights Act, which will enter into force in the end of 2001, will strengthen

the competences and veto rights for the commissioners for women's affairs. The offices of the federal administration have to establish Frauenförderpläne ("female personnel development plans") which must contain explicit targets for the participation of women at all hierarchical levels. This Federal Equal Rights Act will form the basis for equal rights agreements for non-university research institutions.

Principles of the scientific system

The Framework Act for Higher Education (HRG) establishes important framework conditions for the higher education sector, which are implemented by the corresponding higher education laws of the *Länder*. The 1998 amendment of the Framework Act provides for the integration of the fulfillment of the constitutional equal rights mandate (Article 3 of the Basic Law) in state funding of higher education institutions as well as in the evaluation of higher education institutions' work in research and teaching. For the first time, the commissioners for women's affairs at universities were named in the federal Framework Act.

The public higher education system is basically divided into two types of institutions: There are universities and there are *Fachhochschulen* (Universities of Applied Sciences). Furthermore, there are numerous, mainly publicly funded, non-university research institutions, some of which are combined in research associations such as the Max Planck Society, the Fraunhofer Society, etc. In addition, there is an increasing number of private higher education institutions, at the *Fachhochschule* as well as university level. Usually, they are recognized by the state; the degrees they award are therefore comparable to those of the public education system.

Professors at higher education institutions are usually civil servants for life (in exceptional cases also employees with a permanent contract). At *Fachhochschulen* there are C 2 and C 3 professorships; at universities C 3 and C 4 – in relatively few cases also C 2.5. At *Fachhochschulen* there is also some teaching staff for special tasks whose pay is considerably below that of professors. At universities, qualification is usually achieved by a doctorate, usually on a fixed-term (part-time) job, by *Habilitation* for a C 1 job (fixed term is 6 years). Those holding a qualification job also teach; they are however supervised by a professor also during their *Habilitation* phase and are therefore dependent with regard to their activities. The average age for an initial appointment at universities is 39.5 years for men and 40.5 years for women; at *Fachhochschulen* it is significantly lower.

Situation of women in science and research: statistics

On all levels of the qualification of women in the area of education and research⁷, the proportion of women is rising – however, at different levels. The base (percentage of women in all persons with higher education access qualification/first enrolment/degrees) is getting increasingly broader. It remains to be seen whether this increase will be continued on subsequent qualification levels (doctorate, *Habilitation* as well as, in particular, women in leadership positions). So far, there has been a considerable "shrinkage" in the percentage of women from one qualification level to another.

There are breaks in between the degree and the doctorate as well as between the doctorate and *Habilitation*. This leads to a considerable under-representation of women in leadership positions. On the assumption that talent, qualification and professional goals of men and women are not different in principle, the larger than proportional participation of men suggests that – among several possible factors – different performance and qualification criteria are being applied to both groups. This is true for all subjects in principle, and even more for the subject area of languages and cultural sciences, in which the percentage of women – in contrast, for example, to the subject

area of engineering sciences – is traditionally very high.

Concerning the number and proportion of women in doctorates, there has been a significant increase from 28.9% in 1992 to 34.3% in 2000.¹⁰ However, in the new *Länder*, there has been a sharp drop after 1991 in absolute numbers to nearly a third, which – in spite of a slight increase since 1996 – has still not been compensated for. This drop in doctorates, however, concerns men in the new *Länder* even more than women.

In total, there is a tendency towards a larger-than-proportional increase in the percentage of women in the subject group of legal, economic and social sciences as well as in mathematics/natural sciences.

With regard to *Habilitationen* the picture is similar. Between 1992 and 2000, the proportion of women rose from 12.9% to 18.0%,¹² and there is a clear difference between the development in the old and in the new *Länder* in this area, too. In 1992, the proportion of women in the old *Länder* was 12.8%, in the new *Länder* 13.7%. The proportion of women in the old *Länder* then rose to 18.1% (1999), while there were slumps in absolute numbers as well as in percentage points in the new *Länder* in 1992 as well as between 1996 and 1997, which still persist. (1999: 14.6%). As regards professorships, the number of women increased between 1992 and 2000 by 76%, from 2,246 to 3,960; their share increased over the same time-span by 46% from 6.5% to 10.5%.¹³ There is an increase both in the old and the new *Länder*, while it takes place at a slightly higher level in the new *Länder*. The increase in the proportion of women in professorships at Fachhochschulen is slightly more significant than at universities/colleges of art.

Since 1997, the Bund-Länder Commission for Educational Planning and Research Promotion (BLK) has made annual surveys in the *Länder* covering higher education institutions and research organizations (HGF, MPG, WGL, FhG) in order to describe current calls and the filling of leading positions in a differentiated way and in order to make appointment procedures more transparent.¹⁴ In 1999, in comparison to 1997, offers of new appointments and actual appointments of women at universities decreased slightly in absolute numbers as well as in percentage points (from 15.2% to 13.9% and from 14.0% to 12.3%), even though more women applied for positions in 1999 and even though more women were given a place on the list.¹⁵ The situation is similar with regard to Fachhochschulen: despite the increase in women's applications and in places on the list, the percentage of women who were offered appointments decreased.

The number of women in leading positions at the more than 300 higher education institutions¹⁶ rose from 87 (= 8.3%) in 1996 to 133 (= 11.6%) in 2000. When looking at the positions in detail, the increase in the number of female presidents from 3 to 10 and of female chancellors from 25 to 41 over the abovementioned period catches the eye, while there are no considerable changes for other positions, and the number of female rectors even decreased slightly. From 1992 to 2000, the proportion of female staff in leading positions at non-university research institutions rose in absolute as well as in percentage points – at a lower level – from 37 (= 2.0%) to 98 (= 5.2%).

Specific measures for women in science and research

In Germany, structures for an effective representation of the interests of female staff were established early on by relevant legal provisions in the Framework Act for Higher Education as well as in the corresponding higher education laws of the *Länder* by the introduction of commissioners for women's affairs. Within the framework of the Special Funding Programmes for Higher Education and Research II and III, which were co-financed by the Federal Government and the *Länder*, more than one billion marks was made available for specific measures for women between 1990 and 2000. Apart from specific measures for women, this programme also contained further support areas; the general rule was that, of all the funds used for personnel measures, 20% had to be spent on the promotion of women. This target was reached – in particular over the last

few years of the programme -, and was even surpassed in some Länder. 19 Within the framework of the Academic Science Programme (follow-up to the HSP II/III), from 2001 to 2003 a total of DM 60 million annually will be provided by the Federal Government and the Länder for the programme section "Equal Opportunities for Women in Science and Research", of which 75% are to support the qualification of women for leading positions at universities, 15% should be used for women's and gender studies and 10% are to support measures to motivate women in scientific and technical subjects. Thus, this programme section receives a 33% higher annual funding amount than under the HSP II/III. Major progress is therefore expected, which should also lead to an increased filling by women of the many professorships, which will become vacant in the near future. The overall percentage of women in personnel-related support measures over the past years has been significantly more than 40% and rising. In 1999, more than 12,000 women in science were supported under HSP III. In 1989 already, the Bund-Länder Commission for Educational Planning and Research Promotion submitted a report to the heads of the Federal and the Länder governments on the "Promotion of Women in Science", which contained proposals and recommendations in particular on the appointment of commissioners for women's affairs at universities and non-university research institutions, on procedures to fill vacant positions, on specific support measures for female scientists, on the drawing up of women promotion schedules as well as on women's studies. This report was updated in 1996; the recommendations were elaborated in more detail and specified. In this report, the situation of the new Länder since 1990 was looked at for the first time. With its resolution of October 30, 2000, the Commission submitted an up-to-date report "Women in Science – Development and Prospects on the Way to Equal Opportunities" (Report on Women 2000) to the heads of government for their December meeting. For this report, the Länder and non-university research institutions were surveyed for the implementation of the previous reports' recommendations. The report shows where progress has been made and what the proposals are, and simultaneously reveals where there is a need for action. It stresses in particular the necessity of a paradigm shift from the promotion of women to equal opportunities. The concept of the promotion of women used to be linked to the approach of achieving a better reconciliation of family and career. Equal opportunities as a pervasive guiding principle go beyond this and aim at structural changes in order to make better use than in the past of women's qualification potential. The report stresses that decision-makers and leaders at universities and, in particular, at non-university research institutions bear a special responsibility for the implementation of the constitutional mandate in Article 3 Section 2 of the Basic Law. By improving opportunities for women, a considerable qualification potential can be better tapped as a resource for research and teaching. This is a contribution to quality assurance, increase in performance and increased competitiveness of higher education institutions and non-university research institutions. Structures must be created which enable the free development of women and men's potential regardless of traditional roles. The dimension of equal opportunities must be included in the discussion on the reform of higher education institutions and non-university research institutions and applied as a pervasive guiding principle to all plans, legislative projects and measures by taking into account the different implications for women and men in all areas and on all levels (gender mainstreaming). By means of these reports drawn up by the working group "Promotion of Women in Science" of the Bund-Länder Commission, the situation of women in science is made visible and put up for discussion by a broad public. This is an important contribution to a necessary change in attitudes.

Case studies

With the funds of the Special Funding Programme for Higher Education and Research II/III and the programme "Equal Opportunities for Women in Science and Research", a number of measures

were funded in the Länder, which are described in detail in the various, above-mentioned BLK reports. Some of them are:

- In North Rhine-Westphalia, women's studies network was established and extended. 45 professorships were established, in particular in subjects in which women's studies were not yet or, not sufficiently, represented, such as architecture, medicine, law, economics, history and technically-oriented subjects.
- In 1994, the Maria-Jahoda Visiting Professorship for International Women's Studies at the Ruhr University in Bochum was established. Other Visiting Professorships were established in Lower Saxony (Maria-Goeppert-Mayer Professorship for international Women and Gender Studies) and Rhineland-Palatinate (International and interdisciplinary Visiting Professorship)
- In Lower Saxony, the Dorothea Erxleben Programme was established in 1994, which has provided 37 positions at universities as well as 14 positions at Fachhochschulen so far in order for women to qualify for a professorship by Habilitation or adequate achievements or by a professorship. Of those who were supported since 1994, 10 women were appointed to a professorship.
- Mostly all Länder established grants or appointments for women to obtain the qualification for professorships in universities, Universities of Applied Sciences or colleges of art.
- To motivate women in scientific and technical subjects there are mentoring projects or programmes for schoolgirls. In Bremen a coordinated project to increase the participation of women in scientific-technical and engineering studies is funded by 2 Mio DM.
- Furthermore, there are two women-only study course "industrial engineering" and an international women-only study course computer science at German Universities of Applied Sciences.
- With additional funds from the Federal Government and the Länder Berlin, Hamburg, Hesse and Lower Saxony the project "International Women's University 'Technology and Culture'" (IFU) was supported during the EXPO 2000. An international, interdisciplinary teaching programme in six areas (body, city, information, migration, water, and work) was provided. 959 female students from 115 countries were accepted, half of them from the developing countries. More than 200 teachers came from 40 countries. The students as well as the teachers were enthusiastic about the high standard of the scientific discussions and about the lively atmosphere in the work together on the basis of so many different cultural backgrounds. The "IFU" has taken us a lot further in the discussion on mono-educative teaching and research programmes for women; there is a lively discussion on a continuation of the IFU.

III.2.2. Review of the situation in Austria

52% of Austria's population are women, and 43,3 % of the Austrian workforce are women. The proportion of women in managerial, executive and decision-making positions remains comparatively low; women in Austria still work primarily in subordinated positions. More than half of the students at Austrian universities today are women, and in comparison to their male colleges, a higher proportion of women student graduates. Unfortunately, these very promising developments are not yet reflected in the numbers of the academic staff, although much has been done to promote Women in Science over the last 3 decades. Milestones include:

1970 – 1990: Between 1970 and 1990, active women at universities and in public administration laid the groundwork for the institutionalization of an extensive legal framework designed to

achieve equal opportunities and take measures for the advancement of women.

1990 – 1999: High legal standards were introduced. At the same time, emphasis was put on financing various special programs and projects related to women and science.

1999: In this year, the White Paper on the Advancement of Women in Higher Education and Research was issued which included 25 concrete new measures aimed at the realization of equal opportunities and the advancement of women in academia and in the non-university research sector.

2001: Emphasis was put on integrating the Gender Mainstreaming strategy throughout the civil service. Several work groups on Gender-Mainstreaming at interministerial and ministerial level have been set up. The Ministry of Education, Science and Culture has launched three Gender-Mainstreaming pilot projects in the areas of research funding and research programmes, university autonomy and pedagogical academies.

Equal Opportunities and affirmative action for women in science and research - legal framework and institutions

In the attempt to fulfill the commitment to gender equality contained in Art.7 § 2 of the Austrian Constitution, high legal standards for Universities have been reached in the last decade.

University organization act

According to a 1991 amendment, supervisory bodies called Equal Opportunities Working Parties were set up for each university to provide *protection against gender-based discrimination*. These bodies are equipped with unparalleled powers and rights which extend to

- full information on and involvement in all staff recruitment and
- the possibility to file a complaint to the Minister of Science against gender-based discriminatory decisions which can be repealed through a legally binding notice if discrimination has occurred.

This legislation, in particular the Federal Minister's role in respect of equal opportunities and the advancement of women, takes on particular importance in view of impending university autonomy.

Federal government equal opportunities act

Passed in 1993, it provides for *protection from discrimination as well as regulations providing for the advancement of women*, installing a number of institutions such as - the Federal Government Equal Opportunities Commission

- Equal Opportunities Task Forces (which in the case of the Education, Science and Culture comprises the chairs of the Equal Opportunities Working Parties at the universities and the equal opportunities representatives of the Ministry and its affiliated institutions);
- equal opportunities representatives;
- "contact" women and establishes a 40% target quota of women in all functions and positions and employment groups of Federal State agencies, depending on qualification. This goal is to be achieved through preferential employment, promotion, training and education of women.

The exact nature of such measures for the advancement of women is not specified in the act but is to be determined through Affirmative Action Plans by the individual federal ministries.

Affirmative action plan for women of the ministry of science

Enacted in 1995 for the first time in the form of a *regulation*, i.e., as a normative document, to ensure compliance by the universities; provides for *various measures for the advancement of women* among university staff:

- scheme for the achievement of the 40% target quota of women
- ensuring affirmative action in the announcement of vacancies
- role of Equal Opportunities Working Parties in staff recruiting procedures
- provisions for resources of the Equal Opportunities Working Parties
- implementation schemes for structural changes such as budget planning, distribution and penalization for (non-)compliance with the advancement regulations for women
- equal value of women's and gender studies with other curricula during evaluations of candidates' qualifications
- provisions for child care facilities
- on-going training and human capital development for women.

This affirmative action plan for women has proven to be quite an effective legal instrument, and is to be amended every other year.

Affirmative action plans at the universities

According to the University Organization Act and the Universities of the Arts Organization Act, every university needs to set up its own affirmative action plan for women tailored to its specific requirements. These plans have to be seen in addition to the Ministry of Science's affirmative action plan for women as a means to create further self-binding measures for the advancement of women at an individual university level. In 1999 the White Paper on the Advancement of Women in Higher Education and Research was issued which included 25 concrete new measures in the fields of studies, enhancement of profile in science and the arts, as well as measures regarding what is called „cross section matter“ such as allocation of funds at universities and research funding; interlinking of university and non-university science and research; infrastructural measures in the service sector; and the promotion of feminist research/gender studies. A work group was appointed to provide consultation and support to the department of the Federal Ministry of Education, Science and Culture responsible for the implementation of the measures.

- The Women in Technology (FIT) program - Breaking down gender-specific attitudes in the selection of degree courses:
This program has been implemented on 6 of the 7 university sites and has been demonstrably successful in encouraging an increased number of female school leavers to opt for technical or scientific studies. It is being financed by funding of the Ministry of Education, Science and Culture and the European Social Fund.
- In order to support female university beginners in the initial phase of study, the University Studies Act of 1997 (8 Art. 3 UniStG) (BGBl I Nr. 167/1999) was amended. Now, the dean of studies has to inform beginning students among others of the legal framework for the advancement of women as well as of legal protection from discrimination.
- Child care tailored to the needs of students, teaching and research staff
Among the preconditions for equal opportunities in higher education and non-university research institutions is the availability of an adequate number of child care facilities. These should be tailored to the special time constraints of teaching and research jobs. Therefore an extensive analysis of the child care demand was launched followed by pilot projects for inexpensive, flexible, walk-in child care facilities, near to or on campus, with hours adapted to university activities.

In October 2000, the first project called UNIKID was implemented and went live on the Web under www.univie.ac.at/unikid. UNIKID is a web-based information program on child care for university members at Vienna University including students who are in need of child care facilities. There are plans to extend the project to other university towns.

- The "PREMIERE" project (support program for women graduates of art colleges)
The goal of this project is to improve career opportunities of women graduates of art colleges within and outside of the universities by providing funding for the initial career start-up.
- Mentoring-Programmes for women
The target group of these Mentoring - Programmes are women working on their thesis, dissertation and habilitation. The goal is to provide for new forms of direct support in their carrier, enable them to participate in informal networking, provide them with a new view on career opportunities in the field of Research and Science and to evaluate these new approaches of promoting young female scientists.
- Institutes (research institutions affiliated with universities for the promotion of women-specific teaching and research)
This project tries to create research Institutions of interdisciplinary character which are affiliated with university Institutes and work on transferring knowledge. The goal is to promote graduate female scientists who are not working at universities, Gender Studies with inter and transdisciplinary focus, institutionalizing Gender-Studies in technical Studies, creating powerful research institutions in the field of gender research, transfer of knowledge into university teaching, networking between university and extra university Research and teaching.
- Stand-in professorships for women
An improvement of women's academic careers was established through an amendment to the University Organization Act. It is now possible for women university lecturers to apply for stand-in professorships if a professorship is vacant due to unpaid sabbatical leave.
- Data bank of women experts (international women scientists and artists)
Conceptual work has been started for the creation of a data bank on women scientists and artists to shed light on the existing pool of female competency, inform the public and facilitate the transfer of existing knowledge

Universities: current situation

The statement from the women's report 2000, saying that non-scientific jobs are strongly dominated by women, whereas science and research posts are unchangedly dominated by men, is still true. The proportion of women among university staff has increased by 0,6% to 41,5%, which is also due to the low proportion of women retirees. The proportion of women among new recruits is the same as the one among those who left public service and amounts to 48%.

Students & academic personnel

At the students level we find that by now more women (58%) enroll in university courses than men. The proportion of women students and graduates is about to reach the 50% mark. In certain fields of studies such as in medicine, veterinary studies and pharmacy, the percentage of women students has already overtaken those of men. However at the PhD level women are clearly still underrepresented. By and large the situation at the student level has improved whereas female academic staff has still not reached the 40% target at any level. The data makes sobering reading: 31% of women assistants, 14% of women lecturers and only 7% of professors. The low proportion

of female University lecturers is an important reason for the very slow increase in the number of women professors. 30 years of rising representation of women have neither influenced the almost exclusively male composition of the professorate, nor have they ever led to the election of a female rector.

Scientific universities, function by sex, June 2001

If it still was the case ten years ago that the lack of female professors was claimed to be due to a shortage of qualified candidates, today the over-qualification of women is becoming increasingly prevalent. Women are qualifying for a profession in which there are scarcely vacancies. The statistics on women in academia are all the more important to look at since the Universities are to be an innovative social motor, and to this day have yet failed to take a lead in this very sensitive and important area of Society.

