



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

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Meta-analysis of gender and science research [www.genderandscience.org](http://www.genderandscience.org)



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

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

The objectives of the study were to:

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

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

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

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

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

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

## Executive summary

This is the Nordic country group report of the project 'Meta-analysis of Gender and Science Research', 7th RTD Framework Programme of the European Union (contract no.: RTD-PP-L4-2007-1). This report presents the Nordic country part of the project's European country groups. Other country groups are the Southern, Anglo-Saxon, Eastern and Continental countries. The aim of this report is to describe and analyse the specific characteristics, if they exist, of the Nordic countries' challenging and monitoring of equality issues in science.

*The first part* of this report gives a state-of-the-art account of Nordic policies and practices in science. It provides a literature review of comparative studies covering European countries and Nordic countries that enhance our understanding of what characterizes and explains science policies and practices in the latter country group. There is relatively little comparative research on the European or Nordic level on gender and science issues and thus the comparative reports used here are mainly those written for European Union funded projects. In addition, we searched databases of scientific literature to find relevant comparative literature. The basic objective of this part is to help understand the Nordic countries as a special political entity representing the Nordic welfare state model. Such a model is expected to create its own research policies and institutional structures of research. One specific aim is to determine whether there have been any developments in gender studies and women's participation in science that are peculiar to Nordic institutions. In addition, the central policies for the promotion of gender equality in research are studied. Finally the general trends in gender segregation in science in the Nordic countries are assessed.

*The second part* is based on analyses derived from the European Gender and Science Meta-Database (GSD). The database consists of all relevant scientific publications related to gender and science issues in Europe. Each publication entered into the database by a national correspondent consists of several information fields—detailed bibliographical information, English abstract, methodological approaches, geographical coverage and relation to database topics. The report is divided into the database and meta-research topics, namely: 1) horizontal and vertical segregation, 2) pay and funding, 3) stereotypes and identity, 4) science as a labour activity, 5) Scientific excellence, 6) gender in research contents and 7) gender equality policies. Detailed information about the project methodology, the database structure and the topics can be found on the Web at: [http://www.genderandscience.org/doc/META\\_methodology.pdf](http://www.genderandscience.org/doc/META_methodology.pdf).

The analyses of the second part involved reading through all the Nordic GSD entries and their abstracts; subsequently, the most informative publications were selected for further analysis. In this phase, GSD entries were coded by country, year of publication, research questions and findings. After coding, the retrieval process was used to group and organize the entries for the analysis and writing process. By using this coding and retrieval process it was possible to organize these disjointed entries in a more systematic and reportable way.

Publishing activities and research approaches in the GSD were identified using a quantitative database search facility. Each social science correspondent has entered into the database form the research qualities related to one publication. These single inputs form one area for database searches. When reading the database tables, it should be noted that there might be more than one characteristic per publication. For example, there could be multiple research methodologies used simultaneously in one publication. This means that the columns or the rows of the tables usually exceed 100%.

The Nordic country reports<sup>1</sup> were used as a source when appropriate information was missing from the entries or when more detailed country-specific information was available and needed. This was especially the case when working on the concluding paragraphs.

The report shows that there are specific Nordic welfare state policies with an impact on a larger societal level as well as on the research sector. The general Nordic welfare state ideal of social equality is the general aim of the educational system and finally of higher education as well. The Nordic paradox is that despite the ideal of equality, clear gender segregation exists in science. This is reinforced and affected by the strongly horizontally-segregated labour markets.

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<sup>1</sup> See <http://www.genderandscience.org/web/reports.php>

**Table of Contents**

<b>1. Introduction</b>	<b>1</b>
1.1 The general background of the Nordic countries and societies	1
1.2 Research policies and institutional structure of the research	2
1.3 Institutional development of gender studies and women's participation in science	5
1.4 Institutional structure of gender and science	10
1.4.1 Policies of promoting gender equality in the universities	11
1.4.2 The Nordic gender studies	12
1.5 Central policies and research trends of gender and science	20
1.6 Gender segregation in science generally	28
1.7 The extent and quality of gender and science policy – a general assessment	32
<b>2. Analysis by topics</b>	<b>34</b>
2.1. Horizontal and vertical segregation	39
2.1.1 Research questions	42
2.1.2 Research approaches	43
2.1.3 Findings	45
2.1.4 Gaps	52
2.2. Pay and funding	53
2.2.1 Research questions	54
2.2.2 Research approaches	54
2.2.3 Findings	56
2.2.4 Gaps	58
2.3. Stereotypes and identity	59
2.3.1 Research questions	61
2.3.2 Research approaches	62
2.3.3 Findings	64
2.3.4 Gaps	74
2.4. Science as a labour activity	75
2.4.1 Research questions	76
2.4.2 Research approaches	77
2.4.3 Findings	78
2.4.4 Gaps	82
2.5. Scientific excellence	83
2.5.1 Research questions	85
2.5.2 Research approaches	86
2.5.3 Findings	87
2.5.4 Gaps	90
2.6. Gender in research contents	90
2.6.1 Research questions	92
2.6.2 Research approaches	93
2.6.3 Findings	94
2.6.4 Gaps	100
2.7. Gender equality policies in science	101
2.7.1 Research questions	102
2.7.2 Research approaches	103
2.7.3 Findings	105
2.7.4 Gaps	111
<b>3. Conclusions</b>	<b>112</b>
<b>4. Selected literature</b>	<b>116</b>
<b>5. Annex</b>	<b>143</b>
5.1 Horizontal and vertical segregation	143
5.2 Pay and funding	144
5.3 Stereotypes and identities	145
5.4 Science as a labour activity	151
5.5 Scientific excellence	155
5.6 Gender in research contents	157
5.7. Gender equality policies	160

# 1. Introduction

## 1.1 The general background of the Nordic countries and societies

The Nordic countries represent societies of proclaimed equality in fields of not only social but also gender issues. The Nordic welfare states are manifestations of strong state-guided public policies guaranteeing universal (similar) services, benefits and treatment to all its citizens in order to achieve general equality. This is especially true for income distribution measures but also for education, social services and (at least formally) gender equality issues. The Nordic countries seem to have achieved a stable institutional basis for the promotion of gender equality as well as of equality in other areas: parliamentary democracy, equal constitutional rights for every citizen, and a well-functioning, mainly state-financed social security and service system, which also functions in the modern global market economy. We can also suppose the Nordic countries to be forerunners of gender equality—for example, Finland was the first country in Europe to grant women the right to vote (in 1906) and to become electoral candidates, followed by Norway in 1913, Denmark in 1915, Iceland in 1918, and Sweden in 1919. When in the presidential election of 2000 the gender distribution at the top of the political hierarchy was changed, Finland was the first European country to have a woman president and, later, prime minister<sup>2</sup> (Kurki et al. 2001, 1) However, this proclaimed equality can be a problem too. It is easy to disregard the less visible underlying problems when everyone is believed to be equal and treated fairly. In the worst cases, the universal equality orientation of public policies can even lead to the neglect of specific gender equality issues (Kuronen et al. 2004).

The common—at least rhetorical- goal for all the Nordic countries is the idea of gender mainstreaming, which means a proclaimed systematic integration of gender equality into all policies, legislation, programmes and organizations. The term “state feminism” has been applied in the Nordic countries to refer to the situation in which the state becomes the main driving force towards gender equality, including equality as a goal in laws and regulations for society at large (Gulbrandsen 2001, 1). Gender equality is no longer considered exclusively a women’s issue; it is seen as a policy area affecting all citizens and requiring the active efforts of both women and men. Equality between women and men must be considered in all decision-making bodies and at all levels. The Nordic countries in particular have announced the use of gender mainstreaming as an integrated approach to gender equality in all policy fields. Few countries apart from the Nordic ones have legislation to ensure gender balance in public bodies such as funding councils and science policy administrations. Some also insist upon a gender balance on the academic and scientific committees of universities and research institutes. The Helsinki Group of Women claim that the Nordic countries have been at the forefront in applying gender mainstreaming in the field of women and science. Legislation has, for example, ensured a gender balance on academic and scientific committees (Rees et al. 2002 and European Commission 2008).

The national policies on gender equality vary across Europe and are affected by the general gender-equality policy framework. The Nordic countries are assumed to be leading in gender equality issues, as they have repeatedly achieved the smallest overall gender gap in global and European comparisons. In the Nordic countries, gender equality is embedded in society; it has been visibly and continuously on the political and societal agenda since the 1970s and, later, on that of the higher education sector since the early 1980s. The promotion of women in science was commissioned earlier in the Nordic countries than in other European countries and various support and coordinating actions have been funded at the national level since the late 1970s/early 1980s. The issue of gender equality in research has been a part of the higher education and science policy agenda since then. For example, there is legislation in the Nordic countries on gender balance and gender quotas for public committees. This also affects the gender composition of the boards of national research funding organizations and research institutions (European Commission 2008, 18-19).

There are several gender equality-related policies in the Nordic countries. In the legislation, there are Acts on Equality Between Women and Men (Finland 1987/2005, Denmark 2002, Sweden 1992/2001, Iceland 2000,

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<sup>2</sup> Norway: Gro Harlem Brundtland (a woman) was a cabinet member from 1974. She was elected prime minister for the first time in 1981 and in the period from 1981 to 1996, held that office for a total of 10 years. In 1986, 44% of the government were women (above 40% for the first time).

Norway 1978/2005). These Acts establish a quota for the minority sex in governmental institutions and are aimed at preventing gender discrimination, promoting equality and improving women's position in working life. In compliance with these Acts, there are the Offices of the Equal Opportunities Ombudsmen, responsible for the enforcement and promotion of anti-discriminatory policies and practices (Finland, Sweden and Norway). In addition, parental leaves are long in comparison to other countries and this affects women's opportunities to participate in working life, including research (Ruest-Archambault et al. 2008).

Rees et al. (2002, 6, 14) state that many countries have institutionalized positive action measures to support women in their scientific work. 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. Only a few countries have experimented with earmarking academic chairs, research funds and prizes for women in science. Some countries are using gender mainstreaming tools in order to embed gender equality into the systems and structures of science and scientific careers. Gender mainstreaming is the systematic integration of gender equality into all policies and programmes, and into organizations and their cultures. Gender mainstreaming tools in this context too include legislation, gendered budgets, the use of sex-disaggregated statistics, the development of gender studies, awareness raising and equality training. The gender mainstreaming experts plan and advise on policies and practices and do gender impact assessments to monitor and evaluate these policies. Gender studies and gender mainstreaming experts are crucial during the process of visioning.

All Nordic countries are politically committed to gender mainstreaming through their governments (=state feminism). In practice, this means that public authorities seek to promote gender equality in all planning and administration and on all levels. This applies to the primary, secondary and university education sectors as well. Moreover, there are many development initiatives, information services, mentoring activities and support networks related to gender equality issues (Ruest-Archambault et al. 2008). The Helsinki Group Sweden (2001) conclude that gender mainstreaming will affect all political and administrative decision-making processes. This work and its strategy have been in process and developing in Sweden since 1996 on the national, regional and local levels.

## 1.2 Research policies and institutional structure of the research

It can be argued that the Nordic countries have a unique educational system, as it is to a greater extent than in other countries integrated with state policies on issues such as social support, citizenship and equality. According to Telhauga et al. (2006), the Nordic school model has developed in three stages. The "classical period" from 1945 until about 1970 is often referred to as the golden era of social democracy, when reforms were introduced on the basis of national policies drawn up by the state in association with business organizations and industry. The main objective was to involve the unitary school system in the attainment of such social goals as equal opportunity and community fellowship. This has made the schools an important arena for fighting against inequalities, not only in terms of gender, but also of economic or social background etc. The Nordic countries generally followed the same course, but at different tempos, with Sweden being the main source of inspiration. During the next phase, 1970–1985, the Nordic model was influenced by new international political radicalism. At that time, increasing importance was attached to students' individual emancipation, and there was a greater local influence on school system development as well as influence exerted by the teaching profession. In the third and final phase, the Nordic school model lost its importance in comparison to other countries. Technical and instrumental goals were given priority at the expense of national and social unity. The Nordic model of higher education was especially affected by the neoliberal market orientation and its values.

Although one cannot say that there exists a single unitary Nordic model of higher education, there are many similarities between the universities and high schools in the Nordic countries. First, they have expanded during the development of the welfare state and have become more non-elitist, recruiting students from a wider range of social groups. Nordic women entered higher education earlier than in other countries. Most of the universities have been administrated by the (welfare) state, which has guaranteed their financial independence and autonomy. One consequence is a policy of free education--studies at most of the universities and high schools are free of charge. Secondly, higher education in the Nordic countries is often an integrated part of public policies and their development. The educational system supports the implementation of public policies by educating professionals and providing the information and knowledge

needed to put the policies into practice. The ideology of the welfare state has been present in many of the disciplines of the Nordic universities, as in social sciences, life sciences and education. Many of the professionals were women from these disciplines. In Finland and Sweden, a regional policy aspect has also been important in the development of the educational system. The ideology of the welfare state with its orientation towards universality and equality has played a role in the establishment and ongoing support of gender studies in the universities.

Higher education is now moving towards a more liberal economic orientation and towards market adjustment mechanisms. This means productivity controls, research assessment procedures and the creation of funding markets instead of direct state funding. It also means the benchmarking and ranking of research institutions and of the research itself. State policies as guiding mechanisms are moving towards productivity and quality assessments and institutional competition in these fields. This will represent a considerable challenge for gender equality in science because markets and competition as a guiding principle do not necessarily involve equality issues of scientific workers and social aspects of scientific results. Another source of change is the Bologna Process involving the harmonization of European credit and examination systems. The Nordic countries also signed the “Reykjavik Declaration” in 2004. It describes the mutual recognition of higher education qualifications among Nordic countries and channels for the exchange of information and experience. Another “Reykjavik Declaration” task is to address the issues of adapting credit point and grading scale systems to the European Credit Transfer System (ECTS) (CHEPS 2005, 43-44).