An overview on the latest sex-disaggregated data on the overall employment situation of scientists in R&D (source: Statistics Austria, 1998) shows that of the four sectors Tertiary education, State, private non profit, business enterprise sector), the Tertiary education and the business enterprise sector are the predominant employers in R&D. For the purposes of this report the private sector is defined as the business enterprise sector and does not include the private non profit sector. The business enterprise sector is subdivided into two categories: The company R&D subsector and the cooperative subsector, which consists of common research institutes of various business sectors (Forschungseinrichtungen von Branchen). While most men are employed in the business enterprise sector, a significantly higher proportion of women opt to work for the tertiary education sector. A close-up view on the category of the scientific personnel shows that men are almost equally represented in both sectors while more than double the amount of women scientists are working for the Tertiary education sector. The lesser qualified the men are, the more they are represented in the business enterprise sector, whereas the proportion of lesser qualified women is almost twice as high in the Tertiary education sector. The proportion of women in R & D of the business enterprise sector is low. Only 13.5 % of the entire R&D personnel are women, with the exception of the pharmaceutical industry (50%), food industry and financial services industry (30%). Women scientists account for only 8% of overall headcount in all R&D sectors. The lower the level of scientific qualification required for a post, the higher the proportion of women. In the category of higher-qualified personnel, 16% of women are found, and that proportion rises to 39.5 % for the "other jobs" category. In industries such as Engineering, Metals and Construction, the overall proportion of women varies between 2.6 % and 5.1 %. The proportion of women scientists here ranges somewhere between 0,9 % and 1,5%. It is interesting to note that level of education within the category of scientists is remarkably low: only 49,3% of men & women hold an academic degree.

Information on promoting women in science in the business enterprise sector does not exist to date.

Future perspectives at the national and EU levels

At the national level:

- In the year 2001 the Gender-Mainstreaming strategy was implemented for the first time as a complementary approach to the existing measures of promoting women in Science. Although the Gender-Mainstreaming approach is considered an important building block for the future, intensified and direct support of women is still seen as essential at this point. An efficient implementation of the Gender-Mainstreaming approach would require that - beyond a general recognition of and commitment to women's advancement - the entire staff

in the field of science and research be specifically trained in matters of women's advancement.

- The current university reform which is moving towards full university autonomy will have direct impacts on the promotion on women in Research and Science in the future. Universities for some time now have argued that the existing high legal standards for gender equality are rather a hindrance to achieving scientific excellence, since personnel recruitment is being closely scrutinized in time-consuming procedures. The statistics show that since the implementation of these legal standards a decade ago women have improved their qualifications dramatically but are still not being promoted adequately. Therefore it seems appropriate to make efforts to preserve these standards and offer the universities a chance to prove over time that they are able and willing to take action by themselves for the benefit of the entire scientific community and society at large. The envisaged structural changes of the university reform will offer plenty of opportunities to fulfill the goal of gender equality. Until this goal is achieved it is advisable to continue to interfere by legal means in cases of blatant discrimination.

At the EU Level:

From the Austrian point of view, the upcoming framework offers many possibilities for implementing Equal Opportunity Policies. The recommendations made by the ETAN-Report „Promoting Excellence through Mainstreaming Gender Equality“ can be seen as an excellent basis for further actions. Concerning the Sixth Framework Programme the following measures should be considered:

- „Equality Training“ for the Commission staff, experts and monitoring panel members responsible for the Framework Programmes.
- Gender specific aspects are to be included in all programmes.
- As a basic principle, positive action measures are to be taken for every step of the framework's process.
- Objectives for the forthcoming framework should be obligatory and easily modifiable.

A corresponding monitoring system and reports to the council should be taken into account.

The survey on the situation of women in extramural technological and scientific research was carried out in 2004. The figures showed that the share of women in the 62 institutions covered by the survey was as low as approx. 26%. Their share in top management and supervisory positions was below 5%.

III.2.3. Review of the situation in the United Kingdom

In 1993, the Government White Paper, Realizing Our Potential, highlighted the importance of Science, Engineering and Technology (SET) for the country's economic growth, and recognized that women are the UK's single biggest most undervalued and underused human resource. It stated the belief of the Government that there was, and still is, the potential to attract many more women into SET at all levels. The Rising Tide report, published in 1993, presented 14 recommendations following an evaluation of the situation of women in SET in the UK. Subsequently the Promoting SET for Women Unit (PWSET) was set up in 1994 in the Office of Science & Technology.

The UK Government aims are to:

- a) create an environment in UK science, engineering and technology education and employment, research and policy-making in which women contribute to, participate in and share the benefit equally with their male counterparts;
- b) ensure that the UK knowledge-driven economy benefits from the inclusion of the talents of

the whole population and that women benefit from the opportunities afforded by it.

Science and innovation white paper

In June 2000, the Science and Innovation White Paper – *Excellence and Opportunity: a science and innovation policy for the 21st century* – was launched by the Secretary of State for Trade and Industry. It set out the actions that the Government is taking to build upon the UK's record of scientific excellence and harness the full potential of science to improve the quality of life for the people of the UK. It outlined the Government's proposals for:

- investing in the UK's world-class science base;
- stimulating stronger university-based links so that our science and engineering excellence can be turned into successful and innovative products and services;
- fostering a confident relationship with science.

The White Paper stressed the importance of improving the quality of science teaching, so that more people, particularly more women, choose science as a career. The White Paper recognised that significant progress had been made in efforts to involve women in SET policy making. The *Rising Tide* target of 25% (as an average) involvement of women on SET related advisory bodies by 2000 has been increased in the White Paper to 40% by 2005. The Implementation Plan of the White Paper outlined policy for improving opportunities for women leading to the creation of the Maximising Returns Report, the ITEC Study and a number of other projects.

Policy framework for women and science

Women make a vital contribution to UK competitiveness at all levels of industry and are an increasingly important asset. The Government is committed to raising the profile of Women in SET careers and to ensuring that women can reach the highest levels. In February 2002 the DTI's Secretary of State reiterated the commitments made in the Science and Innovation White Paper (2000), namely, to focus attention on the issue of underrepresentation of women in SET, and to encourage an increase in numbers.

The promoting SET for women unit

The role of the PSETW Unit is to promote the greater participation of women in SET throughout the UK, and specifically to improve the recruitment, retention and progression of women throughout SET education and employment and to increase their involvement in shaping SET policy.

The aims of the PSETW Unit are to:

- a) develop policies to mainstream gender in SET in the UK and the EU;
- b) provide up-to-date statistics on the state of women's participation in SET;
- c) improve and facilitate UK infrastructure for women in the SET community so that more women choose SET careers, take up SET occupations and are able to return after career breaks;
- d) develop and encourage national and international good practice in the field of women in SET.

The Unit's objectives for the next 2 years are to:

- a) increase the level of gender mainstreaming and reporting of gender activity in all DTI/OST initiatives, research activities and the SET base
- b. improve co-ordination and dialogue between the Unit and OST/DTI, other Government departments' and the wider community to achieve the Unit's aims;

- b) focus the PSETW Unit's resources so that a small number of projects can be pump-primed, in partnership with the market operators, to gain minimum impact of public funds.
- c) ensure that UK contributes effectively, at EU-level, to the dialogue on women in SET;
- d) an improved website which provides easy access to enquirers and contains up-to-date information
- e) improve statistics, particularly on gender.

The Unit's long-term objective is to achieve a SET community in which it is tacitly assumed that women can have successful, rewarding careers based upon equality of opportunity at every level and throughout all institutions.

Measures adopted to promote the role of women in science

Baroness Greenfield's Review

Earlier this year, the DTI's Secretary of State appointed Baroness Greenfield to write a high level strategic report on Women in Science & Engineering. The report will, amongst other things, consider UK activity along with overseas activities and identify priorities for more focused action. It will advise on what could be done to improve the recruitment and retention of women in SET, increase the number of women in policy making and recognize women's achievement and contribution to SET.

Baroness Greenfield established three working groups, which considered the three key stages of a career in science and technology: early stage, mid-career and management, and then going right through to the top. The report was expected to be completed by June 2002; however this has been slightly delayed. The Secretary of State will need to consider the findings of the review before the Department launches further work in this area.

Science Ambassadors Programme

The Science and Innovation White Paper published in 2000 announced the Government's intention to establish a Science Ambassadors Scheme. The aim was to put in place a structure to strengthen and expand, within a single quality-assured framework, all those activities that encourage younger people with science, technology, engineering and maths (STEM) skills to go back into schools to act as role models, relating the STEM subjects more clearly to the world of work, and encouraging others to follow them.

Science and Engineering Ambassadors (SEAs) are people with STEM skills employed in a variety of occupations at all levels. Ambassadors will assist teachers in a variety of ways to set STEM studies in the context of daily life. The Ambassadors will go into classrooms to encourage more young people, especially girls, to choose science and engineering careers. The aim of SEAs is to provide a national umbrella resource that establishes a quality "brand" and, eventually, will make Ambassadors available to all school students. The Programme has been developed jointly by the DTI and the DfES and was officially launched at the DTI in January 2002. Many companies including BAE Systems, BP, IBM, Ford and Unilever support it.

The maximising returns to science, engineering and technology careers report

The Secretary of State for the DTI launched the Maximising Returns Report in January 2002. The study, undertaken by an independent consultant on behalf of the PSETW Unit, highlighted three intertwining issues:

- there is still an issue of women getting in to SET;
- women remain less likely to choose SET courses;

- women who qualify with SET degrees are less likely to stay and progress with their careers than their male colleagues.

The single most important finding was that only a minority of SET graduates (40% of men and 25% of women) were employed in SET occupations. Key facts and figures that emerged from the report are included in the Section 4 of this report.

General data on education in science and engineering

- All students study a balanced science curriculum containing biology, physics and chemistry between the ages of 5-16. Double science at GCSE is a solid grounding from which students can go on to study any science subject at A level.
- Girls continue to outperform boys at GCSE science, however the difference in GCSE physics is only 1% compared to 15% in English.
- Between 1995 and 2000 the number of boys awarded an A level in physics fell by 1.6%. Over the same period, there was an increase of 8.7% in the awards made to girls. However, there is still a major gender divide to overcome with 3 times more boys awarded physics A level than girls were in 2000. Over the same period, there has been an increase of 22.9% in chemistry A levels awarded to girls while there has been a 1.9% decrease for boys. The number of Chemistry A levels awarded to girls and boys is now almost equal.

SET Graduates

- The proportion of SET degree holders relative to other subjects has declined from 32% of all graduates in 1992 to 25% in 2000.
- Between two thirds and three quarters of women with SET degrees, who were not working at the time of the LFS interview, had been out of employment for at least two years and almost 40% have been out of employment for at least five years.
- Number of people of working age with degrees (in any subject) has risen from 3.5 million in 1992 to 5.4 million in 2000.
- The number of SET graduates in the working age population has increased from 1.1 million in 1992 to 1.3 million in 2000.

SET employment

- Between 1992 to 2000 the number of female SET graduates employed in SET occupations rose from just fewer than 50,000 to nearly 65,000.
- The majority of SET degree holders are not employed in SET occupations. Over the period 1992-2000, male SET degree holders employed in SET occupations has remained fairly stable at 40% (but there was a dip in 1995 as a result of the recession) and that for women has remained around 25%.
- Number of women in computing has increased from about 14,000 in 1992 to around 19,000 in 2000.

SET returners

- In 2000, economically inactive female SET graduates provided a pool of approximately 50,000 potential returners.
- There has been an average of about 5,000 women SET graduates returning to SET employment per year during the latter part of the 1990s.
- About 24,000 women SET graduates returned to employment in 2000; about a third of them returned to SET occupations. [NOTE: The figures for 2000 happen to be significantly higher than for the average over the period studied.]
- The number of women of working age with SET degrees has risen from 240,000 in 1992 to 290,000 in 2000. The total for both men and women has increased from 1.1 to 1.3 million over the same period.

The ITEC Sector

A study on education and employment, “Women in Information Technology, Electronics and Communications (ITEC) Courses and Careers⁵”, commissioned in the UK, USA, Spain, Ireland, Canada and Taiwan, was launched in November 2001. The UK country report considered good practice and identified actions to try and improve the participation of women in this sector. The report concludes that in the UK, in the year 2000, only 13% of women were working in ITEC jobs across the whole economy, down from 16% in 1999. Women’s employment in ITEC sub-sectors in the UK is skewed towards broadcasting services. They are poorly represented in IT services, telecommunication services and electronics manufacturing. There are more opportunities for part time work in the US than in the UK. The proportions of men and women working part time are more similar in the US than the UK. This may be having a more positive impact on the acceptance of more flexible forms of working in the US than in the UK. Women in ITEC jobs are on average 4 years younger than men. Therefore, age may also be a discriminating factor against women in ITEC employment in the UK. There are reasons why women may delay entry into an ITEC career, for example, because of care for children and/or dependants. Women may also be having more problems advancing once in employment and/or securing more professional, higher level jobs. Women in the US and the UK are concentrated in lower level ITEC jobs such as telephone operators or data processing equipment installers and repairers, jobs that typically receive lower pay. Men are also better rewarded for their work in ITEC than women in the same jobs. This differential appears to increase with occupation status in the UK and with experience in the US. The proportion graduating in engineering is beginning to rise in many countries but it remains stable in the UK. Sixty per cent of women work in ten occupational sectors and the UK accepts the need for a more balanced representation of women and men in all sectors⁶. Women are encouraged to return to priority careers in science, engineering and technology. A Taskforce will encourage more women to study ICT and explore how to persuade women to move into ICT careers. There is a special ICT work experience programme for women, and a campaign to improve the image of ICT. The Government is working with the ICT sector to encourage ICT employers to put in place work-life balance employment policies to improve recruitment and retention to the sector.

Active networks on women and science

Networks are essential as they allow women in SET to have dialogue which is absolutely critical because there are a very large number of organisations (both public and private, education and businesses, charities and professional institutions) working throughout the UK to improve the representation of women in SET. Many of these networks support women at all stages of their education and careers and networking between the various networks facilitates the sharing of experience and information and, importantly, spread good practice. There are more than 60 organisations with an interest in women in SET that have evolved in the UK. An obvious starting point for finding out about these networks is the individual website managed by each of the organisations; the PSETW Unit’s website provides a signpost. See <http://www2.set4women.gov.uk/set4women/networks/index.htm>

Involvement of the private sector in promoting women and science

Every employer in the UK, regardless of size with a stake in either the understanding or application of SET has a part to play in maintaining and improving business competitiveness through the talent and skills of the people they employ. There are many businesses that are involved in promoting women in SET and the UK Government is keen to develop this even

further.

Making the Most is a joint DTI /Opportunity Now⁷ venture which through the use of case studies demonstrates the business benefit of innovative people management processes that encourage women's participation in science, engineering and technology. These case studies illustrate different strategies and programmes developed to each of the companies' specific needs, but all demonstrate a significant business benefit.

III.2.4. Review of the situation in Finland

Finland is generally known as being one of the Nordic countries, which in some connections have been called the paradise of equality. Reasons for this depiction include the development of women's position towards equality with men since the end of the 19th century, and the development of the Nordic type of welfare state in the 20th century. This depiction is, of course, an exaggeration. But what is reality, is the so-called Nordic model of equality. The Nordic countries seem to have achieved an established basis required to promote gender and other equality: parliamentary democracy, equal constitutional rights for every citizen, and a well-functioning, mainly state financed social security and service system, which also works in the modern market society.

Women's role in Finnish society

In 1906, Finnish women were the first in Europe to receive the right to vote and the first in the world to obtain the right to become electoral candidates. In the first parliamentary election in 1907, women's share of the elected candidates was 10 per cent; this share has ever since been very high internationally. The gender distribution at the top of the political hierarchy was changed in the presidential election in 2000, when Finland received the first woman president. One of the major "woman policy" reforms of the 1990s was the quota principle that was introduced with the amendment of the Finnish Act on Equality between Women and Men in 1995. The gender quotas are applied in all government committees, advisory boards, working groups and other corresponding bodies for preparation, planning and decision-making as well as municipal bodies excluding municipal councils elected in elections. The gender quotas (40/60) have increased the women's share in committees (43%); almost 70 per cent of the committees are composed in accordance with the quota provision.

Finnish women have long participated actively in the working life. Today, the labour force participation rates of both women and men are almost equally high. Starting from the 1950s, women's labour force participation rate grew slowly right up to the end of the 1980s. With men, the rate was in slight decline. As the period of economic boom turned to a recession in the early 1990s, the labour force participation rates of both women and men fell by approximately five percentage points. In 2000, the rate for women was 64 per cent and for men 69 per cent in the 15 to 64 age group. Finland is an exception among the EU countries in that long-term unemployment is not particularly young people and women's problem. By international comparison, relatively little part-time work is done in Finland. Only 11 per cent of all employed persons were employed part-time in Finland, whereas the corresponding proportion for the whole EU was 17 per cent. In its equal opportunities programme, the Finnish government has committed itself to promoting equality by mainstreaming. The aim is to create such political and administrative ways of action where the principles to promote equality also lead to actions in practice. The Nordic model of equality is widely accepted in Finland; this is seen in, for example, the results of the equality barometer by Statistics Finland and the Finnish Council for Equality. The first equality barometer was made in 1998 as part of the Government's equal opportunities programme. This barometer

measures the Finns' attitudes towards and experiences of equality in human relations, in the working life, and in society at large. No corresponding empirical study has been conducted so far elsewhere in the world. The results received from this equality barometer also show an interesting Finnish paradox: it is a general view that the Finns have achieved equality. However, there is still much hidden resistance coexisting side by side with the general acceptance of the Finnish equality policy and the fact that equality is taken for granted.

The Finnish education and research system

The long-term objectives of Finnish education policy have traditionally been to raise the general standard of education and to promote educational equality. Efforts have been made to provide all population groups and regions of the country with equal educational opportunities. The comprehensive school system, the vocational education reform, the regionalisation of universities and the new polytechnics have all been consistent with this approach. Increasing flexibility and the opportunities for individual choice as well as internationalisation are considered important. As regards higher education there are twenty universities in Finland, ten of which are multifaculty institutions and ten specialist institutions. All universities engage in both education and research and have the right to award doctorates. The autonomy of universities has been strengthened and a management by results process between the Ministry of Education and universities has been developed. The aim of the polytechnic reform has been to raise the standard of higher vocational studies and establishing a distinct non-university sector of higher education. In higher education the goal to provide student places for 60 - 65 per cent of the age group by the year 2000 has been achieved. The aims of developing the research system are to improve the quality and efficiency of its work and its scientific and social relevance. Multiple network co-operation and quality-based competition in the targeting of research funding has been increased as well as basic funding to research organisations. Co-operation has been developed between the research-funding organisations, universities and the business sector. There is a consensus on the strategy for development between the different stakeholders in Finland; the ministries, universities, the Academy of Finland, the National Technology Agency and industry. In recent years Government measures have brought a substantial increase in public funding for research at the same time as the contribution of the private sector has grown even faster. Finland is one of the most research-intensive countries; in 2000 the country's R & D expenditure accounted for 3.30 per cent of GDP.

The policy framework for women and science

International experiences show that the promotion of women's research careers and gender equality are not self-evident but require all hard work. From the early 1980s onwards, both the Ministry of Education and the Academy of Finland have paid increasing attention to the advancement of women's careers in research, women's studies and equality issues in general in the Finnish science community. Important achievements towards better equality include:

- 1987 Act on Equality between Women and Men
- 1990 Guidelines issued by the Ombudsman for Equality for universities
- 1995 Amendment to the Act on Equality regarding the minimum percentage (40%) of both women and men on government committees, working groups, scientific committees and other corresponding organs
- 1995 The five-year professorships in women's studies (eight posts) of the Ministry of Education
- 1997 The working group of the Academy of Finland to advance women's careers in research

- 1998 The first Minna Canth Academy Professorship (women's studies and equality research) of the Academy of Finland
- 1999 The working group to prepare an equal opportunities programme for the Academy of Finland Proposal for gender equality plan
- 2000 The follow-up group of the Academy of Finland monitoring the advancement of women's careers in research Memorandum
- 2001-2003 Equal Opportunities Plan for the Academy of Finland

"Women of Learning", an exhibition arranged in Helsinki in May 2000, introduced for the first time in Finland on a large scale the scientific work and the research career opportunities of Finnish women researchers. It was arranged jointly by the Helsinki University Library and the Christina Institute. Women in Finland, as elsewhere in the world, have for a long time been actively involved in academic research. However, their work has very often been shadowed by the achievements of their male colleagues. The exhibition showed the gradual advancement of Finnish women in research and presented both well-known and unknown pioneers of learned women in various scientific fields from the 19th century to the present day. The exhibition was not only a one-site event; the online exhibition is available on web pages (Finnish, Swedish, and English) at <http://www.helsinki.fi/akka-info/tiedenaiset>.