With regard to higher education, there are twenty universities in *Finland*, ten of which are multi-faculty institutions and ten of which are specialist institutions (Kurki et al. 2001, 2). In *Denmark*, at the beginning of the 2000s, there were 11 independent universities and approximately 45 government research institutions (Reuss and Madsen 2000). In 2007, most of the universities and some research institutions were merged into six universities, while two universities were kept out of the merger (European Commission 2008, 93). *Norway* has six accredited universities, six accredited specialized university institutions, 25 accredited university colleges, two accredited national colleges of the arts and 29 private institutions of higher education with either institutional or programme accreditation<sup>3</sup>. *The University of Iceland* was established in 1911 and is the largest. It is organized into 5 academic schools and 25 faculties. Reykjavik University is the second largest in Iceland and one of its major roles is to enhance the competitiveness of the Icelandic business and technology communities.<sup>4</sup> In *Sweden* there are 42 universities and university colleges (15 universities, 20 university colleges and 7 university colleges of art) (Johansson 2006). Elected bodies at all levels usually govern the Nordic universities. The laws regulating the universities have given them the right to allocate funds internally, as well as to hire staff. It is typical too, that the public research sector has direct basic funding from the state and from a number of other research funding sources.

Nordic higher education is steered by the relevant ministries of each country, such as ministries of education and science or of culture and science. Under these ministries is the national research council responsible for the public funding of higher research, which is granted in addition to the direct state funding of the universities. In *Iceland* the *Science and Technology Policy Council* (STPC) established in 2003 is chaired by the Prime Minister (PM). The members of the council consist of the relevant ministers, university rectors and social partners (Guðmundsson 2008, 3). The Icelandic Centre for Research (RANNIS) monitors and analyses resource allocation and performance of R&D. *The Academy of Finland* has its Board and four Research Councils and annually issues funding decisions worth about EUR 280 million, 16% of the total government R&D spending (European Commission 2008, 96). The public research funding system of *Denmark* was changed in 2003 from six councils to four different lines of research funding (European Commission 2008, 93). The Swedish Research Council has 140 employees and the members of the scientific councils are from the scientific community and peer review groups, engaging about 400 people. There are other scientific committees involving 300 people in Sweden and about 200 external experts both from Sweden and from abroad<sup>5</sup>. (Johansson 2006).

<sup>3</sup> see e.g. <http://www.studyinnorway.no/sn/Education-system>, different calculation <http://www.nokut.no/no/Norsk-utdanning/Universitet-og-hogskole/Akkreditering/Akkreditererte-institusjonar/>

<sup>4</sup> <http://www.iceland.is/people-and-society/EducationResearch/HigherEducationIceland/>

<sup>5</sup> It is important to note that one of the key research and science institutions of social science and equality research in Sweden was Arbetslivsinstitutet (The Working Life Institute). It was active between 1995 and 2007 and was finally closed by the Swedish government as a budgetary decision.

Typically, the research councils (in Iceland the Icelandic Research Fund) provide key research-policy input to the government and are the main allocators and evaluators of higher research funding. The activities and strategic efforts of the councils are primarily based on the guidelines established for national and EU research policy.<sup>6</sup> The research councils can initiate different types of specific research programmes, funding instruments and positive measures; an example is Norway's Centres of Excellence (CoE) scheme, whose intention is to bring more researchers and research groups up to a high international standard.<sup>7</sup> In addition to CoE's, there are Centres for Research-based Innovation (SFI) in Norway. Their task (as in the other Nordic countries S.R.) is to build up and strengthen Norwegian research groups working in close collaboration with partners from innovative industry and innovative public enterprises.<sup>8</sup> The search for product innovation is the line that research funding has been directed towards of late. The gender perspective of the research councils is seen in the gender quotas on the governing bodies and the financing of the research.

The Nordic countries are known for the high intensity of their research in technology and in the business enterprise sector. R&D expenditure is especially high in Sweden (3.9% of GDP) and Finland (3.5%), the highest in the OECD<sup>9</sup>. In Finland business enterprises currently account for 70% of the R&D expenditure and this is due mainly to the electronics industry (Nokia). In Sweden private companies accounted for almost three quarters of the total volume of R&D in 2005, corresponding to about EUR 8300 million (note: the population of Sweden is 9 million) (European Commission 2008, 124-125 and Prometea 2006, 48). The problem from the perspective of the Meta-analysis of Gender and Science is that this intensity of research in the private sector does not appear in the GSD publications, but is hidden within the companies.

Specific changes related to higher education are currently being discussed. Denmark has been active in reforming its research system since 2003, when the new University Act was passed in Parliament. This Act recognized Danish universities as self-governing institutions and also stressed the quality assurance of universities and research; all the universities must have an internal quality assurance system. By virtue of *the government research institute reform* the institutions became independent of their ministries; however their research is to be evaluated continuously based on uniform and independent principles. Public research funds--in addition to the institutions' basic grants--are to be distributed in open competition. Government research must be well founded and should not distort competition. The *reform of the research council system* created two research councils in place of the previous six. The first is based on bottom-up ideas from the research community and the other on top-down political priorities. A common characteristic of the two councils is the principle of promoting diversity and quality through open competition based on independent quality evaluation (CHEPS 2005, 18-19).

The Finnish university system is changing and moving towards the Danish model of self-government, the economic independence of universities and the assessment of productivity and results. In the case of Finland, the main results of the universities are the production of Master's and Doctoral degrees and high-level international publications. The basis for the governmental steering of higher education is the performance agreements entered into between the Ministry of Education and the individual universities and polytechnics. There are performance monitoring systems for these agreements, notably the KOTA and AMKOTA databases (CHEPS 2005, 23-24). In Norway as well, we are seeing a move towards "productivity" at universities--the counting of ECTS and academic publications. The use of bibliometric measures is currently under debate, and this also brings new challenges to the goals of gender equality in academia.

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The institutional structure of Nordic higher education and research is changing rapidly. Behind this change are the globalization and market liberalization of the Nordic economies. The basic model in research has historically involved direct state funding of universities and high schools and sectorally-divided research in

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<sup>6</sup> see <http://www.rcn.no/en/Policy+platform/1185261825589> and Johansson (2006)

<sup>7</sup> <http://www.forskningsradet.no/servlet/Satellite?c=Page&cid=1224067001813&p=1224067001813&pagename=sff%2FHo vedsidemaal>

<sup>8</sup> <http://www.forskningsradet.no/servlet/Satellite?c=Page&cid=1224067021109&p=1224067021109&pagename=sfi%2FHo vedsidemaal>

<sup>9</sup> R&D expenditure per GDP of the other countries: Iceland 2.78%, Denmark 2.43% and Norway 1.5% (Eurostat Statistics in Focus 91/2008)

technology and innovation in public institutions. The Nordic countries are research intensive in both the area of public policy and that of private business R&D. The research structure is well developed, geographically extensive and open to all citizens having the required skills to study and work. Direct state funding and science policies have allowed the development of disciplines focusing especially on social and equality issues. Now the move towards a more liberal market model means the introduction of external evaluation of research and growing competition for research funding. This trend will represent a great challenge for the Nordic welfare state model and its policies of universal public services and equality. The state-funded open and free higher education sector has been the main source of research in the Nordic countries. Education and research have been closely connected with the socially-orientated “Nordic model” aiming at equalizing opportunities across social groups. However, these underlying values are being challenged by the greater emphasis on economic autonomy, external evaluation and market competition for research funding. A comparison of the research orientations of the various Nordic countries shows that:

- In Iceland, research is more directly funded by the state than in the other countries. The university and high school sector is relatively young and orientated towards supporting the economy and specific branches of the economy. The research sector is small in absolute numbers due to the country’s small population.
- Denmark has been a forerunner in the liberalization of public research and higher education.
- In Norway, there is a clear connection between industry and the publicly funded research.
- In Finland and Sweden, research in the business sector is strong and carried out by private companies and through the R&D actions of private export industries. In both countries, the regional development aspect is important in implementing and developing higher education policies.

### **1.3 Institutional development of gender studies and women’s participation in science**

#### Main trends and shifts

The history of women’s participation in science in the Nordic countries must be viewed in relation to the political and professional emancipation of women and the development of the welfare state. Since the 1970s, the women’s movement has not only focused on shaping women’s position in society but also on the development of the education and research sector. Collective actions and projects initiated by women’s groups inside and outside academia have been the basis for the establishment of women’s and, later, gender studies at several Nordic universities. The publication of academic journals focusing on women’s and gender issues is a common feature across the Nordic countries. The Nordic higher education sector has been a good home for studies orientated towards welfare, social and equality questions. The connection between the ideology of the welfare state and research has been crucial in the implementation of social policies and equality measures.

During the 1980s, women entered universities in increasing numbers in all Nordic countries and attained higher and more influential posts than ever before, although their number was relatively small at first. The social sciences especially expanded in the universities and now for the first time it was possible for women to obtain posts as social science professors in greater numbers. Their interests were to found women’s studies as an academic discipline and an epistemological principle for the other scientific disciplines. Women’s study units, centres and associations were established. This development was inspired by Anglo-American first wave scientific feminism, which emphasized women’s own subjective experiences and was critical of male oppression and power structures. (See, for example, Ruoho 1990 and Saarinen 1992)

The Nordic universality of social policies and the public state-funded university system that have provided higher education free of charge constructed a favourable environment for the development not only of women’s studies (later gender studies), but also of feminist contents and epistemology in the other disciplines. Gender has become an important scientific concept identifying power structures, values, roles and other aspects distinguishing social gender from biological sex. The starting point of this research was an

analytical distinction between physical and cultural aspects of sex. First-wave scientific feminism was related to women's studies by fostering it as a scientific discipline of social sciences often with close connections to the women's movement. Moreover, feminism has affected the institutional and theoretical structure of later Nordic gender studies. During the 1990s, professorships were earmarked for women in Denmark, Finland and Sweden as a way to speed up efforts to increase the proportion of female university professors. The scope of gender research also broadened to include the importance of gender in all relevant spheres of life. Hence, gender studies have been given several different names/terms such as women's studies, gender research (both empirical and theoretical), feminist research, men's studies, masculinity studies, queer studies and research on sexuality. These terms reflect the rapid development of gender equality research in various academic fields and topics. The main trend has been the evolution of feminist women's studies into the conceptually broader gender studies.

Women's studies has traditionally focused on how women can affect mainstream science and disciplines by highlighting women's subjective experiences and by opposition to male dominance. What difference does women's perspective make to traditional scientific thinking and to institutional structures? How can women be made visible in some fields while opposing the traditionally-maintained masculine values of science? Naistutkimustyöryhmä<sup>10</sup> (1990) of the Academy of Finland noted that women's studies is multidisciplinary, that it brings to the fore the gender dimension and calls into question the traditional concepts of science. On the international level, women's studies is present in all Western countries and is usually organized around Centres or Units for Women's Studies. The forerunner of women's studies was the USA, where the institutionalization of the discipline has taken place over the last 15 to 20 years.

The Finnish Council of Gender Equality (Tasa-arvoasiain neuvottelukunta 2006) states that in Finland women's studies has been closely associated with statutory national equality support work. One of the main tasks has been to support women's status and gender equality work in Finnish universities. Later, this type of gendering of science affected areas such as queer research and men's studies, especially in *Sweden* and *Finland*. This development has been a part of second wave scientific feminism born in the late 1990s that has directed gender research towards questions of the body and sexuality as a cultural and subjective phenomenon. In addition to feminist/women's studies approaches, there are constructivist approaches that study gender and science issues. The central concept presented by Åsberg (1998) is a gender system that emphasizes structural gender relations more than the voluntarily acting agents of subjectivist approaches. This situates women's studies within the larger and more general context of gender studies. Gender studies, today, is characterized by the growing amount of knowledge about sex and gender, femininity and masculinity, and is often conceptualized not as a system, but rather as an ongoing process of historically changing ideas.

#### **SOCIAL CONSTRUCTION OF SCIENTIFIC OBJECTIVITY:**

Science defines itself discursively as an objective and interest-less 'culture of no culture'. The scientist has no personal character or attitude that shapes her/his research. Thus, the problem of gender inequality becomes invalid in academia, because gender issues are seen as external to academia – they are seen as functions of family, reproduction, biology, socialization etc. Within this discourse, the alternative discourse, which emphasizes the importance of gender equality and the existence of gender inequality, becomes invalid and incomprehensible.

(Source: Egeland, C. 2001, 'Kønsforskellens monstrøsitet: kønsbarrierer i Akademia – et ugyldigt problem', *Kvinder, køn & forskning*, vol. 4, pp. 38-49).

#### Gendered science

Gender research in the Nordic countries focuses on some central aspects of gender relations within working life and academia. The themes and analytical concepts of concern are vertical and horizontal gender segregation in institutions, education and working life; the pay gap and gendered experiences of workers. This type of gender research has been motivated by the uneven progress towards gender equality seen in all the Nordic countries. Strong gender segregation prevails in the Nordic labour market, although women have

<sup>10</sup> The group of developing women's studies

been in the majority among university students since the 1980s and the proportion of employed women with a tertiary education has for some time been even higher than that of men. Segregation in fact continues in spite of proclaimed social equality and gender equality policies and the social progressiveness of the Nordic countries.

It is possible to identify three major trends focusing on gender relations within the labour market in Nordic research. Until the 1980s, the focus was on women's weaker position in the labour market in terms of educational level, labour force participation and the gender pay gap. This type of research was to a large extent descriptive and exploratory, bringing to light uncovered aspects of gender relations. The emphasis then shifted from this exploratory phase to a more explanatory phase or towards the implications of power relations between men and women that were reflected in, for example, gender stereotypes and questions of identity that hindered women from becoming economically independent and men from taking on greater responsibility for the home, children and their emotional life. Projects were implemented to do away with the extensive gender segregation prevailing in the Nordic labour market. These actions turned the attention of labour market researchers to the processes and mechanisms at work in organizations and occupational groups. Hence, the focus of the research broadened during the 1990s to include the ways traditional gender patterns were created and reinforced within public and private organizations such as universities and firms.