Women and science in Finland: some statistics

In all countries, the younger generations of women are higher educated than men, but behind them in the level of jobs, top positions and salaries. According to a European survey the highest frequencies of academic women are in Finland, Sweden and Denmark. Also very similarly, in all countries female students tend to choose medical and humanistic studies, while natural sciences, mathematics and information technology fields are dominated by male students. (Key Data on Education in the European Union 1997) In 2000, a total number of 6,714 women received their higher-level university degree (Masters degree) in Finland; this is 58 per cent of the degrees attained. Five most popular disciplines for women were health care sciences (92%), psychology (88%), veterinary medicine (84%), education sciences (82%) and fine arts (80%). The lowest percentage of women among discipline areas is in the technical sciences (20%). However, a slight increase as compared to previous years is now seen.

As to doctoral degrees, a steep increase in doctorates gained by women is now seen even in the technical and engineering studies, where 26 women (16%) received a doctoral degree. In 2000, women in Finland received 45 per cent of the total of 1,156 doctoral degrees. The proportion of female professors in Finnish universities is the highest in the European Union. In 1998 the associate professorships were combined into one full professorship category; the previous figure of 13 per cent jumped up to 18.4 per cent for 1998. The proportion has slightly increased and was 20 per cent in 2000. The fact that the invitation procedure for appointing professors had become quite popular in the late 1990s seemed at first to decrease the possibilities for women to become appointed professors. However, according to the newest data collected by the Ministry of Education this development has significantly changed during the last few years and taken a more positive direction as far as women are concerned. Still in the fields of engineering and technology the invitation procedure is quite often used and at the same time potential female candidates to be invited are rare. According to the figures only a few women have been appointed professors in the universities of technology. In the future it is important to follow the situation closely and ask the universities to present regularly information on their appointed professors.

What are the critical points in this figure from the viewpoint of promoting women's career in research? The proportion of female doctors has grown significantly, but their distribution among various disciplines is still very uneven. Second, it is generally known that women are well

represented on the initial stages of the academic career, but after gaining the doctorate women clearly more seldom than men succeed in advancing into more demanding tasks in the science hierarchy.

What is positive here is the great potential of women for researcher training shown in the figure. For instance, a study of the decisions regarding appointments to the Academy's research posts shows a very rapid development towards a more even gender distribution. All research councils have appointed more women to research posts than the share of women among applicants for these research posts. At year-end 2000 women occupied over one-third or 37 per cent of all Academy research posts. In natural sciences and engineering the proportion of women remains no more than one-fifth.

Postgraduate studies are still clearly differentiated according to gender and discipline, and the traditional choices made regarding discipline and education remained. In 1987, in all fields of science less than half of the doctorates were obtained by women. In 1998, women accounted for more than half (54%) of the doctorates attained in social welfare and health care studies. Nearly half (49%) of the doctorates in the fields of education, the humanities and social sciences were gained by women. Less than third of those receiving a doctorate in theology, business administration, law and engineering in 1998 were women. A percentage of women receiving doctorates has clearly increased in the fields of business administration, natural sciences, engineering, agricultural and forest sciences, and social welfare and health care.

Some even though somewhat contradictory data are available on the effects of the integration of motherhood and research. The majority of the Finnish women taking doctorates are mothers; international comparison shows that this is unusual. Available statistical data reveal that motherhood does not significantly lengthen the time of graduation. A recent study by Statistics Finland shows that academic education seems to decrease the number of children by women, but increase their number by men. Men with researcher training have the biggest number of children whereas women with researcher training have the smallest number of children. However, only less than third of women with doctorates had no children in 1998.

In the 1990s, R&D have more and more typically been seen as a major resource that provides basis for the development of the enterprise sector. Competent staff and human resources are key competitive factors in business life. Funding invested in R&D has increased more than 2.5-fold from 1991 to 1998. The number of staff has at the same time increased 1.3 -fold. For women's career in research, the starting point in 1991 was unfavourable. In business sector, women were strongest represented in assisting tasks requiring little education. In these, women's proportion was some 40 per cent as late as 1993. After that year, women's share in this group dropped and was less than 30 per cent in 1998. The share of women with higher education or lower degrees has remained almost the same, i.e. 20 per cent. Development has been more favourable for women with researcher training and particularly for women with doctorate. The relative share of women has grown from 15 per cent in 1991 to some 20 per cent of doctoral labour force; the absolute number of women with doctorates has almost tripled.

Measures to promote the role of women in science

The following describes the measures taken by the Ministry of Education and the Academy of Finland.

Graduate schools

A new system for postgraduate training was launched in 1995. The Finnish graduate schools, which cover about 30 per cent of postgraduate training, have also assisted women in improving their opportunities for more efficient doctoral training. The system now comprises a total of 96

graduate schools and 1,280 doctoral student positions financed for a four years' period by the Ministry of Education. Additional funding comes from the Academy of Finland, universities, the National Technology Agency or from private funding sources. The total number of doctoral students in the graduate schools is some 4,000, almost half of whom are women. According to a recent survey, no major differences were observed between male and female doctoral students in their satisfaction concerning research equipment, quality of training courses, possibilities to take international training or participate in meetings abroad.

The graduate schools have clearly improved the quality of teaching and training and made the doctoral studies more efficient and better organised. Also the age of doctoral students at dissertation has slowly decreased. In 1999, the median age to receive a doctorate was 36 years, while the median for doctors from graduate schools was 32 years. Women were usually nearly two years older than men were. The reason for this was not that it takes longer for women to prepare a doctorate, but that women are older when joining the graduate schools. However, the number of children did not have a delaying effect in the time period necessary for finishing the doctoral studies.

Gender studies

In the early 1980s, researchers and students in Finnish universities established special women researcher associations to promote women's studies and women's position in universities and in science. Most of these associations were discontinued in the 1990s, when academic teaching and research in women's studies had gradually become an integral part of everyday university life. Institutes for women's studies have been established in several universities. The Association for Women's Studies in Finland started in 1988, and it also began to publish a scientific journal entitled *Naistutkimus – Kvinnoforskning* (Women's Studies) in the same year. The first university study modules in women's studies were also introduced at that time; in the latter half of the 1990s several associations for women's studies were established in universities.

The Government action programme for gender equality for the years 1980 - 1985 set the objective for the promotion of academic gender studies. Today there are special units for gender studies in four universities; the unit at Åbo Akademi University is the oldest and was officially established in 1986, followed by the University of Tampere, the University of Helsinki (the Christina Institute) and the University of Turku. Altogether nine of Finnish universities have teaching and research positions in gender studies, of these the Christina Institute is the largest with its five permanent positions, two of which are professor's positions. The Ministry of Education has established six professor's chairs to five universities and several new projects have been accepted in the agreement on target outcome negotiations with universities. A new professorship for gender equality studies, the Minna Canth Academy Professor was recently established and the first appointment made to this professorship. Plans have been made for additional two professorships designed for promotion of equality in academic research and teaching.

The Ministry of Education has asked the Academy of Finland to prepare an evaluation of gender and equality studies during the year 2001. The term of the five-year professorships in women's studies and gender research, funded by the Ministry of Education and established during 1995 - 1998, will expire soon; furthermore, research environments and EU research policy have undergone major changes. This is the background for the wish to explore further development needs and identify new priority areas within women's studies and gender research. These fields were also discussed during the annual negotiations between universities and the Ministry of Education in spring 2001. After the end of the five-year programme the universities have committed to allocate funds also in the future to support research in these fields. The aim of the evaluation is to study the position and standard of Finnish women's studies and gender research in international comparison, the strengths and weaknesses of research in the field, the functioning of

teaching arrangements and allocation of resources in comparison to international development and the societal relevance of women's studies and gender research. The aim of the evaluation is also to explore the needs for further development of gender studies and propose measures to be taken.

Eliminating obstacles and promoting research careers: a working group of the Academy of Finland

A working group appointed by the Academy of Finland investigated and assessed in 1997 the need for measures to promote research careers for women and proposed ways of eliminating the obstacles encountered by women in academia; efforts have been made to take these proposals into account in the Academy's science policy strategies. The measures include the improvement of the evaluation procedures of the Academy, the focussing of the Academy's research funding and the improvement of the position of young researchers and researchers with family. This work still goes on. The recent reports by the working group preparing the Academy's equal opportunities programme and by the follow-up group monitoring women's careers in research form a coherent whole with the aim to describe the status of women researchers in the Finnish science community and in Academy research funding as well as to make proposals to improve gender equality and to promote women's careers in research. The aim is on the other hand to strengthen women's opportunities to advance on a research career and on the other hand to increase the number of women aspiring to embark on a career in research. The working group preparing the equal opportunities programme focussed its work on making proposals for further measures, whereas the follow-up group monitoring women's career in research concentrated on producing statistical data and background material. In addition to basic strategies, the main emphasis of both working groups was on practical measures and on continuous follow-up of the state of equality.

The following issues in particular are being discussed to develop monitoring and the compiling of statistics:

- Research statistics compiled by Statistics Finland should be developed to make it easier to compare the career advancement of women and men in various fields of research
- The public statistics should present more detailed data on the development of the research career structure by gender
- The compilation of general statistics by gender and the information management of various organisations should be further developed in terms of efficiency and resources
- The annual reports and other documents of universities and research institutes should provide sufficiently detailed data on gender-specific professional assignments to further develop the follow-up of the career structure.

One of the Academy's most urgent tasks in the promotion of equality will be to develop procedures that will facilitate women's recruitment into researcher training and research in the natural sciences and engineering. Although the Academy has efficient instruments to support research, it is important to continuously seek for new tools and options in the rapidly changing operational environment.

A new tool: equal opportunities plan

In order to better promote gender equality in the Finnish science community, the Academy Board recently accepted an equal opportunities plan for the Academy. The aim is to promote equality by means of clearly defined actions, by dissemination of information and by systematically monitoring how this plan is implemented. The Academy's equal opportunities plan is for the years 2001 – 2003, and it concerns researchers working by Academy funding. The point of departure is the best for science, and the aim is to support the best possible, high-level research. The Academy's equal opportunities plan has been described as being very advanced. It comprises 36 proposals for further actions, of which the most important are:

- The minority gender shall have at least 40 per cent representation in research posts, expert tasks and working groups, if not justified otherwise of some special reasons. If the applicants for a research post are scientifically equally qualified, priority in the appointment shall be given to the applicant whose gender is under-represented in this post category.
- The Academy will investigate as how to nominate more women than previously to Academy professorships in the natural sciences and engineering.
- Researchers applying for research funding shall in their applications specify the gender distribution of the research project concerned. The leaders of the projects funded by the Academy must also report on gender distribution of the researchers hired by the project, both in the final reports and when applying for further funding. This will also provide good material for statistics.
- Extension of time is given to appointments to Academy research posts and research projects on the basis of maternity, paternity and paternal leaves. The Academy also encourages male researchers to take paternity and paternal leaves guaranteed for them by Finnish legislation.
- Two actions are directly linked with money: Unique even in the European perspective is the paragraph according to which researchers in researcher training or working abroad may be granted 20 per cent increase in their grants if they have underage dependants. Another is the so-called incentive money of two to six months intended particularly to young researchers and women researchers. This money can also be granted to researchers returning to work after their paternal leave.
- The plan pays special attention to dissemination of information; according to feedback received, both researchers and the leaders of research projects are poorly aware of, for example, the procedures applied in connection with maternity, paternity and parental leaves.

This equal opportunities plan is important as it provides a concrete tool both for the Academy's decision-makers (research councils, subcommittees) and for those preparing matters for decision (experts, panels, working groups, civil servants). The equal opportunities plan indeed supports the advancement of women's career in research. Academy funding and Academy research posts are important for the career prospects of university researchers. The equal distribution of Academy research funding improves the opportunities of women to equally compete for university posts and research tasks.

Though this new equal opportunities plan concerns only researchers funded by the Academy, it also proposes to lead the way and provides a very good example for the scientific community both in Finland and abroad.

Several factors outside the Academy also affect gender equality and researchers working with Academy funding. The plan therefore urges the public administration to promote gender equality in the preparation of all matters and in decision-making. Special attention should be paid to developing family policy legislation and to increasing the responsibility of the sites of research, i.e. universities and research institutes to further promote gender equality.

Monitoring and evaluation

For evaluation and the decision-making process it is important that universities regularly report to the Ministry of Education on the attainment of objectives and performance. For this purpose the KOTA database has been established; universities enter relevant statistics into this database maintained by the Ministry. The database contains data describing university performance since 1981 by institution and by field of study. More detailed national data are available at Statistics Finland and more detailed institution-specific data in the information system of each university. The technical side has been developed and the content expanded in recent years. Gender is well

taken into account in the reporting. The user-interface on the World Wide Web (<http://www.csc.fi/kota/kota.html>) was launched in 1997.

Indicators need to be, however, constantly developed. Consequently, the Academy of Finland is starting to work to further develop the equality indicators describing Academy research. The first step is to chart and harmonise national statistics and to give directions for the compilation of statistics. The second step is to upgrade the compilation of statistics to a European level; Finland has an excellent facility for this, as Finland is a pioneer in the field of equality indicators (e.g. projects Decision-making; Participation in the working life). From the viewpoint of equality, the development of corporate R&D will have a growing significance also for research career, and therefore, accurate data is needed on the field of study of researchers working in the enterprise sector.

The data of the Ministry of Education and Statistics Finland are based on the registers of universities, companies and institutions or on separate data compilation. It is relatively easy to find gender-specific data for follow-up analyses as far as the organisations' own data systems can be used. Data on gender is almost without exception entered in the personnel data systems which usually also contain data on work duties, education, salary, and the length of the person's work career. In many cases production of the statistical follow-up data would be easier and its quality much improved, if these systems could be used more effectively and the data content developed in accordance with the same, consistent principles. Attention should not only be focused on the measures taken by the Academy. From the equality perspective, the representation of women in the Academy and its four research councils is also a question of utmost importance. The members of the research councils and the Academy Board were nominated by the Government for a three-year period starting January 1, 2001. Nominations were widely asked from the research community. Among the proposals for candidates submitted to the Ministry of Education approximately 33 per cent were women. However, in preparing the final decision a balance between the sexes was considered very important among the selection criteria and as a result now approximately 48 per cent of the new research councils members are women.

In December 1999, the Government adopted a Development Plan for Education and University Research for the years 1999-2004. The fundamental policy line in the Government programme highlights know-how, a capacity of utilising the know-how and creating new innovations. Equal opportunity for education and training is the right of everyone in accordance with the principles of lifelong learning regardless of their gender, place of residence, age, language, economic standing, state of health, disability or origin. The plan states that researcher training will be promoted. The graduate schools are seen as a central, but not the only track, to a doctorate. Researcher training will take account of economic, cultural and social needs. Conditions will especially be improved for women researchers to combine work and family life. The development programme specifically states that obstacles to women's research careers will be removed. The road towards equality is long and there are many hurdles on the way. It needs the combined actions of different partners in society to promote the same aims and work for the gradual improvement of women in science. The way to mainstreaming equality in science may have been smoothened but constant efforts and continuous attention are still demanded in a rapidly changing overall context.

III.2.5. Review of the situation in Sweden

National situation background

The year 1921 Sweden became a fully-fledged democracy, when the full and equal right of women and men to vote was introduced. 1970 Sweden abolished joint taxation and replaced it with individual taxation. These two policy decisions had a considerable impact on gender equality but also other political reforms regarding social insurance system, improvements in education, health and care sectors have contributed. Sweden considers gender equality issues being an area of priority. Gender equality is no longer a woman's issue – it is a policy area affecting all of us and require active efforts on the part of both sexes.

The Government declaration is the fundamental document for the Government to consider equality between women and men in all decision-making. Every year since 1994, the declaration states that a gender perspective shall be mainstreamed in all areas of policies and politics.

In October 1999, the Swedish Government presented a communication (Regeringens skrivelse 1999/2000:24) regarding gender equality policy. The communication report on progress made regarding strategies and policies made for accelerating changes in society to eliminate failings in equality between women and men in different areas of policies and politics. Gender mainstreaming shall imbue all political and administrative decision-making processes. This work and strategy have been in process and are being developed since 1996 both on central, regional and local levels. On central level, the work is being processed by the Minister of equality issues and the unit for equality issues at the Ministry of Industry, together with the Equality Ombudsman (Jämställdhetsombudsmannen, JämO). At regional level the counties are responsible for coordination of the equality issues. The municipalities do not have a homogeneous organization for equality work, but in recent years the equality work in the counties and municipalities have broadened to include both staff policy and content of their activities.

To make gender visible the Swedish enactment from 1992 about the official statistics order that individual based official statistics must be gendered.

Policy framework for women and science

The first post-graduate woman in Sweden made her degree 1883. The first female to hold a (governmental) professorship was not until 1937. Fifty years later, the women professors had increased to the number of 84, which was five per cent. Today approximately 12 per cent of the professors are women. Gender equality in the higher education and research is a question about democracy, equity and quality. Measures taken to promote women in higher education and research during started during the 1990's. In two bills, Equality between women and men (Jämställdhet mellan kvinnor och män 1994/95:164) and Science and Society (Forskning och samhälle 1996/97:5) measures were taken according to the Governmental policies for equality, to increase the numbers of women in different appointments at the universities, and to make equality and gender issues transparent. Reports from the Committee for Equal Opportunity in Higher Education and Research (the JÄST group) provided a basis for the Equality bill, as did a study carried out by directive of the Ministry of Education and Science to document and evaluate various projects carried out by institutes of higher education from 1985 to 1992. The findings of this study were presented in 1994 under the title Documentation and Evaluation of Projects for the Establishment of Equal Opportunity at Universities and Colleges in Sweden. In connection with the Gender Equality bill and as a basis for the continued handling of the subject there was a further study initiated by the Ministry of Education and Science in 1995. The task was to examine

contributions to Women Studies and Gender Equality Research. The report was called The Desire to Know and the Desire to Understand: Gender, Power and the Challenge of Women's studies in Higher Education. Report on the Investigation of Contributions to Women's Studies and Research on Equal Opportunity. The main-streaming concept was added during the 1990's but Sweden have also used the "double strategies"- concept, which means that both mainstreaming and special measures are used to make the gender equality work progress.

Measures adopted to promote the role of women in science - tools established to assess the impact of the measures

Instructions for agencies, research councils and universities

1995 all instructions for agencies and research councils were changed to take equality between women and men into account in their areas of knowledge. The research councils have responsibility for the scientific development in their specific areas. This also means a responsibility for the quality of research in all aspects. Both the scientific and ethical quality is included as basis for assessments in the work of the councils. The universities have a responsibility for the work of equality between men and women at all levels. Since 1997, the universities have a commission to attain more gender equality in disciplines where gender is uneven represented, i.e. technology, science, care and in education for teachers. The Government and the legislation encourage to affirmative actions. In elections to the faculties, and other institutions, both women and men must be represented in the election committee. At least one third of the suggested members must come from the underrepresented gender.

Between 1996-2001 a certain group working with gender and equality issues between the Swedish research councils. Its purpose was to enhance the knowledge of gender issues relating to the research councils tasks to make quality peer review, to educate the staff and members of scientific boards within the councils in gender specific issues.

Post-doctoral fellowships and guest-professorships for women

As a measure to enhance and facilitate for women to qualify further in the academia, the Government financed specific post-doctoral fellowships for women during the period 1995 – 2000. During the same period the Government financed specific guest-professorships for women researchers to come to Sweden. The post-doctoral fellowships and the guest professorship were administered by the research councils and were financed with 21 million SEK (approx. 210 EURO) for each year.

Women post-graduates

To increase the number of female post-graduate students to graduate, the Government finances 30 million SEK per year (approx 300 EURO) since 1995. The National Agency for Higher Education is administering this measure. The support is given to research-areas where the process from basic-higher education to post-graduate exams has few women. In the latest bill for research, the government allocated funding for 16 new graduate schools (one of them for gender research). The Government stressed that affirmative action should be taken to get gender equality of the post-graduate students.

Tham-professors

During 1995 the Government created the 32 posts at full professor level especially for women. Men were allowed to apply but could only be given the job if there was no suitable female candidate. The professorships also had extra funding in form of financing of 73 postdoctoral fellowship. The financing of the full professors was shared between the Government, concerned research councils and universities. The Government financed the postdoctoral fellowships. In July 2000, the EU Supreme Court, after complaints, turned down this Tham-measure (affirmative actions) concerned specific research positions for females. The Tham-maritime professorship in

Göteborg University is now occupied by a male. Later investigations have showed that the Swedish court might have asked the wrong questions to the EU Supreme Court. A discussion is continuing in Sweden, whether the laws really need to change.