In addition to discussions of the development of science on the levels of institutions and contents in the Nordic countries, there have been more general European-wide debates on questions of women's weaker position and career development in science institutions. In all European countries, the slow integration of women at all levels into academia is considered a serious problem. Several countries and their ministries and central research funding organizations have made special efforts to change the situation. In discussions about the relatively slow inclusion of women into higher academic positions, questions have been raised as to whether academic culture represents a barrier (Rogg 2001). In 2004, five countries (Romania, Turkey, Latvia, Portugal and Finland) had a proportion of women full professors that was above 20%. For the remaining 25 countries it is unlikely that they will reach the 25% target recommended by European Commission (2005) by 2010. Only Slovakia, Iceland and Sweden (in addition to those five countries) will have at least 25% of women professors at grade A if their growth rate remains unchanged (Ruest-Archambault et al. 2008, 8). According to Ruest-Archambault et al. (2008, 9), one of the most important questions is the role and the character of Nordic countries in shaping gender and science relations and positive actions to promote gender equality in science. It is important to take note of and analyse the higher-level policy making of each Nordic country, as the welfare state models express a fundamentally different gender division of labour. The Scandinavian countries present the only model which differs from that of the male breadwinner.

The statistical analyses show that the proportion of women in research is negatively linked to the presence of certain policies or measures for women in science (presence of a unit for women in science at the Ministry of Science, gender targets, quotas and mentoring programmes, special funding for women researchers and paternity leave). Thus, paradoxically, the countries with the highest proportion of women researchers are less likely to have policies for women in science than those with low proportions of female researchers. There are various explanations for this (Ruest-Archambault et al. 2008, 20).

**Figure 1 Percentage of women out of total R&D staff relative to gross domestic expenditure on R&D (GERD) spent per R&D researcher (in euro) in 2004 (Ruest-Archambault et al. 2008, 21)**

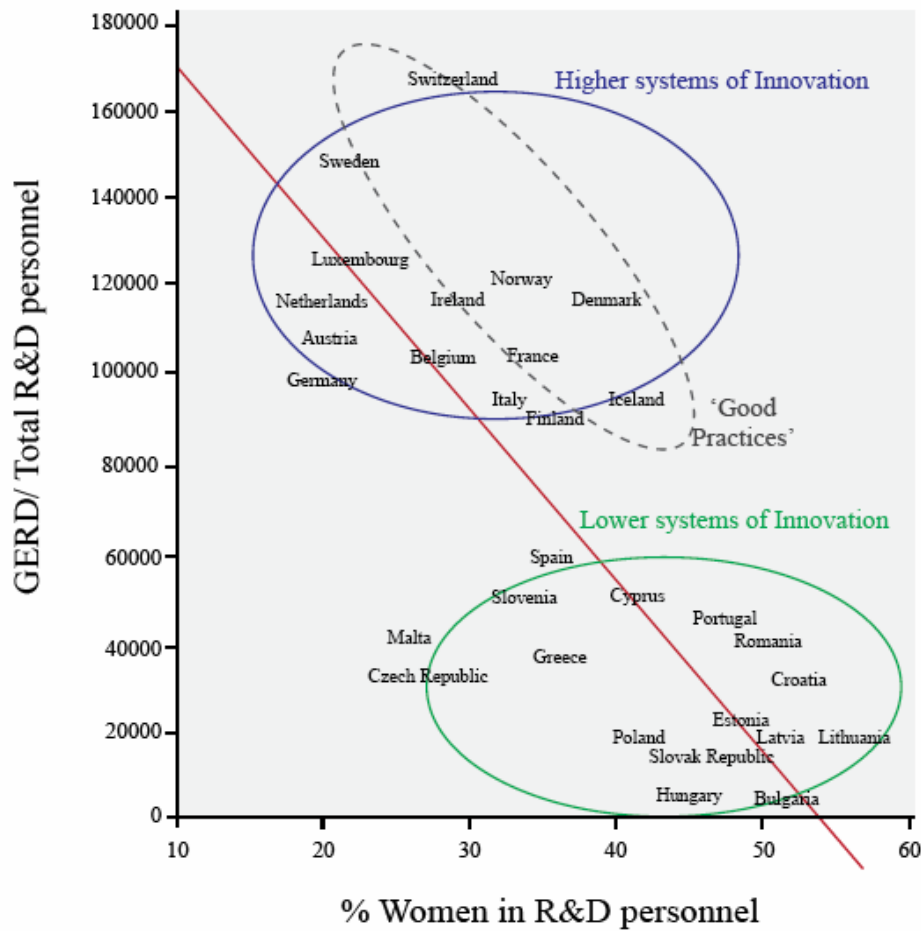


Figure 1 shows that there is a strong negative link between a country’s expenditure on R&D and the proportion of women in science. The distance of a country from the line indicates the loss or the gain of access and or control over R&D expenditure. If a country is below the line, it shows that there are fewer women in R&D than the R&D expenditure per researcher would predict in that country. Figure 1 also shows that countries with high systems of innovation policies and expenditure, such as Switzerland, Norway, Denmark, Iceland and Ireland, have a substantially higher proportion of women in R&D than R&D expenditure per person would predict. The national policies of these countries could indicate ‘good practices’, but a careful study of these policies does not indicate a common pattern or differences from other countries. One possible explanation could be that Denmark, Norway and Iceland are Scandinavian social democracies, where the idea of the ‘male breadwinner’ is not as strong as in the rest of Europe. However, this argument is limited by the notable absence of Sweden in this group. There could be a more complex pattern linked to each country’s national system of innovation, which might explain why their level of employment of women is below or above the norm. The countries with a high proportion of women researchers, but with low R&D expenditure, is another contradictory observation for further study (Ruest-Archambault et al. 2008, 21–22).

The ‘lower paid sectors’ hypothesis explains why in the countries with low R&D expenditure there is a high proportion of female staff in R&D. Women tend to work in the public sector (higher education and government institutions) and these sectors are traditionally regarded as providing safer and more stable occupations at the cost of lower salaries. In the countries characterized by low levels of innovation in research and development activity, R&D is concentrated in more traditionally feminine areas (biology, social services and health services) while it is concentrated more in masculine areas (defense, industrial production and technology) in the countries with high levels of innovation. This means that in the countries with a high level of R&D activity and a low proportion of women, there is a higher level of R&D activity in the private

sector, where the demand for women researchers is lower. This pattern can be attributed to employers' policies, strategies and organizational cultures of the business enterprise sector. Moreover, gender mainstreaming policies and networks supporting women are usually lacking in the countries with low levels of innovation (Ruest-Archambault et al. 2008, 24–25, 37).

In comparing the gender equality policies in the field of research, the European Commission (2008, Table 1) divide the countries into two major groups: proactive countries, which promote and monitor gender equality in research with active policies and measures, and countries that are relatively inactive in this area:

**Table 1 Overall gender gap in society and proportion of women researchers in the higher education sector (European Commission 2008, 17)**

<p><b>Smaller gender gap, more women in HE research</b> Norway, Finland, Sweden, Iceland, Ireland, Latvia, UK, Spain, Lithuania, Belgium</p>
<p><b>Smaller gender gap, fewer women in HE research</b> Denmark, Netherlands, Germany, Switzerland, France, Austria</p>
<p><b>Larger gender gap, more women in HE research</b> Bulgaria, Estonia, Portugal, Poland, Hungary, Slovak Republic, Luxembourg, Romania, Greece, Turkey</p>
<p><b>Larger gender gap, fewer women in HE research</b> Slovenia, Israel, Italy, Czech Republic, Cyprus, Malta</p>

Among *proactive countries* having introduced advanced policies and several relevant measures, there emerge three distinct subgroups. First, *the global gender equality leaders*- Finland, Norway, and Sweden-- have been particularly active in promoting gender equality in research since the late 1970s/early 1980s; they were later joined by Denmark and Iceland. In these Nordic countries, the promotion of gender equality is embedded in society. The *second group* includes countries that have more recently become active in this area. They combine high research intensity with the largest underrepresentations of women in research: Austria, Belgium (Flanders), Germany, the Netherlands and Switzerland. A *third subgroup* of proactive countries includes the UK, Ireland and, recently, Spain. All three have adopted advanced policies and introduced innovative measures both nationally and organizationally, but somewhat later than the Nordic countries. They differ from the second subgroup of newly active countries in that women have a much greater foothold in research. The group of *relatively inactive countries* has larger gender gaps than the EU median. These countries show relatively little commitment (or initiative) to the gender and science issue. The reasons for this inactivity are complex and varied, and are linked to the historical, social and political development of these countries (European Commission 2008, 18).