Recruitment-targets for women professors

During 1997, equality percentage targets in respect of the distribution of sexes among newly recruited professors were introduced by the Government, at a majority of the universities and university colleges. The first percentage targets was set for the period of 1997-1999. At the same time a change of legislation has been made, instead of having a certain number of professor posts at the universities, one can have a professorship when reaching a certain level of expertise. At the moment there are approx 12% of women professors. For the year 2008, the target is set for 25 %. The evaluation of the recruitment targets for 1997-1999 indicates that most universities made their targets. Universities in the technology field had the most successful recruitment rate of women professors compared with the recruitment base. New recruitment targets have been set for the period 2001-2004.

Working environment for women researchers

In the beginning of the year 2000, a new statistic project regarding the academic worlds started up by the Ministry of Education, Statistic Sweden with partners from the Research Councils, Research Institutes and the university teacher's trade union (SULF). The pilot survey regards the working environmental situation for both women and men at the universities in Sweden. The pilot survey was from the beginning supposed to include two universities, but in the end the survey was done in only one university, Umeå. All faculties are represented at Umeå University. The ambition is to show what lies under the edge – to throw light upon questions like distribution of power both visible and invisible – hierarchies of gender, mobbing, sexual harassment, influence etc. A questionnaire was sent to all assistant, associate and full professors. The answers from the questionnaire are now being processed in Statistic Sweden. The results and a report from this survey are expected during spring 2001. In the legislation for the universities a change of directives was put 1996 in regarding the Universities' responsibility to make sure that no students are sexually harassed. The ordinary Laws for Gender Equality did not include schools or universities, only the labour market.

Gender studies/ research

Gender studies and research are important tools to reach and create gender equality. 1998 The Swedish Secretariat for Gender Research was inaugurated. The secretariats main tasks are to survey gender research in Sweden in all disciplines and to analyse the need of gender research in all disciplines. The secretariat shall actively spread research results both in the academic world and outside. The secretariat shall work for enhancing gender consciousness about gender research and the meaning of gender perspective. The secretariat is located in Göteborg and work closely together with the national library for gender research – which was inaugurated in 1997. One of the new graduate schools (see above) will be for gender research. The Swedish research councils are funding gender research projects with a minimum of 10 million SEK per year (1 million EURO).

Statistics

Most statistics are gendered in Sweden. The main holder of the statistics regarding higher education and research are the governmental agencies Statistics Sweden, the Swedish Research

Council and the National Agency for Higher Education. Statistics shows that female students tend to choose medical and humanistic studies. Natural sciences, mathematics and information technology fields are dominated by male students. The numbers of postgraduate degrees has increased each year during the 1990s. Some 3.100 PhDs and Licentiates were awarded in the financial year 1999. There was approximately the same number commencing postgraduate training as received degrees on completing their training. The proportion of women among those awarded degrees increased during the 1990s from 26 per cent in 1990 to 35 per cent in 1999. The proportion of female professors in Swedish universities is approx. 12 per cent.

Active networks on women and science

Women's studies and feminist research have gained great importance during the past ten-year period both inside and outside academia. There are several networks for women in science in different subjects/disciplines. The networks are local, national or international. The rector of Lund's university has started a network for female rectors. There are also several centres or forums for gender research at the universities in Sweden, which have networks for different disciplines. Most network-members in gender-research are women.

Involvement of the private sector in promoting women in science

The private sector has no specific strategies for the improvement of women in Research and Development. The private sector does not have any active networks on women and science in Sweden.

Significant case study (success or unsucccess story)

The Tham-professors has probably made the largest impact on gender and equality in academia. It started a discussion on how to promote women in science. What can we do about the structures? Are Tham-professorships the right way? Will the women appointed Tham professor be as qualified as the other professors, will there be an A and B team of professors in the Swedish research community? The very term Tham professorship has become a derogatory to some and belittling to others. The debate in the press has shown that there is support for the measure. The holders themselves are in unison support of the possibility of resorting to affirmative action seeing that such measures might become necessary if we are serious about changing the gender balance in the academy. In general, there have not been negative comments on the Tham-professors. They were well qualified and demonstrated exceedingly high competence. Looking in the mirror we know that the appointed Tham-professors probably would have been professors anyway, so there was not an A and B team, but we also know that the procedure was fastened up.

Future perspectives at the national and EU levels

Sweden will work for the 25% goal of women professors till the year 2008. It is important for women researchers to be able to have both an academic carrier and a family. Measures to create such possibilities must be continued on the EU-level. (Mobility High Level Group)

III.2.6. Review of the situation in Norway

The national situation

Gender equality has for many years been a stated aim high up on the public agenda in Norway. This favourable background for working equality in all spheres of our society is suggested by the term “state feminism”. While we can point to a certain success in equalizing our political representative bodies, women researchers are still grossly under-represented in many scientific fields as well as in higher positions and leading roles in the scientific system. At present our Government is putting high pressure on working equality in the R&D sector. Regularly the Government presents reports on research and development to the Parliament, last time in June 1999. As this report, *Research at the beginning of a new era*, was debated in the Parliament in February 2000 one of the seven singled out challenges was equality. The Parliament also underlined the importance by asking the Government to intensify the work to achieve equality of opportunity in the research system. More women should be recruited to top positions as well as to certain natural sciences and technological fields. In the years ahead the strengthening of long-term fundamental research will be a main objective. In addition priority will be given to research in four areas; Marine research, Information and communication technology, Medicine and health care, Environmental and energy research. Gender equality is singled out as a perspective that should be formative while developing these four prioritised research areas.

In August 2000 the Ministry of Education, Research and Church Affairs staged a national conference on “Women in the Academe” targeted at leaders in the research system. In the Financial bill for 2001 presented to the Parliament in October, the Government proposes 40 earmarked post-doc positions and 20 earmarked professorships for women. One of the challenges identified and singled out in the above-mentioned parliamentary report concerns the knowledge base for working equality in the research system. This has to be strengthened. The Research Council of Norway has been commissioned to draw up a report. In co-operation with the Ministry, The Research Council has identified four areas for further deliberation. The drawing up of the report started in November, and we will return to this task when describing future perspectives at the national level.

In the following we will give a description of the legislative and policy framework as well as listing some of the measures adopted to promote the role of women in science in Norway. We also describe the active networks on women and science. The situation concerning baseline statistics was presented in the report for the 2nd meeting of the Helsinki Group (June 2000). This time we focus on indicators as well as touching on challenges concerning evaluation and benchmarking activities in Norway.

Legislation and collective agreements in Norway

The Equal Opportunity Act adopted in 1978 and enforced by the Gender Equality Ombudsman, has two main intentions: to promote gender equality by ensuring the same opportunities to both women and men, and to improve the position of women through positive/preferential treatment. Article 6 of the Act calls women and men to have an equal right to education while giving the opportunity to preferential measures for both sexes in this domain. The Act opens up for affirmative action in favour of women. The Ombudsman does not initiate affirmative action, but she may encourage measures introduced in schools, universities or the workplace. An example of such measures is the use of quotas in cases where women are greatly under-represented in a particular occupation. In practice, affirmative action is currently based mainly upon provisions in

collective agreements between the social partners pursuant to the Act. The provisions therefore have to be enforced by the parties to the agreements, and not the Ombudsman. The universities and state colleges have adopted collective agreements between their social partners which opens up for use of quotas for women in job appointments. These agreements are founded upon the Basic Agreements that regulate negotiations and conciliation in Norwegian collective settlements in the state, municipal and private sectors. The Basic Agreements contain a number of supplementary agreements dealing with current working life matters, among those are gender equality in work life.

The University Act, revised in 1995, permits the advertisement of positions in such a way as to target the underrepresented sex. It also permits the earmarking of academic positions for women. In addition, it requires that both sexes be represented on selection boards.

Governmental responsibility

The Ministry of Education, Research and Church Affairs are responsible for the education and research sector in Norway, including the responsibility for gender equality in the sector. A major part of the responsibility for gender equality is taken care of by a Secretariat for gender equality in the Ministry. The Secretariat works with gender equality issues both internally and externally and coordinates many gender equality projects in the sector. There has been a strong focus on gender equality in primary school, but in the last few years the Ministry has increasingly given priority to the work for gender equality in the R&D Sector. Through the University Act, the annual assignment letters to the institutions and parliamentary reports they have put more pressure on the work for gender equality in the Sector.

The Research Council of Norway - its role in the work for gender equality in R&D sector

The Research Council of Norway is responsible for gender equality in research at a national level. The Council is also responsible for women's studies and gender research. This responsibility is carried out in compliance with the Research Council's two main tasks:

- To serve in an advisory capacity in matters concerning general research policy;
- To engage in strategic planning efforts that include the initiation, implementation and follow-up of research activities.

The main responsibility for tasks concerning general research policy rests with the Strategic Planning Division. The implementation of research strategy is incumbent upon the six research divisions of the Research Council of Norway. The Section for Feminist Research Policy in the Department of Research Policy in the Strategic Planning Division, is responsible for providing research policy advice based on development in gender equality in research at the national, Nordic and international levels. This is one of its main tasks beside providing research policy advice based on the monitoring and evaluation of developments in women's studies and gender research. The Section was in charge of developing an Action Plan for Gender Equality in the R&D sector (1999-2003). The plan was adopted by the Executive Board of the Council followed by internal and external hearings. A preliminary version of the plan had been forwarded to the Government as an input to their work on the earlier mentioned report on research and development presented to the Parliament in June 1999.

Through the Action Plan, the Research Council intends to help raise the priority assigned to equality work and to further sensitise the players in the sector, as well as to focus, systematise, and facilitate control of the efforts of those involved. Challenges vital to equality policy in the entire R&D sector are brought to the fore, recommendations are made to the research policy authorities

and the research institutions, while the plan provides more specific guidelines for equality efforts made by the Research Council's divisions in their respective spheres of responsibility.

The overriding goal of the Action plan is to:

- Strengthen the recruitment of women to fields with a low percentage of women;
- Increase the percentage of women in tenured academic positions.
- For all players in the R&D sector, the Action Plan recommends:
- Improving the knowledge base underpinning equality policy;
- Ensuring more targeted efforts to promote equality in research and the integration of equality efforts into regular activities.

The following general measures have been recommended to the various players:

- Lay down equality policy guidelines for the R&D sector and ensure that they are followed up (Ministry of Education, Research and Church Affairs)
- Evaluate equality measures and implement studies on women's participation and their working situation in the R&D sector (Ministry of Education, Research and Church Affairs, the Research Council and the university, college and research institute sector);
- Ensure that account is taken of equality policy objectives and measures at management level and in governing documents (The Research Council, the university, college and research institute sector);
- Ensure/establish separate equality policy bodies and positions, and build networks (university and college sector in Norway and the other Nordic countries).

Equal opportunity advisors

During the 1990's the universities appointed equal opportunity advisors due to internal pressure from female students and researchers. In a Nordic perspective there was nothing special or unusual with these appointments. The universities in Sweden were already then way ahead in professionalizing the work for equal opportunities. These jobs are located in the central administration of the universities and their duties include advising and encouraging the university administration in this field. Decision-making authority lies at the political and administrative level. Having the confidence and the necessary "pull" with the top management of the university administration is an essential precondition for success.

Gender equality committees

Three of the four Norwegian universities have central gender equality committees with representatives from the scientific and technical staff. The equal opportunity advisors are secretaries for these committees. There are also local gender equality committees at faculty level at these three universities. One of their main tasks is to keep an eye on the appointment processes and deal with complaints from female applicants. They can also act as a hearing committee when it concerns other issues where gender equality perspective is relevant.

A few years ago a majority of the faculties at University of Oslo dissolved their committees and integrated the responsibility for gender equality into the faculty boards. The responsibility for gender equality at local level lies with handpicked members of the faculty boards. The gender equality apparatus at the state colleges differs somewhat from the universities'. They have no equal opportunity advisors in their administrations, but they should have a gender equality committee.

National networks for gender equality in research

There are two national networks for gender equality in research: Network for Equal opportunity

advisors at the universities and Network for Equality in the University and College Sector. The former network was founded in 1994 by the members and consists of equal opportunity officers at the four universities and the Research Council of Norway. The network is a professional forum for exchange of experiences, discussions of strategies and development of competencies among the officers. It also serves as a social forum where the officers, in their solitary positions in the institutions, can get support and new strength to keep up with their work. The other network was founded in 1998 at the sector's annual conference. This network, with an elected working committee, admits all who are either working with or interested in equality in the R&D sector. These two networks are actively promoting gender equality in the sector. The annual conferences are a meeting arena for the members of the networks. Responsibility for the conferences is rotating between the gender equality committees of the institutions.

Political measures

Throughout the years several different measures have been implemented to promote gender equality in education and research. Some are implemented by the Ministry of Education, Research and Church Affairs, f.ex. economic rewards to the institutions for graduating students with a higher amount of money for female graduates and doctorates, personal promotion from senior lectureship to full professorship for female researchers and gender equality mandatories in the University Act. In the late 1980's the Norwegian University Council made an appeal to the four universities to adopt Action Plans for gender equality. During the last ten years the institutions in the University and College Sector has implemented Action Plans with a variety of measures. On the whole a majority of these measures can be categorised like this:

- Earmarking of grants and positions for female researchers
- Mentor projects
- Courses and projects to build self-esteem, motivate and qualify women to a research career or management positions in trade and industry
- Improving supervision and work conditions, including measures against sexual harassment
- Campaigns in order to recruit female students to fields with a low percentage of women
- Opinion-forming activities like conferences and seminars
- Information activities through different kind of media
- Prizes/rewards

Very few of these measures are evaluated. Many of them are too small and insignificant to form any basis for evaluations. Most of them are specific measures targeted to women with little or no link to the general structures and processes of the institutions. Some are on-going measures and therefore it is too early to tell how they function. But in an overall perspective, the measures have had some positive effect. Indeed, in any case it is methodologically difficult to isolate an effect of each measure on the percentage of women in research.

Gendered indicators

The data that the universities, university colleges and state colleges in Norway report each year to the Ministry of Education, Research and Church Affairs are mostly student-related information. These statistics are regularly published through The Norwegian Social Science Data Services. The Norwegian Institute every second year collects data on research staff and doctorates for Studies in Research and Higher Education. Statistics Norway is responsible for collecting data from the private sector. BIBSYS, which is the shared library system for all Norwegian University Libraries, the National Library, most college libraries, and a number of research libraries, also has information on research activities through FORSKPRO (projects) and FORSKPUB (publications).

These are the main sources for statistical information on education- and research activities in Norway.

New data in the pipeline

In the spring 2000 a group appointed by the Ministry of Education, Research and Church Affairs delivered a report with proposals on indicators on research activities and quality of research. These indicators should be a supplement to the student-related information from the Norwegian Social Science Data Services. Gender as a variable was included in several of the indicators:

- Number of scientific staff by position and gender
- Number of scientific staff financed from outside the institution
- Participation in national and international research programs
- Number of research fellows
- Membership in national and international boards, councils and committees related to research collaboration
- Participation in national and international conferences
- Papers delivered to national and international conferences
- Number of researchers in public councils and committees
- Number of doctorates by gender, age and discipline
- The other suggested indicators did not include the gender variable. In our opinion, the gender variable is relevant to several of these indicators. These are:
 - R&D man years by scientific staff
 - R&D man years by technical staff
 - Number of scientific publications by type and discipline
 - Number of citations in international journals by staff
 - References to scientific publications in governmental reports

The majority of the institutions who received the report for commentaries applauded the suggestions. However the indicators have not yet been implemented. The reason is that the Ministry of Education, Research and Church Affairs is working on a new budget model for research that hopefully will be approved in spring 2001. Which type of research indicators that will be chosen for implementation will depend upon the construction of the budget model.

Defined needs for gendered indicators

In the June Report to the second meeting of the Helsinki group, we informed about our national survey concerning indicators and policy reviewing in the university and college sector. The institutions were asked which gendered indicators they had available and what other indicators they possibly needed. If they had any defined needs we wanted them to state why and also point out who they thought should be responsible to develop the needed indicators. Of those who responded we got a total of seven different gendered indicators that the institutions defined as a need in order to increase their knowledge of gender equality in research. These seven indicators are:

- Applications to scientific positions by gender
- Applications for research funding, size of application sum, rate of assigned sum by gender
- Number of scientific publications by gender
- Time and resources used on research, lecturing, supervision and administrative tasks by gender
- Time used on masters degree and doctoral degree by gender

- Sabbatical year by seniority, discipline and gender
- Application and approval/disapproval of personal promotion to professorship by gender

The list above is ranged according to frequency in the suggestions from the institutions. Application to scientific positions by gender is one of the most needed indicators. This reflects the need to know which disciplines and level of positions most women apply for, and on the other hand, where in the system they are non-existent among the applicants. Which doors do the women knock on? This kind of statistics could give useful information if compared with another possible indicator; appointments by gender. The Faculty of Mathematics and Sciences at the University of Oslo initiated a few years ago their own registration of applicants by gender. The administration of the Faculty registered the gender of the applicants in all the phases of the appointment process; such as all applicants to a position, those who were evaluated as qualified and in the final phase those who were proposed by the judging committee. The registration can reveal how many women applicants reach the final phase, or how many are excluded or choose to withdraw during the process. This kind of statistics seems to be recognised as vital by the institutions in their work for the gender equality in research. The second indicator, applicants for research funding, would measure how many women researchers apply for funding, the size of their application sum and how much they are assigned comparing to their male colleagues, and finally their rate of the total grants. There are several funding sources in Norway; one of the main is, of course, the Research Council of Norway. There is now a dialogue between The Ministry of Education, Research and Church Affairs and the Research Council on how to comply with the need for this kind of information. The third indicator in the list above, number of scientific publications by gender, is similar to one of the suggested indicators from the governmental report mentioned earlier. Only here the gender variable is included.

Next two indicators deal with time, how women and men divide their time on their different duties as researchers, and the length of time used on their masters and doctoral studies. Could it possibly be that women use more time on lecturing and supervision and less on research comparing with their male colleagues? Or don't they? Related to time used on research is also the indicator on sabbatical years. How often do female researchers, according to levels of positions and disciplines take their sabbatical year comparing to their male colleagues? How many female researchers apply for personal promotion to professorship and how many are approved of, or rejected, also give useful information on their chances to achieve professorship without competition with others.

Problem-oriented indicators

The baseline statistics in the R&D Sector give us very limited knowledge on women's situation in the research system. This is partly due to the primarily function of the statistics, which is to show the production and quality of production in education and research for budgetary and financial reasons. They also give a static picture of the research system. These statistics show us where in the system women are situated, but very little about why women are positioned as they are. We need to know more what constitutes the direction of women's mobility into/within/out of the education and research system. Such knowledge requires what we would call problem-oriented indicators, including interrelated indicators to achieve a more advanced understanding of the women's situation in Academia. Such indicators presuppose different kind of methods for data collection. The baseline statistics give us; for example, scarce information on what grounds the students choose disciplines, what decides their mobility in the education system. An alternative to focus on those students who follow a normal education course, is to turn to those who quit or drop out of their studies or change direction in their education. A very relevant question is why some female students drop out of the natural sciences and technology studies. What can they tell us that can throw light on the problem of recruiting and keeping women to these disciplines? The

experiences and views of that women who choose to quit studies at Master, doctoral and post doc level, are very valuable information in relation to the work for gender equality in Academia. Career planning is an important tool to achieve your goals in education and work life. How many female students make their own career plans and how many of them have research jobs as a career-goal? How many of the female researchers had research jobs as a career-goal? Could it be that an early fixed goal of becoming a researcher increases the possibilities for the women to reach that goal?

Another vital question is what employment possibilities do female researchers have after they have finished their doctor's degree or their post doc period. How many apply and compete for a tenured position in the University and College Sector or Institute Sector? What other career paths are chosen by the women who fail to achieve such a position? How many female doctorates decide to choose otherwise and apply for a position outside the sector? And on what grounds? We have to look upon the labour market in general and see how we can combine Research & Development statistics and Labour market statistics to keep track of the female doctorates.

Several studies show that female students at Master and doctoral level, experience problems with their supervisors, especially in social sciences and humanities. Unfortunately most of these studies lack a male control group. It is therefore difficult to conclude whether there are any significant gender differences in experiences with supervision. An indicator here could be satisfaction/dissatisfaction with supervision by gender. Supervising is organised differently according to discipline; in natural sciences supervision is mostly performed in groups, in the social sciences and humanities the supervision is performed individually. Which satisfaction/dissatisfaction level do we find in each of these two traditional ways of supervision according to gender? Could we find any other ways of practising supervision that would suit women or doctoral students in general better? How are the effects of law regulation? Do the institutions use the tools the Gender equality Act and the University Act offer like quotas and earmarking of positions? Another question is whether a representation of both sexes in the selection boards has any effect on the number of appointed women.

National benchmarking

Benchmarking is a useful method to compare, analyse and improve results and processes between similar institutions in the R&D Sector in questions concerning gender equality. In Norway the method has never been used in a gender equality perspective, not until recently. The Minister of Trade and Industry announced in November (2000) a benchmarking project on the portion of women in management and board positions in the 250 largest businesses in Norway. A committee with 14 prominent women from Norwegian industry, trade, research and organisations will work out a ranking list of the 250 businesses according to their capability in appointing women to management and board positions. This benchmarking project can pave the way for a similar project on gender equality in research on a national level. It also gives us the opportunity to cooperate with an already established committee working on a related topic.

Future perspectives – at national level

When preparing the Action Plan for Gender Equality in the R&D sector, the Research Council identified the knowledge base for working equality in the sector as very weak. This challenge was also duly noted in the in the parliamentary report on research and development presented to the Parliament June 1999. Later the Research Council was asked by the Ministry to draw up a special report on the knowledge base. Evaluating and assessing the impact of measures already undertaken makes up vital parts of the knowledge base. As we have accounted for above, this dimension of the

knowledge base is not well developed in Norway and consequently one of the focal points to be explored. But even without such vital information, it is evident that quite a lot of efforts have been undertaken at the national level without much long-term or permanent effect. The numbers rise when for instance special programmes for recruiting girls are put up. Hitherto the numbers have receded when focus and special measures are withdrawn. Confronted with the highly contested but intriguing concept of mainstreaming, we have identified the need to ask whether developing strategies for equality at this level, will demand fundamental changes in the knowledge base. At present equality issues are only to a lesser degree integrated in the challenges confronting the research systems of today. Connecting the equality issues to other “big” questions confronting the scientific systems more generally, may ensure that dominant as well as marginalized perspectives/ voices will be included in co-creating of alternatives, increasing their chances of success and sustainability. A very challenging move indeed, as we seem to be able to agree on and develop knowledge about what we want to end, much more easily than we develop visions of what we want to struggle towards.

When working to identify focal points for the report on the knowledge base, we have been struck by to how much effort has been invested in identifying flaws, bias and barriers in the research system, as well as in uncovering and unveiling the deep causes of these flaws. And of course we need to understand the processes that lead to gender imbalance. Such knowledge also functions well as a background for appealing to the state to implement positive action measures to correct the flaws and combat the barriers. It works - according to the logic of state feminism. At the same time, however, as Teresa Rees put it in *Mainstreaming Equality in the European Union*, such measures tend to have a “post hoc” character. They can even turn reactive. As policymakers building on such a knowledge base, we seem condemned to run late while pointing to flaws, bias and barriers. While we should have been upfront facilitating and fostering alternatives, new stories and meanings as well as developing strategies for struggling towards them. So, what kind of knowledge is needed as a base for more solution-oriented approaches?

In order to develop a knowledge base suited for mainstreaming, we need to further the dialogue between policymakers and more established gender experts/ women’s researchers. The latter tend to focus on uncovering and unveiling deep causes of the gender imbalance, bringing forward the understanding of how inequalities tend to operate both historically and currently in academic settings and research communities. Policymakers who want to work at level of mainstreaming, also need to relate to the other “big” present and future questions confronting the R&D sector more generally in order to integrate the equality issues in ways that make sense to a wider range of people than those already convinced about the detrimental effects of gender imbalance. Glaring challenges today concern leadership in knowledge organisations, organisational learning and change more generally. In integrating equality issues, policymakers have to take care so that they are not read as suggesting that more women into the system will bring about the change sought for or contribute to solutions. Choosing mainstreaming as strategy level will consequently demand more attention to *how* equality issues are thought about and *represented*. Such discussions also become an indispensable part of the knowledge base. As stated in the ETAN-report, formulating clear knowledge goals is an important part of building indicators. Integrating or mainstreaming equality issues will of course include reviewing our discussions about indicators. One of the questions we constantly need to ask is: What is the solution represented to be? The commissioned report will also attend to the challenge of building indicators adequate to our mainstreaming ambitions.

Conclusions

The Figures 2006 shows that women remain a minority among researchers in the EU (29% in 2003, a slight increase from 27% in 1999), but that the number of women in research is increasing (plus 4%, compared to 2.4% for men). This represents the increase of some 140,000 researchers in the period, of which 39% were women. While this indicates a continued positive trend overall, we should not forget that women remain underrepresented in science, especially in leading positions.

There is considerable diversity among the countries in terms of scientific infrastructure, equality measures and the climate for women seeking to pursue scientific careers. Common factors include a lack of gender balance in decisionmaking about science policy and among those who determine what constitutes 'good' science. The Helsinki Group has acted as a prompt in many countries to the setting up of National Steering Committees on Women and Science to focus attention on these issues.

Many countries have instituted positive action measures to support women and science. These include supporting networks of women in science, encouraging the development of role model and mentoring schemes, and in some cases, establishing targets and quotas. A few countries have experimented with earmarking academic chairs, research funds and prizes for girls and women in science.

Gender mainstreaming is the systematic integration of gender equality into all policies and programmes, and into organisations and their cultures. It is supported by the European Commission, in its Communication: *Women and science – Mobilising women to enrich European Research*. Nordic countries in particular have been using gender mainstreaming as an integrated approach to gender equality in all fields. However, most countries are using at least some gender mainstreaming tools to help embed gender equality into systems and structures of science and scientific careers. Gender mainstreaming tools include legislation. A few countries have legislation to ensure gender balance on public bodies such as funding councils. Some also insist upon a gender balance on university and research institutes' academic and scientific committees.

Gender Studies is an important research area to create a better understanding of the complexities and subtleties of both direct, but more particularly indirect and institutional discrimination. Many countries report that there is support for Gender Studies to enhance understanding of the gendering of science and scientific excellence. This has led to a more sophisticated awareness of the use of patronage and nepotism in appointments' procedures, the social construction of 'scientific excellence' and the exclusionary mechanisms used by scientific elite bodies.

Measures to facilitate a work/life balance are also crucial to gender mainstreaming. While there is a wide recognition of this as an issue, progress on addressing it is patchy. Measures reported upon include good employment practices to facilitate a reasonable work/life balance, and programmes targeted at women returners to accommodate their re-entry to scientific careers after a period at home with childcare responsibilities.

The request for Gender Action Plans (GAPs) in FP6 has led to attention to the gender dimension and increased participation of women scientists in integrated projects and networks of excellence. It compelled applicants to address gender aspects in research and the gender balance in research teams. The need for GAPs also induced a change in communication between scientists and gender equality officers in academic institutions on the national as well as the European level, especially concerning the esteem of these officers' work, which would be important to encourage and develop further.

GAPs are a crucial expression of the European Commission's commitment to gender equality, equal opportunities in research and science and indispensable for increasing the number of women scientists and achieving the goals of the Lisbon Agenda. They should therefore remain an integral

part of European research funding.

The transition from communism to free market economics in the EU's new Member States and candidate countries in central and Eastern Europe, as well as the Baltic countries, was a tough period of adjustment. The collapse of communism not only dismantled many of the former system's negative aspects but also led to the loss of some of its positive achievements. The gender record – particularly in science – of many of the former communist states compared favourably to their Western European counterparts. However, one victim of the breakdown of the central state apparatus was this more equitable policy towards women. An initial impression of the situation in these countries can be drawn from the national reports produced by the Helsinki Group on women and science.

The first European Technology Assessment Network (ETAN) report, entitled 'Science policies in the European Union: promoting excellence through mainstreaming gender equality', focused mainly on female scientists in Western Europe. However, as explained above, women scientists in the former communist states faced their own peculiar set of challenges.

Gender equality in an enlarged Europe is an integral part of the Commission's Science and Society Action Plan. In fact, Action 27 aims specifically to promote such equality by addressing the situation of women scientists in central and eastern European countries and in Baltic States.

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III.3. Research and technological development systems in Estonia, Latvia and Lithuania

Comparative overview

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Introduction

The aim of the overview

This overview is aimed at providing basic information on Research and Experimental (Technological) Development as well as Innovation systems of Estonia, Latvia and Lithuania. The overview is a part of the EU 6th Framework Programme project “Baltic states network “Women in Sciences and High Technology” (BASNET). It was foreseen to give the general picture of RTD systems of Baltic States as an organizational, legal and financial framework in which gender equality issues could be considered.

Definitions

The overview is done on the basis of internationally adopted definitions.

- Research and Experimental (Technological) Development (RTD) – “...creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock knowledge to devise new applications” (Frascati Manual, OECD, 2002, p. 30).

RTD includes any scientific activity which is aimed at developing scientific knowledge (fundamental research), making this knowledge applicable (applied research) and applying this knowledge for creating new products, services and processes (experimental or technological development).

- “**Technological product and process Innovations** comprise implemented technologically new products and processes and significant technological improvements in products and processes” (Oslo Manual, OECD/Eurostat 1997).

An innovation has been implemented if it has been introduced in the market (**product or service innovation**) or used within production process (**process innovation**).

III.3.1. RTDI system in Estonia

The organization of research and development system (institutional framework) in Estonia

In the Estonian RTD and Innovation (RTDI) system, the Riigikogu (the Parliament) and the Government are at the highest level, with legislative and executive powers respectively

(Fig. III.3.1).

The Research and Development Council (founded in 1990) is a strategy advisory body for the Government in the entire field of RTDI. The Research and Development Council is chaired by the Prime Minister. According to the Organization of Research and Development Act, the Research and Development Council has 12 members and its composition (4 ministers, 4 representatives from academia and 4 representatives from business sector) is confirmed by the Government for the period of up to three years.

The Ministry of Economic Affairs and Communication has the central role in organizing technological development and innovation on the state level, and is responsible for the planning, coordination, execution and surveillance of the policies for technological development and innovation. The Ministry of Economy and Communication is advised by Innovation Policy Committee. The task of funding agency Enterprise Estonia (2000) is to support technological development projects within enterprises and market-oriented research and development projects in research institutions.

The Ministry of Education and Research is responsible for the planning, coordination, execution and surveillance of research and education policy. Institutions advising the Ministry of Education and Research in research issues include the Research Policy Committee, the Research Competency Council (1997) and the Estonian Academy of Sciences. The main task of the Estonian Science Foundation, whose various functions are under jurisdiction of the Ministry of Education, is to support research projects by means of the allocation of research grants.

The Research Policy Committee includes experts from academic sector, industry and public sector and is the main Ministry's advisory body for policy development. The Research Competency Council provide to the Ministry expert advice for distributing targeted funding as well as support for research infrastructures and for evaluation of institutions. The Research Competence Council consists of nine recognized scientists covering nine disciplines. The members of the Research Competence Council are publicly nominated by the Councils of R&D institutions. The membership for three years is approved by the Government according to proposal of the Minister of Education and Research. The Research Competence Council is supported by the Research Department of the Ministry of Education and Research and by nine expert groups lead by the members of the Council. The members of Expert Groups (6-8 experts) are internationally recognized in their fields Estonian scientists approved by the Minister of Education and Research.

The Estonian Rectors' Conference as the umbrella structure of Estonian RTD system plays significant role in the Estonian RTD policy formation.

The Ministry of Education and Research is assisted in carrying out its RTD management functions by the Archimedes Foundation (1997) which organizes evaluations of Estonian higher education and research; acts as the national contact point for the EU Framework programmes; coordinates the creation of Estonia's Research and Development Information System; and implements specific projects, with the aim of raising Estonia's capacity for innovation. The Foundation also coordinates exchange programmes for young researchers and students (Marie Curie grants, Erasmus).

The system of Estonian RTD institutions consists of 6 public and 6 private universities, one public and 4 state research institutions, private research organizations and the Estonian Academy of Sciences.

The office of the Gender Equality Commissioner deals with gender equality issues in Estonia. The Gender Equality Commissioner is an independent and impartial expert who acts independently, monitors compliance with the requirements of the Gender Equality Act and performs other functions imposed by the same law.

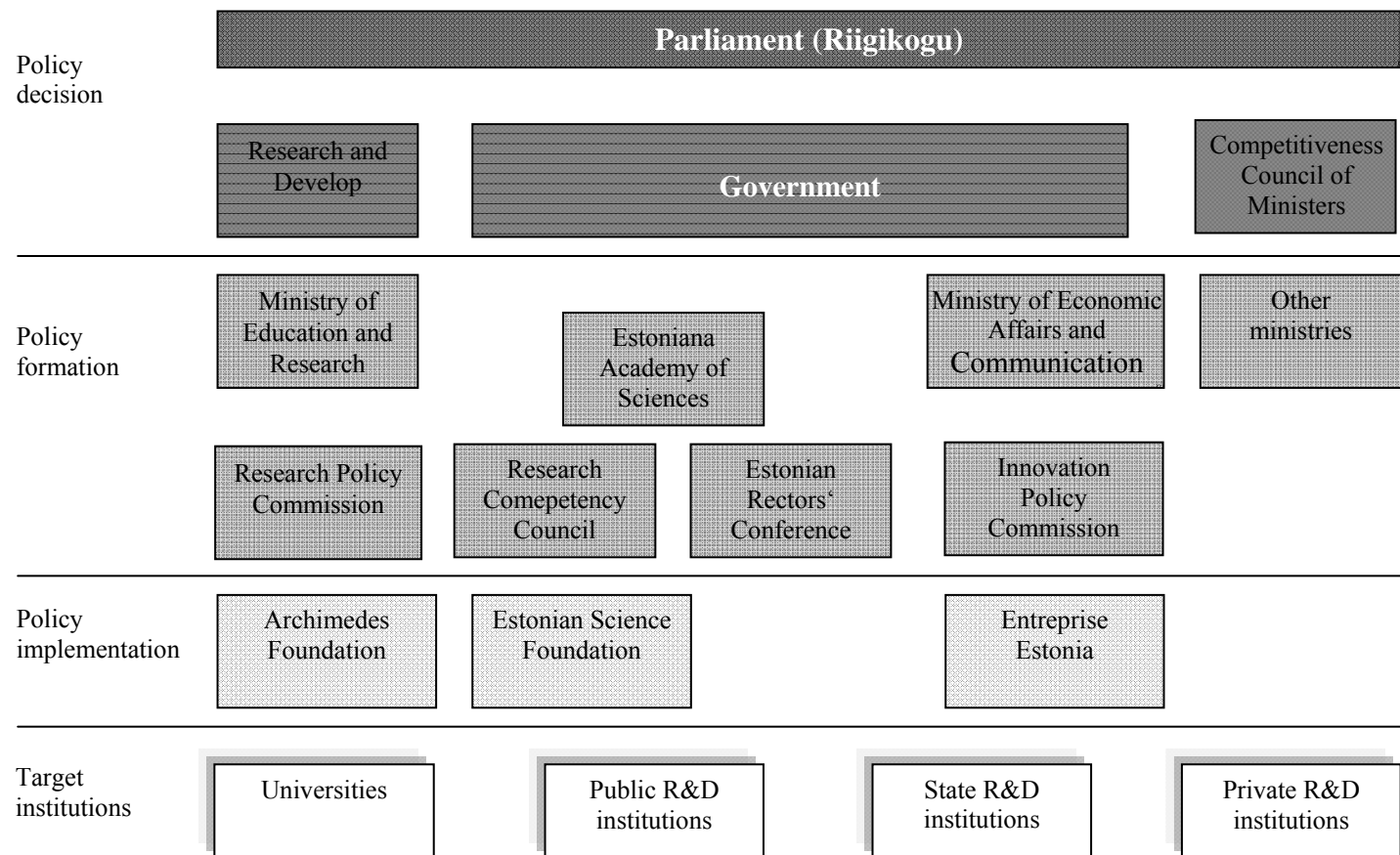


Fig. III.3.1. RTDI system (institutional framework) in Estonia

The legal framework of the Estonian R&D system

The Organisation of Research and Development Act was adopted in 1997 and amended in 1999, 2001 and 2004. In the law the diversity of RTD institutions was fixed as well as diversity of funding instruments. The multiplicity of decision making bodies was also allowed according to the law. Regular international evaluation of RTD institutions by research field was foreseen in the law. The Universities Act was adopted in 1995. Many amendments of the law were made after that.

The Estonian Academy of Sciences Act was adopted 1997.

The Estonian White Paper on RTD: “Knowledge based Estonia” i.e. Estonian R&D and Innovation Strategy for 2007-2013 was approved by the Parliament.

Several significant RTDI development programmes of national level - “Research and Development Infrastructure Programme”, “Centers of excellence Programme” and “Innovation Awareness Rising Programme” - were adopted in 2005.

Another important strategic document is the National Implementation Programme for the European Union Lisbon Strategy – “Action Plan for Growth and Jobs 2005-2007. For Implementation of the Lisbon Strategy”.

Legal acts related to gender issues

The legal act covering gender issues is the Gender Equality Act, adopted in 2004.

R&D funding system in Estonia

The key principles of RTDI funding

Fig. III.3.2 shows main Estonian RTDI funding and funds receiving institutions, types of funds and main RTDI funds flows.

The main principles of Estonian RTDI funding are following. Each year the Ministry of Education and Research advised by the Research Policy Committee and by Research Competence Council prepares the budget proposal for the Government. The Government advised by the Estonian R&D Council prepares the state budget. After the Parliaments’ approval of the state budget the Ministry of Education and Research allocates funds for the Estonian Science Foundation and for R&D institutions.

The Ministry of Economic Affairs and Communications for RTDI funding uses national programmes for RTDI. The Funding Agency “Enterprise Estonia” implements these programmes according to the instructions of the Ministry, and distributes the funding to the users.

Evolution of RTDI funding system

Up to 1991 planned state budget funding of RTDI institutions was practiced. In 1991 funding of individual projects based on peer-review procedures was introduced by the Estonian Science Foundation. The proportion of grant funding in overall Estonian RTDI funding was increased up to 1997 using step-by-step approach. In 1998 targeted funding and institutional funding for maintenance of institutional infrastructures was introduced according to the new Organisation of Research and Development Act. According to the new law allocations of targeted funding after 1998 was carried out using new management scheme: according to the advice of the Research Competence Council. Thus after 1998 all RTD funding became competitive.

Funding of fundamental research

Fundamental research commonly is recognized as “theoretical or experimental research with the aim of gaining new knowledge about the basic principles of phenomena and events, without the objective of immediate application of such knowledge”. However, in Estonian case this research includes pure fundamental research as well as strategic and oriented research. Fundamental research in Estonia is funded by targeted funding of RTD institutions on the base of peer-reviewed research projects. Also the peer-reviewed research grants to individual researchers on competitive basis are foreseen according to the scheme. The main RTD funding institutions are the Ministry of Education and Research and the Estonian Science Foundation.

Targeted funding

The aim of targeted RTD funding is to ensure a competitive basic structure for scientific research and the continuity of research which is necessary for Estonia. Financial means are also planned in this scheme for developing new research areas as well as for obtaining of informational sources necessary for research. Targeted funding is allocated to grantees by the Ministry of Education and Research according to the recommendations of the Research Competence Council. Targeted funding research grants are allocated to the researcher driven peer-reviewed projects up to 6 years duration. The main criteria for evaluation are: the quality of performers of proposal and of environment, critical mass of applying unit.

The Research Competence Council’s mission is:

- developing the principles and strategy for targeted funding of RTD institutions;
- making proposals concerning the opening, amendment and termination of research projects;
- assessing the effectiveness of the targeted funding of RTD institutions and the conformity of the research results with international standards;
- making proposals for covering of infrastructure expenses of RTD institutions;
- making proposals for approval of the results of international evaluation of R&D institutions;
- based on the results of evaluations making proposals for reorganization of state R&D institutions or termination of their activities.