Women were found to be seriously underrepresented on the scientific boards in most EU countries. Only in Finland, Sweden and Norway did women constitute more than 40% of the boards and only in the UK,

Bulgaria and Denmark above 30%. In some countries, like Sweden and Finland, the funding organizations have set targets for equal representation of women among the research and funding evaluators, but these are not always met (European Commission 2008, 35–36). Although the Nordic countries appear to be the most advanced countries supporting gender equality in science, one must be cautious when assessing women's overall position in the scientific world. Rees et al. (2002) argue that some countries with the most advanced equality legislation still experience the effects of a leaky pipeline. It is an enormous waste of human potential and it constitutes a threat to the development of excellence in science.

The most important and debated concept in the discussion of gender equality in science is the leaky pipeline. It is a situation where women, who may even represent a majority in some scientific disciplines, begin scientific careers but then disappear in disproportionate numbers at each stage of the academic ladder. Where this results from discrimination, it is unjust. Nevertheless, this phenomenon appears to hold constant across national boundaries and across discipline boundaries, although there is some variation in specific patterns (Rees et al. 2002, 15–16). Another area of discussion is the small proportion of girls and women in technical sciences and technical studies. It is important to take action to raise the awareness of girls about opportunities in science and technical studies, as well as to contribute to changing the gender stereotypes of some scientific occupations. The image of science and engineering among girls needs to be redefined and refreshed. It is also important to inform girls about the different opportunities offered by the industrial sector. Industry, as well as educational segregation between girls and boys, plays an important role in horizontal segregation. Men must also change their attitudes towards women trying to make their careers in science and engineering (Meulders and Caprile 2003, 78). More women should be recruited to top positions as well as into certain fields of technology and the natural sciences. Having more women in science will serve to strengthen long-term fundamental research (Gulbrandsen 2001, 2). Finally, it is important to remove the formal barriers that prevent women from staying in contact with their workplaces during maternity leaves (European commission 2008, 93).

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The particular characteristic of the Nordic countries as a supporter of gender equality in science has its roots in the close relationship between the welfare state and science. Science has played an important part in the development of the state, making possible infrastructure, industries and services. The integration of state policies and industrial and social development is guided and supported by scientific research and practice rather than by a market approach. This political structure has been favourable to the women's movement as well. The greatest expansion of higher education took place simultaneously with the development of welfare state science, which represented the values of "Nordic social democracy" and, in part, of feminism. One important value has been that of equality between citizens to counteract social, regional or gender differences. This has been the prerequisite for policies of supporting gender equality in science—at least more than in other countries.

## 1.4 Institutional structure of gender and science

The two main strands of the Nordic developments in gender and science are the administrative policies of promoting gender equality in higher education and the institutional development of gender studies. There are statutory bodies promoting different aspects of gender equality in science. Another trend has been towards the integration of women's/gender studies into the established disciplines of universities and colleges. However, this integration into traditional academic conceptual frameworks and structures is incomplete and has been questioned.

All the Nordic countries have endorsed the principle of gender mainstreaming in education and science. They have also adopted a dual strategy involving a combination of gender mainstreaming and positive measures to promote gender equality.

## 1.4.1 Policies to promote gender equality in the universities

### Uneven gender distribution in the universities

Nordic state policies of gender equality in science focus on promoting women's presence in scientific institutions, especially in the universities. The background theme has been the prevention of gender segregation in science. There are rules at various levels stipulating that higher education institutions should promote gender equality in education and research. Usually the national research councils and universities are responsible for gender equality in research. One of the main tools for achieving this is quotas for women in scientific bodies. In the elections of the faculties and other scientific bodies, both women and men must be represented on the election committees and bodies. Typically, according to national equality acts, at least 40% of the members must come from the underrepresented sex. Similar rules are applied to the research councils themselves and to innovation agencies. Also of great importance are the government's directives requiring that higher education institutions and research funding bodies submit in their annual reports gender-disaggregated statistics and a report on the measures they have taken to improve equality between the sexes. (Helsinki Group Sweden 2001 and European Commission 2008, 19, 115)

In Sweden, since January 2007, the Ministry for Integration and Gender Equality has been dealing with gender equality issues, and the Division for Gender Equality is responsible for gender equality matters regarding universities and university colleges. The Division for Research Policies is responsible for gender equality matters regarding the Swedish Research Council. Each university and university college, together with the research council, is responsible for the implementation of gender equality policies and for reporting on this (Ruest-Archambault et al. 2008, 115). The Swedish Research Council looks at the success rate for men and women in its evaluation process. The analysis is made by independent experts whose aim is to show that the success rates for men and women for positions and general applications are equal (Johansson 2006).

In Norway, all state enterprises, as well as private companies, must have 40% female representation on their governing boards. This includes universities, university colleges and research institutes. The University Act, revised in 2005, permits the advertisement of positions targeting the underrepresented sex under certain conditions: if one sex is clearly underrepresented in the category and discipline in question, persons of that sex shall be specifically invited to apply. Every higher education institution must promote gender equality within all categories of employees at the institution. (European Commission 2008, 19)

In Finland, the Academy of Finland is the main research funding organization and has an Equality Working Group and an Equality Plan that state that the minority gender should occupy at least 40% of all research posts, expert positions and working group appointments (Ruest-Archambault et al. 2008, 64).

In Iceland, gender-related issues are mentioned neither in the strategy nor in the rules for the Icelandic Research Fund and no systematic gender monitoring is carried out. However, in general, every two years the main research fund RANNIS delivers gender statistics to Statistics Iceland in the context of the work of the Committee for Women and Science. The focus is on success rates as measured by the number of grants, the amounts granted relative to the number of applications and the amounts applied for (Guðmundsson 2008, 5).

### Specific bodies for promoting gender equality

There are specific bodies promoting gender equality in science, usually under the supervision of the ministry in charge of equality affairs and and/or education. In Denmark, the Ministry for Gender Equality is responsible for equal opportunities in general (Ruest-Archambault et al. 2008, 58). In Finland, general equality matters are the responsibility of the Ministry of Social Affairs and Health (Academy of Finland 2002, 16). Naturally, the ministries in charge vary from one Nordic country to another. Under the ministries in charge of equality and/or educational affairs there are specific permanent or ad hoc bodies responsible for more specific equality promotion tasks.

As an example of statutory bodies in Norway, the Secretariat for Gender Equality of the Ministry of Education, Research and Church Affairs has most of the responsibility for gender equality. The Secretariat works with gender equality issues both internally and externally and coordinates many gender equality

projects in the sector. In the last few years, the Ministry has increasingly given priority to the work for gender equality in the R&D sector (Gulbrandsen 2001, 4). In Finland, the practical implementation of equal opportunity is assured by the Ombudsman for Equality and the Finnish National Council for Gender Equality (TANE). TANE has a research section, which was founded as an expert organ in questions of gender studies and research policy (Tasa-arvoasiain neuvottelukunta 2006). Its role as the national coordinator and a facilitator of domestic cooperation in teaching and research has been important, particularly prior to the institutionalization of women's studies at universities. The newsletter *Naistutkimustiedote*, for example, has played an important role in the dissemination of information (Academy of Finland 2002, 16).

As an example of ad hoc bodies in Denmark, the Ministry of Science, Technology and Innovation, jointly with the Ministry for Gender Equality, formed a think tank on 'More Women in Research', which published a report in 2005. Among other things, the think tank recommended that the universities should define equality objectives in their development contracts with the Ministry of Science, Technology and Innovation. This general commitment to increasing the proportion of female researchers is also apparent in the new set of development contracts for the period 2008-2010. The think tank also recommends that the Parliament allocate resources for a new initiative to promote talented young women in science. However, there are no internal units for women in science in the above-mentioned scientific institutions (Ruest-Archambault et al. 2008, 58). The Women's Council of Denmark is a general umbrella organization for 51 civic organizations with a total of more than one million members. The Women's Council works for women's rights as well as well as in matters of social, professional, economic and cultural interest. (Ruest-Archambault et al. 2008, 64 In Sweden too, a working group with the purpose of enhancing the knowledge of gender issues of the Research Council was formed in 1996 and remained active until 2001. The tasks of the group were to engage in quality peer review and educate the staff and members of scientific boards within the councils (Helsinki Group Sweden 2001).

In Iceland, the University of Iceland plays the greatest role in shaping higher education policy. The Centre for Women's Studies (changed to The Centre for Women's and Gender Studies in 2000) at the University of Iceland has been instrumental in coordinating and organizing women's studies and feminist research.

### 1.4.2 Nordic gender studies

The Nordic specificity is the institutionalized development of Women's and gender studies within higher education. This institutionalization means that there are networks and associations of gender researchers, academic posts and units for gender studies and academic credits and exams in gender studies. The development has been quite similar in all the Nordic countries, although there is also some variation. The starting point for this development is the feminist movement of the 1970s and 1980s.

The Academy of Finland (2002, 23–24) reports that in all Nordic countries a dual strategy for the implementation of women's studies (and, later, gender studies) has been adopted. This strategy involves a combination of integration and autonomy. The activities of most researchers have been directed towards traditional scholarly fields and disciplines. At the same time, an interdisciplinary and autonomous infrastructure has been established through separate research units and support mechanisms. The dual strategy has given the research field some degree of autonomy, whilst simultaneously building up fruitful contacts with the traditional disciplines.

In *Sweden*, the first units for Women's studies were founded at the end of the 1970s. These started out as local associations for feminist researchers and female scholars and most of them were later transferred to the universities and integrated into the university structures. Contrary to other Nordic countries, for a long time Sweden lacked a national coordinating body for women's studies and most coordinating functions were carried out at regular meetings held by the representatives of the women's studies centres and forums. The oldest women's studies journal in the Nordic countries, *Kvinnovetenskaplig tidskrift*, was founded in 1980. In 1996, the Swedish Parliament decided to establish a National Secretariat for Gender Research at the University of Gothenburg. The magazine *Genus* (Gender) is published by the Secretariat four times a year and is free of charge. The Secretariat is administratively a part of the Ministry of Education. Altogether, eighteen new posts in gender research (six professorships plus postdoctoral posts and Ph.D. student positions) were financed with 30 million Swedish kroner in 1996. In addition, the Swedish Parliament decided to establish thirty-one professorships in 1995 for the "underrepresented sex" and these so called *Tham*-professorships were given to women scholars. Of the Nordic countries, Sweden has the highest number of permanent professorial level positions in women's studies and gender research. Money was also set aside

for teaching and for a new interdisciplinary centre, the Centre for Gender Studies (Tema Genus), at the University of Linköping (Academy of Finland 2002, 18–19).

Gender studies is an established field at Swedish universities. Up to 120 study credits (in some universities, 180) can be taken within basic degree programmes. Courses and study programmes are run by the Centres for Gender Studies and several regular university departments. Currently, students can choose gender studies as their major for an undergraduate degree (Fil.Kand.) at almost all universities and university colleges. Gender research is carried out outside the universities as well. The National Institute for Working Life can be mentioned in this regard. The Research Council in the Humanities and the Social Sciences (HFSR)–now included in the new overarching Research Council–is an important funding body for gender studies in Sweden. (Academy of Finland 2002, 19–20) The Institute of Thematic Gender Studies (founded in 2006) establishes national and international excellence in research as well as Ph.D. and Masters programmes in thematic and post-disciplinary research.<sup>11</sup>

The technology and gender dimension can be studied in the Units of Technoscience Studies of the Blekinge Institute of Technology and the Departments of Gender and Innovation and Gender and Technology at Luleå University of Technology. The University of Gothenburg offers interdisciplinary gender studies (global gender studies, gender science). There are Centres for Gender Studies at the University of Lund, Linköping University, Stockholm University, Uppsala University and Umeå University (Mittuniversitetet). At the University of Örebro there is a Centre for Feminist Social Studies. There is also a gender researcher's database, Greda, developed by the Swedish Secretariat for Gender Research and the Women's History Collections at the Gothenburg University Library. The purpose is to give journalists, conference organizers, the interested public, researchers etc. a simple and direct opportunity to find information about and get in touch with gender researchers.<sup>12</sup>

In 2006, the Swedish Research Council founded 3 Centres of Gender Excellence, which received SEK 60 million for the Uppsala Centre for Gender Research, Umeå University, and Linköping University in cooperation with Örebro University (Ruest-Archambault et al. 2008, 124). New thinking and tangible plans on how to become leaders in the international field were the most important selection criteria when an international panel chose these Centers of Excellence in gender research for the first time. The three chosen environments and topics were:

- Nature/Culture Boundaries and Transgressive Encounters, Uppsala Centre for Gender Research.
- Challenging Gender--a Research Programme at Umeå Advanced Gender Studies, Umeå University.
- Gendering EXcellence - GEXcel: Towards a European Centre of Excellence in Transnational and Transdisciplinary Studies of Changing Gender Relations, Intersectional Ties and Embodiment, Linköping University in cooperation with Örebro University.<sup>13</sup>

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<sup>11</sup> <http://www.genus.se/english/resources/gender-research-in-sweden/> and [http:// www.ucgs.umu.se/index\\_eng.html](http://www.ucgs.umu.se/index_eng.html)

<sup>12</sup> <http://www.genus.se/english/resources/gender-research-in-sweden/> and [http:// www.ucgs.umu.se/index\\_eng.html](http://www.ucgs.umu.se/index_eng.html)

<sup>13</sup> <http://www.genus.se/english/resources/gender-research-in-sweden/gender-excellence/>

### **Policy Framework for Women and Science in Sweden**

Gender equality in the higher education and research is in Sweden a question about democracy, equity and quality.