Baseline funding

This new instrument was introduced in 2005. The aim of baseline funding is financing R&D institutions on the basis of research quality, supporting the development and initiative research of R&D institutions, and co-financing of cooperation projects, international and local, between academia and industry. The proportion of baseline funding in overall public financing will increase gradually. The R&D institutions are responsible for allocating the funds, there are no guidelines.

Research and development programmes

National RTD programmes are drafted for the purposeful and systematic development of key research areas. National RTD programmes are devoted for the solution of the problems that are relevant for the development of the economy and society.

There are also national Centers of Excellence in Research Programme and Research Infrastructure Programme. The aim of the Centers of Excellence Programme is to support of high-level RTD and post-graduate studies, promotion of cooperation between research groups, generation of innovations and creation of better preconditions in international RTD cooperation.

The Programme is financed by the Ministry of Education and Research through the state budget and EU Structural Funds.

The Programme for the Development of the RTD Infrastructure was prepared as strategic base for updating of the infrastructure supporting academic higher education, research and innovation. The first phase of the Programme was implemented in 2002-2006. For the period 2007-2013 is foreseen next phase of the Programme with much higher funding including funding from EU Structural Funds.

Research and development grants

The purpose of Research and Development Grants is primarily to support high-level initiative research, new ideas and studies. The Research and Development Grants are financed by the Estonian Science Foundation from the Ministry's of Education and RTD budget.

The Estonian Science Foundation (ESF) was established in 1990. The ESF:

- is a private body fulfilling public functions;
- uses state budget appropriations to award peer-reviewed research grants to individuals and research groups on a competitive basis.

The mission of the ESF is:

- to foster the development of fundamental and applied research in principal areas of scientific strength and in fields of special importance to Estonian economy and social sphere;
- to support most qualified and successive researchers and research groups;
- to involve post-graduate and doctoral students as well as undergraduate students into active research;
- to support international co-operation and mobility of researchers.

The grant expertise of the ESF is supplemented by several hundred top-level Estonian and foreign experts.

The highest decision-making body in ESF is the Council. Seven members of the Council are the representatives of universities, R&D institutions, the Academy of Sciences and the Ministry of Education and Research. Eight eminent scientists are elected by scientific community for a term of three years as heads of the expert commissions (health, environment and biosciences, culture and society, physical sciences and engineering).

Support schemes for innovation

The purpose of the innovation support schemes is to raise the competitiveness of enterprises by developing and applying new technologies. This innovation support is oriented to product development in enterprises, research with market potential undertaken in RTD institutions, preliminary studies for projects.

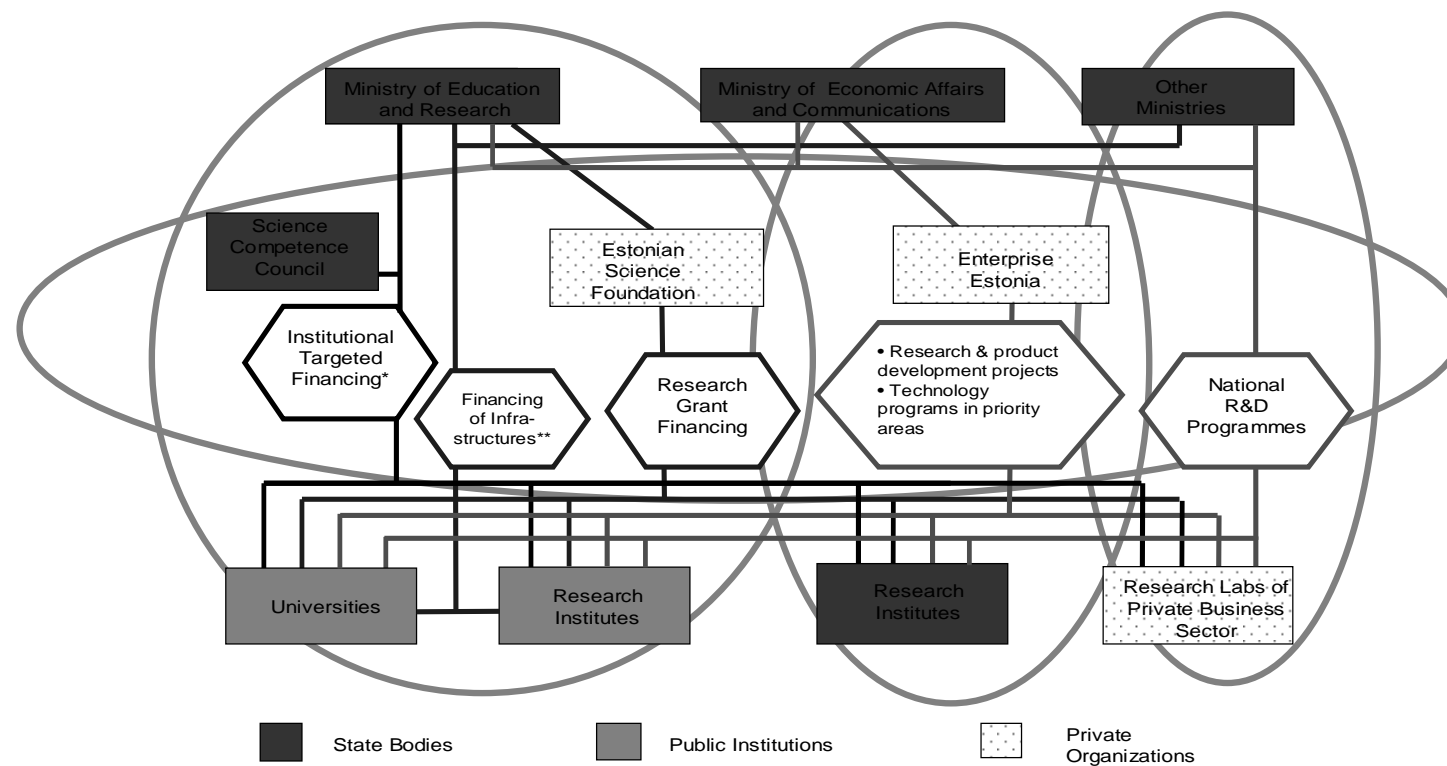


Fig. III.3.2. RTDI funding system in Estonia

III.3.2. RTDI system in Latvia

Introduction

After World War II, i. e. during Soviet time, the science in Latvia developed under the control of the Soviet Union governmental and administrative bodies.

Many high level researchers in Latvian Academy's institutes were involved in the development of Soviet technologies and were directly or indirectly into the Soviet military-industrial complex. For these researchers international contacts was strictly limited. It was for this reason that a major part of high-level researchers were separated not only from the University of Latvia research activities but also from the international research as a whole.

The collapse of the political and economic system of the Soviet Union at the end of 1980's created an opportunity to reform Latvian research and higher education system. In 1989 the Latvian Association of Scientists was founded and as a result a complete reform of the organizational, administrative, and funding system of research took place in Latvia.

In 1990 the Latvian Council of Science was formed and the transition to a new research grant funding system on a competitive basis was initiated.

In 1992 the Ministry of Education was transformed to the Ministry of Education and Science and the Department for Research was formed, which is responsible for science policy implementation. The Latvian Academy of Sciences was re-organized again into an association of prominent scientists in 1992. The majority of Academic institutes were subordinated to the Ministry of Education and several of these associated themselves with the University of Latvia.

During the period of transformation many of Academic institutes considerably intensified their international activities. They signed major agreements and contracts with colleagues from abroad and many researchers participated in competition for international research grants.

Over the last decade the scientific cooperation with EU has increased gradually. Participation in the activities of Framework Programmes was opened to Latvian researchers as early as 1992. A completely new stage in cooperation between Latvia and EU member states started in 1999 when Latvia became full member of the Fifth Framework Programme for Research and technological Development. In 2004 The Republic of Latvia became a member state of EU and this was the starting point for full integration of Latvian research system in the European Research Area.

Legal acts of RTDI system in Latvia

The Law On Research Activity adopted in 2005 regulates the administrative, financial and institutional features in the area of research and development, and determines the competence of the Ministry of Education and Science, the Latvian Council of Science and other bodies. It prescribes R&D financing priorities through the state budget and determines the rights and duties of institutions and individuals engaged in research. The Law states that the Cabinet of Ministers provides annual growth of R&D funding from state budget no less than 0,15% of GDP until the state budget allocations for R&D amounts to the 1% of GDP.

The Law on Higher Education Establishments was adopted in 1995 with amendments in 2000 and 2005. It regulates the status, the rights and tasks, the establishment and reorganization, the accreditation, the juridical basis, the international cooperation of higher education establishments, the economic and research activity in higher education establishments and the status of Higher Education Council.

The main recent RTDI policy development was Framework for medium-term budget for 2008-2010 adopted by Government. This budget plan envisages substantial increase in funding for research programmes, research infrastructures, protection of intellectual property and

popularization of science.

Strategic documents on research and technological development:

- Research and Technological Development White Book;
- Other important research and technological development policy documents:
- Guidelines for Development of Higher Education, Science and Technologies for 2002-2010 (2002);
- Guidelines for Research, Technological Development and Innovation Strategy for 2006-2013 (2005);
- Single Programming Document (2003);
- National Innovation Programme (2003);
- National Reform Plan (Lisbon Strategy Implementation Programme) for 2005-2008 (2005);
- National Development Plan for 2007-2013.

Regulations related to the RTD activity enacted by the Cabinet of Ministers:

- On State Research Programmes
- On Fundamental and Applied Research
- On the Latvian Science Council
- On the Arrangements and Criteria for Awarding Scientific Degrees
- On State Scientists Emeritus;
- On the Statutes of the State Commission of Scientific Qualification.

Legal acts related to gender issues

The first strategic document in the field of gender equality policy was the Concept Paper on Gender Equality Implementation accepted by the Cabinet of Ministers in October 2001. This document was developed in close cooperation between governmental institutions, non-governmental organisations, researchers and branch experts.

Critical areas, problems and measures that need to be taken are identified in the document. The Concept Paper is used as a fundamental basis for the development of further plans of action and documents to implement the goals set in the Concept Paper.

The Programme for the Implementation of Gender Equality 2005-2006 was elaborated and accepted by the Cabinet of Ministers on 8 September 2004. Within the frame of Programme activities in four directions of action are being implemented:

- education at all levels and awareness raising in the society about gender equality issues;
- reconciliation of work and family life;
- improvement of the administrative capacity to work with gender equality issues and improvement of the gender equality policy mechanism;
- prevention of violence.

Institutional framework of RTDI system in Latvia

According to the Law On Research Activities the institutional framework of RTD system in Latvia is the following (Fig. III.3.3.):

- the Parliament (Saeima),
- the Cabinet of Ministers (Government),
- the Ministry of Education and Science,
- the Latvian Council of Science and its Expert Commissions,
- the Latvian Academy of Science,
- Higher Education Establishments ,
- Research Institutions.

The Parliament (Saeima).

The Parliament determines the state strategy in research and technological development and allocates state budget allocations for RTD. The Parliament has formed the Commission of Education, Culture and Science.

The Cabinet of Ministers

The Cabinet of Ministers (Government):

- makes decisions on the state R&D policy,
- accepts rules and regulations in the area of RTD (sets evaluation criteria of research projects and research institutions);
- makes decisions on the establishment, reorganization and abolishment of the state research institutions as well as the establishments of higher education;
- defines national RTD priorities and orders state research programmes;
- defines the control procedure of the respective financial allocations and their spending.

The Ministry of Education and Science

The Ministry of Education and Science is the central executive body responsible for formation, development and implementation of the state RTD policy. The following competencies in RTD of the Ministry of Education and Science should be mentioned:

- drafting of laws and other legal acts in RTD;
- working out and implementation state education and RTD policy;
- representing the state's interest in RTD field in international arena;
- drafting request for annual budget allocations for the provision of research activities;
- preparing proposal for the research grants from state budget;
- distributing state budget allocations for education and RTD;
- managing state institutions related with administration of RTD;
- analysing statistical data on education and RTD
- preparing and publishing analytical review and studies in the fields of education and RTD.

The Latvian Council of Science

The Latvian Council of Science of is a collegial body of researchers that deals with RTD problems within country. The Council of Science:

- makes conceptual proposals on RTD policy for the Cabinet of Ministers and the Ministry of Education and Science;
- makes proposals for development of science and for setting of RTD priority areas; proposes a draft of the annual state budget allocations for RTD;
- works out the projects for decisions and legal acts aimed at developing the RTD system; organizes funding of fundamental and applied research projects;
- promotes integration and cooperation between research institutes and higher education establishments.

The Latvian Council of Science consists of 20 members with representatives from the Ministry of Education and Science, the Latvian Academy of Science, the Latvian Council of Rectors. The Latvian Council of Science is assisted by 14 Expert Commissions which review and evaluate research projects submitted.

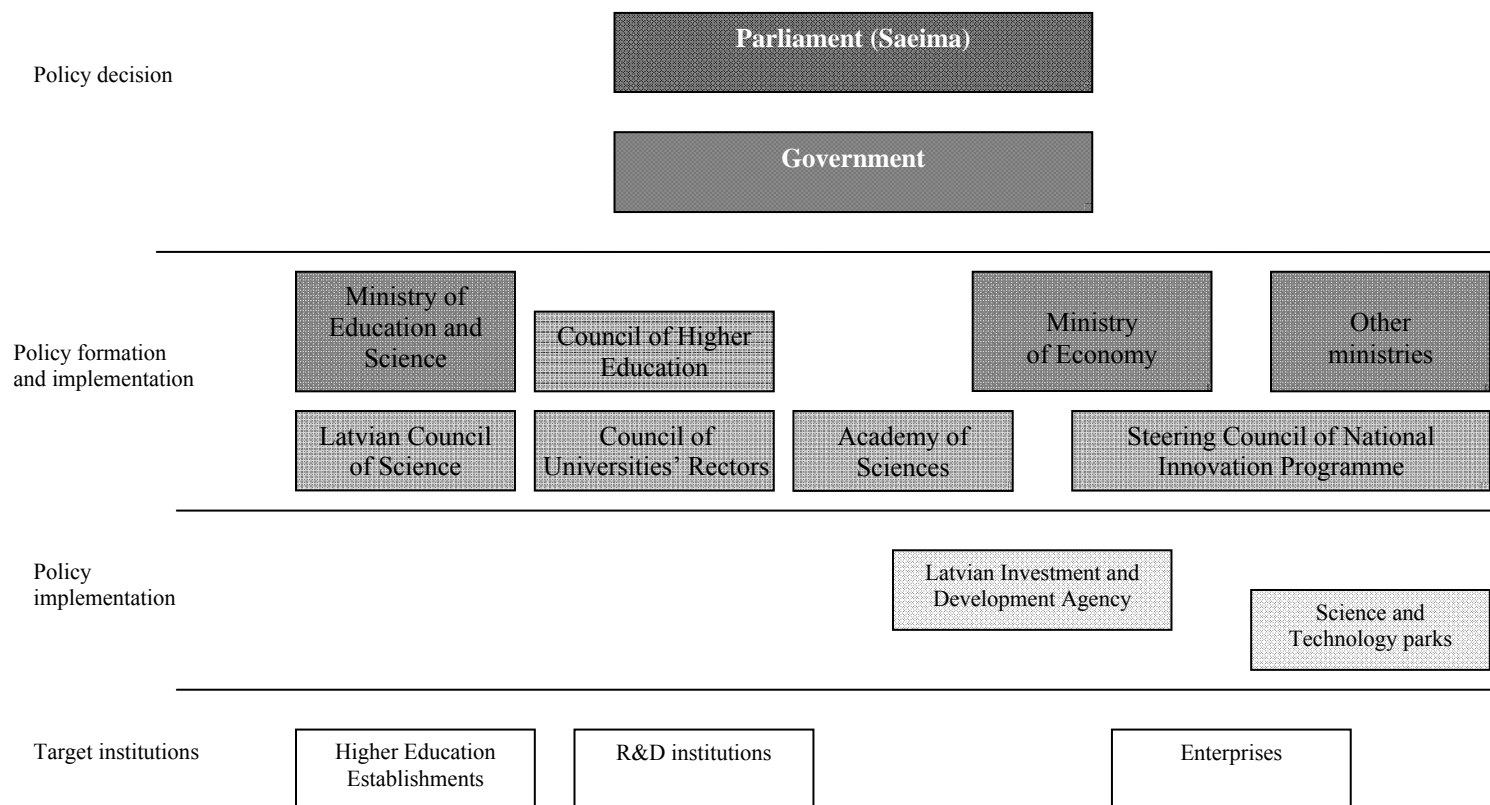


Fig. III.3.3. Institutional framework of RTDI system in Latvia

The Latvian Academy of Science

After its re-organization in 1992 the Latvian Academy of Science became an autonomous legal entity. It functions as an honorary and advisory body in accordance with its Statute and the Charter accepted by the Parliament in 1997.

The main aims and tasks of the Latvian Academy of Science are:

- favoring RTD in the fundamental and applied fields especially in interdisciplinary ones;
- promoting studies in Latvian history and culture;
- developing Latvian language studies;
- actively participating in the formation of Latvian RTD policy by consulting the Parliament and Government in RTD issues;
- becoming involved in scientific publishing;
- developing scientific terminology and maintaining high scientific standards in encyclopedias;
- managing congresses, conferences and scientific discussions,
- awarding prizes for the best results in RTD;
- maintaining international contacts;
- popularizing research and its achievements in the society;
- protecting and maintaining professional research ethics, scientific discussion principles and universally accepted scientific traditions.

The Higher Education Council

According to Law on Higher Education Establishments the Higher Education Council is an independent institution created by the Parliament to work out and oversee the strategies for Higher Education in the state and to realize better cooperation between higher schools, state institutions and society.

The Ministry of Economy

The Ministry of Economy is also involved in RTDI policy. It uses support schemes for RTDI development (applied research and technology transfer). The Ministry of Economy is responsible for implementation of the National Lisbon Strategy. The Knowledge and Innovation System Department in Latvian Investment and Development Agency administers state support programmes, provides analysis of efficiency of innovation system and promotes knowledge transfer to industry.

Equal opportunities institutions

The Ministry of Welfare is designated to be the responsible institution for the development of gender equality policy. The gender equality issues are the responsibility of the Department of European and Legal Affairs, where Gender Equality Unit in July 2003 has been formed.

RTD funding

In 1998 a considerable change of Latvian R&D funding is implemented. Recently state budget allocations to RTD increased significantly and several new mechanisms of R&D financing were established. In 2007 Ministry of Education and Science allocates for RTD activity 71,7 m Euro

including the special funding (5,7 m Euro) of research activities and provision of research infrastructures at higher education establishments.

Funding of national research programmes

A significant part (9 m Euro in 2007) of the direct research funding is allocated to research projects in the areas of national research programmes which are implemented in priority areas determined by the Cabinet of Ministers. For the first period of 2005-2008 five priority areas were determined: information technologies, organic chemistry, and biomedicine, material sciences, forestry and wood sciences and Letonica (Latvian language, history and culture studies). Applications for the funding of projects are accepted and evaluated on a competitive basis.

Grants for fundamental and applied research

Latvian Science Council plays an important role controlling significant part of the state RTD budget. The main part of the funds is allocated to particular projects via the grant system (5,4 m Euro in 2007). Peer-reviewed RTD projects are proposed on a project-to-project basis. Grants given to winners of the National project proposals competition are administered in a manner similar to that used by European Commission. Annually the Science Council basing its decision on the conclusions of the expert commissions distributes this portion of state RTD funding among 700 grant applicants. In evaluating each project application the experts look at the scientific quality of the project as well as at its feasibility. The qualifications of the applicants are reviewed as indicated in publications, patents and other indicators. The significance of these proposals and their potential contribution to the country's economy, culture and education is also taken into account.

Market oriented research programme

Since 1993 the Ministry of Education and Science is realizing and coordinating a special program for applied research the so called "Market Oriented Research Programme". This Programme was launched with the goal to promote researchers from universities, research institutes and SMEs to develop new competitive products and encourage the development of new start-ups. 7% of state RTD budget is being spent for this Programme (0,8 m Euro in 2007). The Market Oriented Research Programme is also used to finance innovation support structures (Latvian Technological Center, Latvian Electric Industry Business Innovation Center and Latvian Technological Park at the Riga Technical University).

Institutional (reference) funding

Institutional RTD funding is allocated only to public research and higher education institutions which are included in the Register of agreed scientific establishments. This funding is intended to be used for maintenance of research institutions and for remuneration of the scientific staff. Institutional RTD funding is 21,1 M Euro in 2007.

III.3.3. RTD system in Lithuania

Historical overview

Heritage characteristics

In 1990, as a result of re-gained independence, Lithuania inherited RTDI system with all features typical to the Soviet times. Fundamental and applied research was concentrated in the research institutes of the Lithuanian Academy of Sciences, therefore, it was separated from higher education activities conducted by university-type higher education establishments. Technological development was mainly carried out by the branch research institutes, which were under subordination of sectoral ministries. A part of those research institutes had a very narrow specialization and were oriented rather towards the needs of the Soviet Union, than to the Lithuanian ones. A considerable part of RTD potential, especially in technical development, was subordinate to the military-industrial complex of the former Soviet Union. As in other Central and Eastern European countries under the Soviet regime and centrally planned economy, there was only government sector in Lithuanian RTD (and Innovation) system.

In RTD the priority was given to the hard sciences: mathematics, physics and chemistry.

Research institutes, including the institutes of the Lithuanian Academy of Sciences, maintained close ties with the economy and its entities. Some of the higher education establishments had also close ties with the economy. The main funding for RTD activities was acquired by universities and research institutes under contracts with economic entities. However, in most cases, those economic entities were outside Lithuanian borders and often related to Soviet military-industrial complex. This complicated greatly the situation of research institutions after 1990.

The reform of inherited RTD system directed to target the activity of this potential to the Lithuanian needs was urgently needed.

As for equal opportunities issues in Lithuanian RTD system during the Soviet time it should be stressed propaganda statement of equal rights for women and men. Despite of comparatively well developed social security system women rights to be equal were substantially corrected by the poor economics and heavy everyday life. The situation in RTD system in this aspect was similar to the one in other social layers.

Major changes after 1990

The Law on Science and Studies adopted in 1991 (revised in 2002) changed the status of the Lithuanian Academy of Science. It lost its research institutes owned. At the same time 29 Lithuanian research institutes (including 17 ones from Academy of Science) were granted a status of the state research institute. High degree of endowed autonomy enabled strong research teams to raise considerably the research level and to integrate into the world research community. However, for weak institutions, the autonomy became the means to protect themselves from external impact and to maintain the status quo.

After 1990 all RTD entities met a necessity to change the orientation in RTD: to terminate insignificant, non-urgent RTD activities and to orient them towards the RTD activity of international quality and to the Lithuanian needs. Unclosing world started changing evaluation criteria of RTD activities in Lithuania: the importance of activity indicators adopted on the international level has increased. It is related to the number of scientific publications in the journals included into the databases of the Institute of Scientific Information (ISI). At present the increase of the number of publications is rather rapid: an average annual increase of the number of publications in Lithuania is several times higher than average EU growth rate. Competition in the

free market became the totally new phenomenon for researchers. Generally they were forced to turn back to the industry. However, as in other post-communist countries, the situation was complicated by the fact that industrial enterprises were tempt to choose technologies developed by the world-known companies rather than by local researchers. Thus innovation at this time was comprised as investments into new technologies acquired from abroad.

International evaluations of Lithuanian RTD

The first international research evaluation in Lithuania was carried out in 1995 upon the request of the Ministry of Education and Science by the expert group formed by the Norwegian Research Council.

The experts stated that, despite of the too large and non-balanced Lithuanian system of research institutions and a difficult economical situation, there were a number of research groups excellent even by international standards.

Following the evaluation results, the experts suggested the guidelines for the reorganization of the Lithuanian RTD system, such as: to considerably increase the scope of competitive research funding, to orient research towards the current and future needs of the Lithuanian society, to merge university departments and faculties, to reduce and reorganize the sector of research institutes, to expand international contacts and cooperation, to give universities and research institutes a high degree of freedom within their total budget limits and the framework of formed national research plan.

The second international evaluation upon request of the Lithuanian Government was made in 2003 by World Bank experts from Lithuania and abroad. It also stated the problems and shortages of Lithuanian RTDI very similar to ones indicated in former evaluation. This evaluators indicated that the situation of Lithuanian RTDI system in a whole become even worse despite of the upturn of economy and high competence of several RTD centers.

World Bank experts insistently recommended fostering the collaboration between research and business, reorganization of public research sector and establishing proper innovation development system.

Thus although the main part of recommendations is still on the initial implementation stage, the conclusions of both international evaluations deserved high attention of the various strata of society and caused new attempts of policy makers to pursue the reform of RTD more actively.

Recent political events with major influence on research policy

After Lithuania's accession to the EU and NATO, it became totally open to the world and encountered all challenges of globalization. Recent Lithuanian political developments was basically related towards a further EU integration and are extensively oriented towards the implementation of the National Lisbon Strategy Implementation Programme (2005-2008) and the preparation of Strategic documentation for the Structural Funds programming period 2007-2013. Notwithstanding some experience of participation in EU Framework programmes the use of opportunities of started Seventh Framework Programme is also a big challenge for the Lithuanian RTD system being in permanent reform.

Legal basis and institutional framework of RTD system in Lithuania

The main laws and other legal acts

The main laws which define the functionality of Lithuanian RTD system are: the Law on Research and Studies in 1991 (revised in 2002) and the Law on Higher Education (2002). Now the discussion for the composition of united Law on Research and Higher Education was started.

Lithuanian Innovation policy is implemented applying the Long Term Strategy of State, Long term Economic Development Strategy of Lithuania until 2015 (2002) and National Lisbon Strategy Implementation Programme for 2005-2008 (2005). The last one is also important for RTD development.

At the end of 2003 the Government of the Republic of Lithuania approved a Long-Term RTD Strategy and a Programme for Implementation of the Provisions of the Lithuanian Science and Technology White Paper to implement the Strategy. Taking into account the necessity to foster high-tech production, the Government in 2002 approved the Programme for the Development of High Technologies. The Programme was updated by new decision of the Government in 2006.

On 2002 the Government adopted decision on Priority Trends for Research and Experimental Development of Lithuania (2002-2006) (revised in 2007). RTD trends named in the decision as the priorities encompass very wide spectrum of RTD fields (especially having in mind limited resources of Lithuania). It was the ground for to ask more money for RTD but it not made any real prioritization of any RTD fields. Since at the beginning of 2007 the foresight study of national economy was at the stage of preparation the decision was made to prolong the operation of former RTD trends. It is related with the consideration that Lithuanian economy foresight should be finished before priority RTD trends could be set down.

Legal acts related to gender issues

The Law on Equal Treatment adopted in late 2003 entered into force in 2005. The Law on Equal Opportunities for Women and Men (1998) was amended in 2004 to ensure it compliance with relevant EU Directives and Lithuanian Law on Equal Treatment.

Lithuanian Government adopted the National Programme on Equal Opportunities for Women and Men (2005-2009) which is extension of the first step of the programme for 2003-2004. The programme covers also education and science area, and aims to integrate gender equality in education and research systems, as well as to provide more favourable conditions for women to pursue careers in sciences.

The institutional framework of Lithuanian RTD and Innovation system

Policy decision institutions

Main actors of RTD activities including policy making and implementing institutions are presented in Fig. III.3.4.

The Parliament (Seimas) of the Republic of Lithuania supported by its committees concerned adopts main laws and decisions related with RTD and Innovation activities.

The President of the Republic of Lithuania with his advising staff is interested in all fields of state and undertakes some checkups of state in RTD and Innovation field.

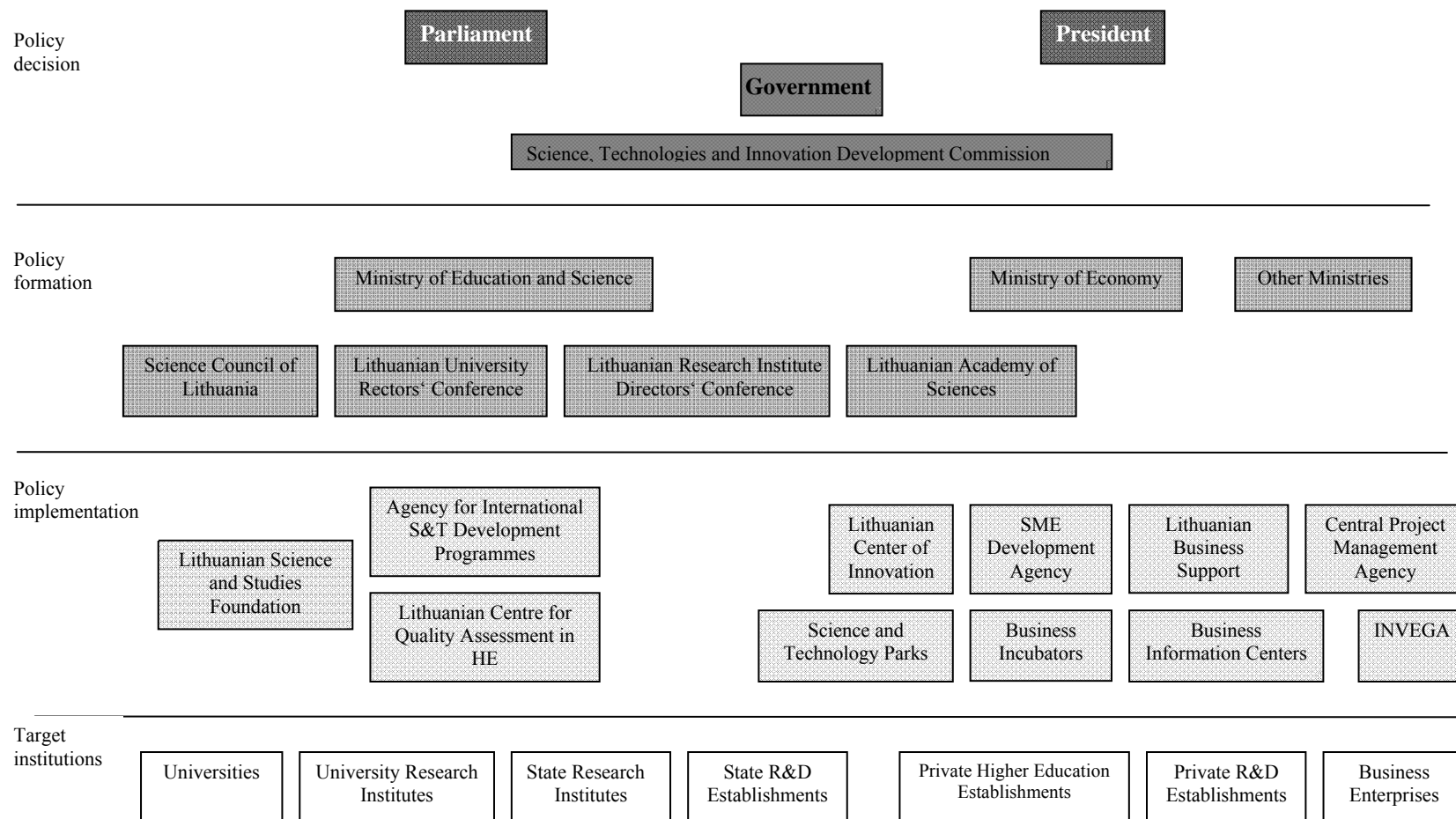


Fig. III.3.4. Institutional framework of RTDI system in Lithuania

The main decisions in RTD and Innovation policy are made by the Government of the Republic of Lithuania assisted by two main ministries involved in RTD and Innovation policy making: the Ministry of Education and Science and the Ministry of Economy.

Seeking to orient the science and technology policy towards the needs of the country's economy, in 2002 the Government of the Republic of Lithuania formed the Commission on Science and Technologies chaired by the Prime Minister. In 2005 the Commission was transformed into Science, Technologies and Innovation Development Commission. The deputies of the Chairman are the Ministers of Education and Science and Economy. The Commission is an advisory institution to the Government. It discusses and advises the Government on the issues of formation and implementation of the policy and strategy of the development of applied research, technologies and innovation to fulfill the needs of the country's economy by promoting interaction of research, production and business.

It should be noted that despite of the high status and wide authorities of the Commission its activity is still formal. It had only several meetings since its reorganization in 2005. Now this Commission is served by the Office of Government, but the common opinion tends increasingly to the necessity of establishment of autonomous secretariat serving the Commission. It could make the work of the Commission more efficient.

Policy formation institutions

The Lithuanian RTD policy is formed and implemented by the Ministry of Education and Science. Innovation and technology development policy and strategy is formed and implemented by the Ministry of Economy.

Contract research in certain fields is organized and coordinated by corresponding sectoral Ministries.

The adviser to the Parliament and the Government on the issues of the research, technological development and higher education policy is the Science Council of Lithuania. The Council is founded by the Parliament on the proposal of the Government. It consists of the 15 scientists proposed by the science and studies institutions, 6 members proposed by the Ministry of Education and Science and 11 representatives of organizations representing the interests of academia, economy and business.

It should be pointed out that until 2003 the Science Council of Lithuania had a status of institution self-governing the system of RTD and Higher education. The provisions delegating this status to the Science Council of Lithuania are still remaining in some legal acts.

Expert institutions legitimated by the Law on Research and Studies is the Lithuanian Academy of Sciences, the Lithuanian University Rectors' Conference and the Lithuanian Research Institute Directors' Conference. Two last-mentioned being only societal (community) organizations has in the some legal acts quite high status – some types of legal acts proposed by the Ministry of Education and Science have to be coordinated with them. This leads to some difficulties especially when legal acts related with reforms should be adopted. All these self-governing corporate organizations usually oppose to the radical but necessary changes in their life.

Policy implementation institutions

The Ministry of Education and Science in its RTD policy implementation work is assisted by the Lithuanian Science and Studies Foundation (established by Government) which allocates on the competitive basis RTD grants for science and studies institutions as well as for individual researchers.

The International RTD and Innovation activity of Lithuanian research and higher institutions as well as of business enterprises is administrated by the Agency for International Science and Technology Development Programmes in Lithuania established by the Government and supervised by the Ministry of Education and Science. This Agency renders information and assist to researchers preparing proposals for European research and technology development programmes like Framework programmes, EUREKA and COST programmes. The Agency also renders proposals to the Ministry of Education and Science how to foster the participation of Lithuanian researchers in international RTDI programmes.

An expert institution to the Ministry of Education and Science for the evaluation of the research activities is the Lithuanian Centre for Quality Assessment in Higher Education established by the Ministry of Education and Science.

For the implementation of its innovation policy the Ministry of Economy has established the Small and Medium Enterprises Development Agency which renders information and consultation services to the SME. For this activity the agency has established 7 Business Incubators and 42 Business Information Centers.

Joint Stock Company INVEGA established by the Government and supervised by Ministry of Economy also promotes small and medium business by providing guarantees for micro credits allocated by banks to SME for start and development of its business.

EU Structural Funds support Lithuanian business and are administrated by the Lithuanian Business Support Agency, established by the Ministry of Economy.

The management of projects implementing EU Structural Funds support to state and municipal institutions is appointed to the Central Project Management Agency, established by the Ministry of Finances.

The Ministry of Education and Science with the Ministry of Economy has established Lithuanian Center of Innovation – nonprofit organization providing innovation support services to business enterprises, research and higher education institutions as well as to other organizations.

Target institutions

According to the Law on Science and Studies RTD activity could be carried out in state and private research establishments. The state research establishments are: state research institutes, university research institutes and other state research establishments. They all are founded by the Government. The legal basis of founding and activity of research establishments are determined by the Law on Research and Studies.

The State Research Institute is founded to carry out long-term international level research important to the Lithuanian economy and culture as well as international cooperation, which require specialized groups of scientists, databases and specialized research equipment. Together with the higher education establishments the State Research Institute trains scientists and assists higher education establishments to prepare specialists. The main research directions of the State Research Institutes are approved by the Government on the proposal of the Ministry of Education and Science prepared after examination of the proposals made by the Science Council of Lithuania and the state institutions concerned.

The university research institute is a research institution, under the agreement with the university rendering the research basis for university students, the training of scientists, as well as for improvement of research qualification of the pedagogical staff. The university research institutes are founded to carry out research of certain directions on the international level.

The university research institute is quite new type of Lithuanian research institutes introduced in 2001 during one of reorganizations of Lithuanian RTD system. In 2001 some of *state research institutes* were renamed to *university research institutes* expecting to encourage collaboration

between universities and research institutes. However, this reorganization was completely formal due to the fact, that university institute conserved their autonomy (they still are independent legal entities). Universities to which they are assigned have only some formal supervision functions.

Other state research establishments are founded to carry out the applied research and experimental development important to the economy and culture and/or to develop the experimental production, to prepare research-based recommendations for enterprises, state and other institutions. The state research establishment is founded by the Government on the proposal of the Ministry of Education and Science considering the proposals of the state institutions concerned.

Private research establishments are founded to solve research tasks of their establishers.

The Law on Research and Studies determines that state research institutes and university research institutes have self-governance enabling them to choose the directions of research and submit them to the Ministry of Education and Science, as well as to define their organizational structure, internal regulations, the number of employees, their rights and commitments, as well as salaries, if there is no other order set by the Government, and to form the self-governance bodies by the order set in their Statutes.

At the moment there are 31 state higher education establishments (15 university-type establishments and 16 colleges) and 19 private higher education establishments (7 university-type establishments and 12 colleges), 17 state research institutes, 18 university research institutes and 10 state research establishments in Lithuania. In addition, various state and public institutions and business entities take part in R&D activities.

Equal opportunities institutions

In 1999 the Office of the Equal Opportunities Ombudsperson was established by the Lithuanian Parliament which is the independent state institution in charge of the supervision and implementing gender equality in Lithuania in general.

In the Ministry of Social Security and Labour there is the Gender Equality Division. The Centre for Equality Advancement and the Women's Issues Information Centre also deal with equal opportunities between men and women. There are no any specific units dealing with gender equal treatment in Lithuanian RTDI system.

Governance and financing of Lithuanian RTDI system

As is set in the regulation of the Ministry of Education and Science it is responsible in formation and implementation of the state RTD policy.

The Department of Science and technologies (consisting of two divisions) is now formatting and implementing RTD policy in the ministry. Until 2006 there was only one half of the Department of Science and Studies engaged in this work.

The lack of human resources (before 2006 – 6 persons, after 2006 – 14 persons) was one of the causes that RTD activity do not became a prestigious and important activity in the state. The whole society and politicians were not convinced that RTD and innovations are the main drivers of economy and guarantee of prosperity. This circumstance could be named as the main reason why RTD funding was and remains so low. Now things are changing, but even new initiatives of politicians intended to promote RTD and Innovation Lithuania are mainly provoked by analogous EU initiatives (like Lisbon strategy) or by reality of being in EU (like the use of EU Structural Funds). In other words, the lack of attention to RTD and Innovation issues in governmental and ministerial level has led to the situation that in Lithuania there are no consistent legal basis even enabling to reform obsolete RTD Innovation system. For example Lithuania still not has created National programmes system and it hinders its participation in ERA-NET projects of national

programmes coordination.

Inadequate attention paid by the Ministry to the EU matters in RTD caused the situation when Lithuania could not use all opportunities of being in EU (including coordination of national programmes, learning by using Open Method of Coordination, participation in pan-European research infrastructures and other projects).

The main tasks of the Department of Science and technologies are:

- formation and implementation of state RTD policy (by preparing drafts of laws and governmental legal acts and by issuing its own legal acts);
- coordination of RTD activity of Lithuanian science and higher education institutions;
- coordination and promoting of international RTD activities.

By implementing the tasks mentioned the Department prepares proposals to Government on financing of RTD activity and participates in preparation of the draft of state budget allocations for RTD activity. The amount of the state budget RTD allocations for research and higher education institution slightly depends on the level and productivity of the research conducted by it. In addition, the methodology of allocation of funds promotes participation in the EU framework programmes, other international programmes, as well as volume of the research conducted according to the contracts with business entities. However, the main amount of allocations depends on the funds allotted in previous years. The methodology of financing was changed several times in last five years, but main principle of institutional funding of RTD activity remained. The institutional RTD funding amounts nearly 90 percent of total state budget allocations for RTD.

The Lithuanian Science and Studies Foundation supports research on the competitive basis. The Foundation promotes complex research projects and interdisciplinary research, supports the RTD carried out according to the contracts with business entities as well as the research carried out under international agreements. The Foundation allots about 10 percent of total state budget allocations for RTD. The Ministry of Education and Science together with the Science Council of Lithuania could recommend to the Foundation how to distribute the funds among different programmes conducted by it.

For formation and implementations of state RTD policy the Ministry of Education and Science executes monitoring of RTD activities financed by the state budget. The Ministry organizes an expert evaluation of the research activities carried out by research and higher education institutions. The data obtained are also used for preparation of draft state budget allocations for RTD activity.

This activity of the Ministry of Education and Science is assisted by the Agency for International Science and Technology Development Programmes in Lithuania and by the Lithuanian Centre for Quality Assessment in Higher Education.

Innovation is not a field which formally is among the responsibilities of the Ministry of Economy, however having in mind its responsibility to ensure the development of Lithuanian economy and its competitiveness in world markets; it is endowed by this responsibility and practically prosecutes all activities related with promotion of innovations. Also it should be noticed that it was no sufficient attention paid to the subject of innovation in the ministry. The lack of human resources could be indicated as well – only one division consisting of only 3 persons is engaged in this field.

Collaboration between both ministries was very weak until 2004 and 2005 where EU Structural Funds support came to Lithuania and Ministry of Economy as leading ministry was engaged in preparation of National Lisbon Strategy Implementation Programme (2005-2008). This could be one of reasons why the relations between research and business in Lithuania are still very weak, business investments in RTD activities are one of the lowest in EU. There is no consistent RTD and Innovation strategy in the state due to the lack of collaboration between given ministries as well as between all ministries. The implementation of Lisbon strategy and especially the

preparation of the Lithuanian Strategy for use of EU 2007-2013 Structural Aid forced at least the present ministries to seek coordinated activity in this important field.

Conclusions

The comparison of the RTD systems of three Baltic States provides the following findings:
In general the RTDI systems of the three Baltic States are organised and function in a similar way. They are determined by common historical heritage and common recent developments.
Some differences in RTDI systems are caused by strategic policy decisions made in the nineties.
After accession to EU the RTDI systems of the three Baltic States are moving to the common European model.
Thus the main gender equality issues in Sciences and High Technologies field mainly could be analysed in the context of a very similar organisational, legal and financial framework of Estonian, Latvian and Lithuanian RTDI systems with regard to some national peculiarities of those systems.

III.4. Overview of work-life balance in Estonia, Latvia and Lithuania

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Introduction

This overview is aimed at providing basic information on family policies, family benefits and gender-related aspects of traditions concerning work-life balance in Estonia, Latvia and Lithuania. The overview is a part of the EU 6th Framework Programme project “Baltic States Network “Women in Sciences and High Technology” (BASNET). It was foreseen to give a general picture of work and family environment in the Baltic States as a framework for consideration of gender equality issues. Distribution of paid and unpaid duties and the complex feedback-type relations between them have strong influence on the participation of women in sciences and high technology field.

Although the situation in Estonia, Latvia and Lithuania is relatively similar, the different development paths taken over the last 15 years have resulted in systems with country-specific features. The following sections look at each of the countries separately, summarizing conclusions follow.

III.4.1. Estonia

The responses by the women researchers interviewed in the BASNET country study (see Appendix 1) clearly demonstrate the importance of the work-life balance issue in Estonia.

Information from the Estonian report to the UN on implementing the Convention on the Elimination of Discrimination Against Women (CEDAW) has been used in this overview, and well as analysis from the 2001 survey “Families with children and national family policy: problems of reconciling professional and family life and their connection with the demographic behaviour of the population”. The survey focused on the situation of women with under 10 year old children in Tallinn on the labour market, and the most frequent obstacles in reconciling work and family life. We also used information published by Estonian Ministry of Social Affairs on their webpage <http://www.sm.ee/>

Child care

In Estonia the Pre-School Child Care Institutions Act says that the city or municipal government must ensure that all children living in its territory have a place in a kindergarten/nursery. Unfortunately about half of local governments cannot fully implement this obligation and many children are held on waiting lists for years. The cost of meals is covered by the parents (some local governments do pay meal costs as well). Other costs are covered by the local government and partly by parents (but no more than 20% of the minimum wage).

Parental benefits

In Estonia, parental benefits are quite generous, partly to encourage women in well-paid employment to have children.

The maternity benefit for working mothers compensates 100% of the mother's previous wage prior and after childbirth, for 140 days in total (+14 days in case of multiple or difficult birth).

The Parental Benefits Act (2004), which aims to compensate for the loss of income due to the raising of a small child and to help in reconciling work and family life, says that a parent can receive the benefit until 455 days have passed from the start of the maternity leave or (in case of a non-working parent) until the child is 14 months old. From year 2008, the duration of parental benefit will be prolonged for 4 additional months. The parental benefit is paid to the working mother after the end of the maternity benefit. As the parents decide, the right to parental benefit may be transferred to the father after 6 months from childbirth.

The amount of the payment is based on the parent's earnings during the previous calendar year and it remains between lower and upper limits, e.g. between 172 and 1382.6 EUR/month for 2007.

After the end of the parental benefit, parents receive substantially smaller child care benefits and allowances depending on the age of the child and the number of children in the family. There exist also family benefits in the form of free time and tax deductions.

Part-time and flexible work

Working practices in Estonia are quite old-fashioned. The norm is inflexible working hours – a considerate employer may be accommodating in certain cases, but the Employment Contracts Act is restrictive. There is no official provision for occasionally working from home, or taking days off if needed for family reasons (e.g. elderly parents). Job-sharing is unknown and part-time work is uncommon.

Based on the results of the survey "Woman, family and work", it can be claimed that women with smaller children have a modern attitude – less than a quarter of them.

(23%) said they would stay at home even if they were sufficiently well off.

Most of the women said that they were willing to continue working but would prefer to work part-time. Among women with higher education, as compared to women with secondary education, there are more who would continue working even when the financial situation of the family would permit them to remain at home.

Stereotypes for women and men

Although in Estonia both women and men participate actively in work life, housework and care of family members still mostly fall under the responsibility of women. An international study of the time budget has shown that women's working day in Estonia along with housework lasts approximately 10.5 hours and men's working day 9 hours.

Women have considerably less free time than men during the entire life curve. Working women who raise children have the least of free time.

Estonian employers stereotypically tend to see women primarily as parents while the same attitude does not extend to men. This, however, has negative consequences for both gender groups. Gender discrimination on the labour market is often related to the more "vulnerable" status of women already during the job-seeking phase, as employers tend to overestimate aspects not related to the job duties of the employee. The existence of a family and children is often associated with the woman's traditional role at home and employers often fear problems that may arise when women try to reconcile their family life and work. Due to such attitudes, women with smaller children often feel that in competition for better jobs children have become an obstacle in access to

employment as well as promotion.

Estonian society magazines and women's magazines often present very stereotypical portraits of women and men, and consequently reinforce and recreate traditional gender roles.

III.4.2. Latvia

State family policy planning is the responsibility of the Ministry of Child and Family and the gender equality policy planning is the responsibility of the Ministry of Welfare.

The Latvian legal system in general corresponds to EU recommendations and international standards. The barriers to increasing the active role of fathers are closely related to general stereotypes, as regards the household duties that should be performed by a man or a woman.

Child care

The Ministry of Education and Science is responsible for the policy of preschool education – the development and accreditation of preschool programmes, education of preschool teachers. Child care principles and funding of child care is a responsibility and a function of local governments, and not a state function. Local governments are responsible for the organization of child care and preschool education in kindergartens.

The municipality decides the working hours of kindergartens, and usually the working hours are 8.00 – 19.00. Kindergartens are closed on weekends. Parents have to pay for meals at the municipal kindergartens. Fees in private kindergartens are high.

The number of kindergartens in Latvia has decreased since 1992, and only a few have been built during the last decade. Around 60% of children attend kindergartens. In 2006, there was a waiting list about 15 000 children willing to attend kindergartens. The attendance rate is 40% for 2-year-olds.

According to legislation all children aged 5-6 have compulsory preparation for school. At that age attendance in preschool education is obligatory and attendance rate is 95%. Preschool education for 5-6-year-olds is organized in kindergartens, schools, hobby education centres, etc. Children who do not attend kindergarten go to preschool education twice a week for a few hours.

The Ministry of Child and Family supports the establishment of child game and development centres, where parents may leave their children for a shorter time – up to 4 hours. There are some enterprises that have established child centres, for example, GE Money, Latvian TV. The University of Latvia has established a “child room”, where children aged 2-7 years may stay for up to 3.5 hours per day.

Parental benefits

In accordance with the Law on Social Allowances, a *childbirth allowance* is granted to one of the parents or person who has taken custody of a child under the age of 1. In accordance with the Law on Social Allowances, a *child care allowance* is awarded to a person who takes care of a child until he/she reaches one year. There is another kind of allowance – “*family state allowance*”. This allowance is awarded to one parent or custodian who takes care of a child, who is younger than 15 years or who is older than 15 and still in education, but only up to the age of 20 or marriage. The family state allowance depends on the number of children in the family.

Each of the allowances awarded by the state – child birth allowance, child care allowance and family state allowance – is awarded to one parent: a mother or a father.

Part-time and flexible work

The possibility to work flexible working hours is defined by the Labour Law. This possibility can be used by both the father and mother. The employer can determine a flexible beginning and end of the working day in accordance with the needs of both sides. An employer has to define part-time working hours if it is requested by an expectant mother, a woman on a post-birth vacation or during the period when a woman is breast feeding. A part-time job must be granted to employees who have a child younger than 14 or a disabled child under 18. In all other cases there has to be an agreement between employer and employee. The Labour Law says that an employee has a duty to do the job at the office unless the parties have agreed differently. Therefore, distance-working is possible, supporting the reconciliation of work and family life.

Stereotypes for women and men

The traditional association of women with the responsibilities of child care is gradually changing. However, there is another trend – increasing public opinion that women can successfully reconcile child care functions with entrepreneurship, politics, academia, and also participate in professions where women have been less represented. Nevertheless, because of public disapproval, women may not retreat fully from the function of the main child-carer or fulfil this function unsatisfactorily.

There is no fundamental difference with the communist period when women had a double burden. The profile of out-of family duties has changed. When analyzing father participation in child care, one cannot see a serious trend, but there are some signs that testify to the higher involvement of fathers in child care. Starting from 2002, fathers may use a 10-day vacation, which has to be taken during the two months after the child's birth. It has been facilitated by the introduction of an allowance for the father of a child in 2004. In 2006, about 30% of new fathers used the allowance. However, time use surveys show that the proportion of time use for child care is the same as in 1996 – women spend twice as much time on child care as do men.

During the last decade a new image of a father has developed. However, it is difficult to say how deep these changes go because there are still strong stereotypes concerning gender roles and family/work. Survey data show that 79% of respondents think that a good father is one who spends a lot of time together with his family. Only 6% say that a good father is a father who works hard to earn money to provide for his family. However, the majority of respondents said that they had started to work more after the child was born. Survey data show that men try to use every state-offered opportunity to reconcile work and family life.

The Ministry emphasizes that gender stereotypes start to develop in the family, kindergarten and school.

III.4.3. Lithuania

Child care

According to the Law on Local Government, most of the pre-school and education institutions are subject to local municipalities. There are about 660 pre-school education institutions in Lithuania. According to the provisions of the Hygiene Norm approved by the Ministry of Health, children are usually taken to such institutions when they are 0 till 6-7 years old. As the government provides working parents with good social guarantees until a child is one year old, children usually start attending nurseries at 12-18 months.

Part of the costs for the child care at kindergartens/nurseries is covered by the parents. The meal

costs are fully covered by the parents. Certain categories of families (students, families with 3 or more children, welfare recipients, etc.) have to pay half the cost or they pay nothing. The usual working hours at a kindergarten are 7 am to 6 pm. There are groups with prolonged working hours in kindergartens, and after-school care groups in elementary schools. Private kindergartens are not supported by the state. They can only be provided with premises for that purpose.

Parental benefits

In Lithuania, women have maternity leave of 70 calendar days before birth and 56 calendar days after delivery. During this, working women receive a payment equal to 100 per cent of their average monthly salary. Until the child is 12 months one of the working parents receives a child care allowance that is equal to 100 per cent of his/her salary, and from 12 to 24 months the allowance of 85 per cent of his/her salary is paid. A person who takes care of a child (mother, father, grandparent or a caregiver) receives income support until the child is 12 years old. Families with 3 or more children are covered by a different payment system.

Since July 2006, a father can take parental leave and receives 100 per cent payment until the child is one month of age. By the end of 2006, 3085 fathers had made use of such a leave.

Other issues

It is provided in the Lithuanian law that breast-feeding mothers can breast-feed their babies in their places of employment. No information could be found on mother and childcare rooms in places of employment. However, the issue of mother and childcare rooms being set up in supermarkets and other public places has been widely discussed recently, and some such places do already exist.

According to the Employment Code, in families with two children under 12 years of age, both parents are given one day off per month or their working hours are 8 hours shorter during a month. Families with three children under 12 have two days off. Legislation provides that an employee, having agreed with the employer, can have a shorter working day. There are no legal acts that oblige employers to shorten working hours or provide employees with a possibility to work at home for family reasons.

In Lithuania, only few workers work part-time.

In 2006, 20 projects were carried out by women's non-governmental organizations with support from the European Social Fund. The aim of these projects was to stimulate the employment of women, particularly of older women and those wishing to return to work after parental leave.

Conclusions

In examining the issue of why so few women make it to the top positions in academia and research – and in proposing ways to change the situation – the role of the family, and the need to balance the demands of family and work, holds vital importance.

Examination of the work-life situation in the three Baltic states results in the following generalisations:

- the countries share a common Soviet past but have developed their own policies since independence was restored in 1990/1991.
- they have been members of the EU since 2004 and have thus adopted, to a varying degree, EU-wide social policies
- there is a reasonable provision of child care
- parental benefits range from the modest to quite generous

- part-time work and flexible working arrangements are rare
- traditional and stereotypical gender roles mean that women still bear primary responsibility for home and family.

IV. BASNET tools for collaboration between women scientists in the Baltic States region

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One work package of the BASNET project was devoted to the creation of the Baltic States **Women in Sciences and HT** information and monitoring systems. The main objectives of this issue were to establish the **internet portal** on Women in EXS and HT field in the Baltic States and create the Baltic States **Data Bases of Women in Sciences and HT** and Electronic Newsletter “Women in Sciences in the Baltic States”. For the needs of the project it was also expected to have the dynamic WEB site. The **MI** group responsible for implementation of this task was formed of both IT specialists as well as the representatives of women scientists and experts for creation of **Women in Sciences and HT data bases**.

To clarify the steps of the establishment of the internet portal “Women in Sciences in the Baltic States” some points of the process were distinguished:

- Inception Phase
 1. Analysis
 2. New indicators and methodology
 3. Drafting of information system
 4. Selection of hardware and software
- Pilot project
 1. Providing for the hardware and software as well as network equipment, designing and implementation of technical system
 2. Ensuring of security and performance of the information system
 3. Creation of required databases
 4. Foreseeing of document’s management
 5. Conception and specification of the main goals for Web-services in the project: dividing between working and public areas of these services, drafting the entity of requirements for the portal
 6. Conception and specification of the Web-services and the management of software maintenance after operation has begun (hot fix control, release planning, etc.)
 7. Programming of portal
 8. Graphic design of portal
 9. Development of software applications
- Extending the system (tested for one region) to the whole project
- Maintenance and training
 1. Quality management of the Web-service including progress control, reviews and acceptance of the software deliveries
 2. On-going site management including also the editorial management of the Web-site contents and data collection

Training of inner-system users (data collectors, redactors, analysts...)

The establishment and maintenance of the periodical Electronic News letter “Women in Sciences in the Baltic States”

Two first steps of the establishment of the internet portal “Women in Sciences in the Baltic States” and DB (Inception Phase and Pilot project Phase) spans in the 2006 year. The next two -

Extending the system (tested for one region) to the whole project and Maintenance and training were foreseen and updated the next (year 2007) period.

The functions of the BASNET web portal, database, communities' support and other web tools are intended: to be:

- the backbone for the communities; to provide aggregated data for the mapping of competencies of women-scientists; to create tools for partner search; to create tools to animate the project network; to create tools for project management; to create tools for project related database analysis.

The draft of information system related to the project and selection of hardware and software was created on the basis of the proposed data basis content and questionnaire. The structure of data bases are show in fig. 1.

The public part of data base BASNET "Women in science and high technology" was created for the communities providing aggregated data for the mapping of competencies of women-scientists and as tools for partner search. It allows searching partners by name, country and/ or trends of science. There are also possibilities to do combinative searching. The fields that are visible in the public part are:

- Occupation and science degree;
- Publication list;
- Contact addresses;

The Non Public part of the data base BASNET "Women in sciences and high technology" consists of information with asterisk, which might be used for sociological study. The connection of public database descriptors with non-public database descriptors is in one direction. Names are not used for monitoring. Information with asterisk helps to show influences of age, academic environment, family and social status to the creativity and carrier of women's in science and HT. All this research may be divided according to different regions, universities, fields of activity, home countries and etc. It is possible to get information out of the answers of the questionnaire.

The data collection and storing in the database was started by filling the approved questionnaire form online, which allows to access the database fill-in form and its updated pages (available only for private users, where each user can modify only her proper data). BASNET questionnaire is registered in Lithuanian Governmental Data Security Inspection on 05.07.2006. Registration number is NR-510 (9.2).

The principle for the data collection is: the information, which is used, comes out of the public parts of the questionnaire (or other public databases). Respondents are informed about BASNET project aims via e-mail. They get a personal message and password. After that, respondent can start filling the questionnaire. The only person who can modify (edit) information is a respondent, who has her own personal password. All data is filled and collected online.

The BASNET portal is presented <http://www.basnet-fp6.eu/>. The BASNET website is oriented to project partners. It is also available for public and society. To begin with, there is a description of the BASNET project at the first page. This helps website visitors to know more about the project, to find out the exact aims of it. Secondly, there are posted short reviews of every cluster - BASNET partners' meetings. Listed main goals of every meeting let visitors to know what subjects were discussed, even if the partner could not take part at the meeting. Moreover, all the necessary and important documents, placed on the website, make BASNET webpage more useful - partners can find all the information they need.

On the website women can register and fill the BASNET questionnaire.

Finally, both electronic newsletters "Women in Sciences and HT in the Baltic States" are published on the webpage, so everyone can download or read the newsletters online.

On the next stage of the implementation of WP4 the system, tested for one region, was extended to the whole project.

As the last step was defined the maintenance and training revealing itself in:

- Quality management of the Web-service including progress control, reviews and acceptance of the software deliveries,
- On-going site management including also the editorial management of the Web-site contents.
- Training of inner-system users (data collectors, redactors and analysts)
- The establishment and maintenance of the periodical Electronic News letter “Women in Sciences in the Baltic States”

All participating countries were assisted in establishing the periodical Electronic News letter “Women in Sciences in the Baltic States”. The first BASNET newsletter was issued on March, 2007.

One of the main goals of BASNET newsletter was to open wide discussion within the scientific society on gender differences allowing to clear problems and ensure real equality in all fields of scientific activity as well as in decision making process on different levels of science policy and its management.

Readers were informed about BASNET events and actions as well as articles of women – scientists from other countries dealing with gender in sciences issuers. The announcements of professional and women in science conferences were posted in the first newsletter as well.

Women were asked to register in BASNET database. There was explained that it helps women to become more visible in the scientific community, easier to find colleagues for fruitful scientific collaboration as well as to be involved in solving problems arising for women – scientists.

The second BASNET newsletter was issued on September, 2007. There was written that some steps already were made to make international contacts with European professional women organizations. In April, 2007 BASNET became the full conditional member of prestigious European organization -

European Platform of Women Scientists (EPWS). The membership in EPWS gave an opportunity to participate in formation of the European Union Science policy. BASNET participants were invited again to be more active in solving their problems.

ISBN 978-9986-885-11-5



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