#### *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 areas of knowledge. The universities have a responsibility for the work of equality between men and women at all levels. 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.

#### *Post-doctoral fellowships and guest-professorships for women*

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 professorships were administered by the research councils and were financed with 21 million SEK for each year.

#### *Women post-graduates*

To increase the number of female post-graduate students to graduate, the Government financed this 30 million SEK per year since 1995. In the later bill for research, the government allocated funding for 16 new graduate schools (one of them for gender research). The Government stressed the affirmative actions should be taken to achieve the 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 fellowships. The financing of the full professors was shared between the Government, concerned research councils and universities. The Government financed the postdoctoral fellowships.

#### *Recruitment-targets for women professors*

During 1997 equality percentage targets of the distribution of sexes among newly recruited professors were introduced by the Government for the majority of the universities and university colleges. 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 was set for 25%.

#### *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 .

A. Hansson & Helsinki Group Sweden 2001

In Norway the national research councils have played a central role in the promotion of gender studies. In 1977, a Secretariat for Women's Research was founded within the Norwegian Research Council for Science and the Humanities (NAVF). The Secretariat has often been regarded as unique in an international perspective because of its strategic location in the Research Council and its resources. The Secretariat has had great significance for Norwegian women's studies, particularly up to the end of the 1980s. By this time, the funding of feminist research in Norway had become the most extensive in the Nordic countries and there were several research programmes underway. In 1998, the Secretariat was reorganized because the women's studies centres at the universities had largely taken over the role of promoting gender research. Some of its tasks were transferred to KILDEN, a new national information and documentation centre for women's studies and gender research (Academy of Finland 2002, 20).

During the 1990s, Women's studies in Norway became more securely anchored within the universities, partly through the university-based centres and partly through the appointment to several personal professorships of feminist researchers. In June 2002, a National Association for Women's Studies and Gender Research was founded. During recent years, the gender studies centres have also developed their cooperation within undergraduate and postgraduate education. In Norway, there are a large number of independent research institutes, especially within the field of applied social sciences. During the 1970s and the 1980s, women's studies was established within these research institutes to a greater extent than in other Nordic countries (Academy of Finland 2002, 21–22).

The Norwegian Research Council requested that the Ministry of Education and Research establish the Committee for Mainstreaming–Women in Science<sup>14</sup> in 2004 to support and offer recommendations on mainstreaming of gender equality work in the university and college sector. The committee provides recommendations that can contribute to the mainstreaming of gender equality. The committee may also contribute to an overall awareness raising around gender balance in academia and in the research sector (Ruest-Archambault et al. 2008, 5). This Committee for Mainstreaming–Women in Science has a 'Gender Equality in Science' resource bank<sup>15</sup>, which provides useful links, relevant literature and statistics on women and gender equality in science. The website 'Gender in Norway'<sup>16</sup> provides an information service on official gender equality work, gender research, and gender statistics (Ruest-Archambault et al. 2008, 129).

In Norway there are 9 gender research units. At the University of Oslo there is a Centre for Women's Studies and Gender Research and an Institute for Women's Law. The university conducts research and offers the bachelor's programme "Gender, Feminism and Equality". The Norwegian University of Science and Technology, Trondheim, has a research group for gender studies in the Department of Interdisciplinary Studies of Culture. The Women's University, Løten, and The Northern Feminist University, Steigen, are private foundations. Moreover, the independent research foundations Fafo and the Institute for Social Research (ISF) conduct gender research mainly as a part of social research. KILDEN is a Norwegian Information and Documentation Centre for Women's Studies and Gender Research and a part of the Research Council of Norway.<sup>17</sup>

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<sup>14</sup> [http://www.gender.no/Topics/11/sub\\_topics?path=4/902](http://www.gender.no/Topics/11/sub_topics?path=4/902)

<sup>15</sup> <http://eng.kvinneriforskning.no/>

<sup>16</sup> <http://www.gender.no/>

<sup>17</sup> [http://www.gender.no/Topics/11/sub\\_topics?path=7/756](http://www.gender.no/Topics/11/sub_topics?path=7/756)

**Norway****Alma Mater's Daughters. One hundred years with women in academic education**

Have women conquered Academia? Are they Alma Mater's daughters or step-daughters? What have women contributed to higher education? *Alma Mater's Døtre* gives an overview of the history of women academics throughout the 20th century, and discusses the past, the present and the future. The book has contributions from many prominent female researchers who present the historical process and analyse the development until today. Topics of the book are the female pioneers in academia, the "heroic period", women and education in the post-war period, growth within higher education, democratization and decentralization, institutionalization of women research, women and research, status and thoughts about the future.

Lie, S. S. & Rørslett, M. B. (eds) 1995, *Alma Mater's Døtre. Et århundre med kvinner i akademisk utdanning*, Pax Forlag A/S, Oslo.

In the 1980s, the group of politically active women grew in *Denmark* and gender research institutes were established. The most important long-term consequence was the growth in the number of female social scientists. In 1994, the requirement for action plans for the promotion of gender equality in institutes was implemented (Sjørup 2001). Noteworthy on the international level was the rise in Denmark of men's studies, which arose out of the activities of the men's movement and was theoretically inspired by women's studies. From the middle of the 1970s to the beginning of the 1980s, Danish scholars were at the forefront of men's studies in Scandinavia. Since then, the establishment and formalization of Danish men's studies has progressed very slowly. (Gender in Research 2003, 60)

At the all-Danish universities (Aalborg, Aarhus, Copenhagen, Odense, and Roskilde) women's studies centres were founded at the end of the 1970s and the beginning of the 1980s. Women's studies was institutionalized thanks to a special action plan adopted by Parliament for the years 1986-1992. Through the plan funded and administered by the Ministry of Education, the Research Council and the Research Policy Council, six senior lectureships were established. Furthermore, 18 million Danish kroner were reserved for strengthening women's studies and promoting the dissemination of research findings. The plan also included funding for the national coordination of women's studies. After the plan expired, the research was integrated into the regular activities of the universities. However, no extensive national initiatives were taken to support this field for the following several years. In 1990, a nation-wide Association for Women's Studies and Gender Research was founded in Denmark. Among other things, it aimed to initiate research networks, supported the recruitment of researchers, promoted the funding of women's studies and feminist research and formed a platform for Nordic and international cooperation. The Association has local sections in Aalborg, Aarhus, Odense and Copenhagen, and produces a scholarly journal in cooperation with the national coordinator (Academy of Finland 2002, 22).

KVINFO—the Danish Centre for Information on Women and Gender—is a national centre for information, documentation and culture at the University of Copenhagen. The tasks of KVINFO include the dissemination of research results. All university centres offer courses at both undergraduate and postgraduate levels. Three of them (Aarhus, Odense, Copenhagen) have established 1–1.5-year study programmes (MA level) and offer BA programmes and separate courses. The centres have organized an interdisciplinary Ph.D. programme in English, in existence since 1993. The women's studies units, as well as the Danish association, have been renamed in recent years, as in the other Nordic countries (with the exception of Finland). In most cases, "gender studies/research" has replaced "women's studies". (Ibid. 22–23).

In Denmark, there are several institutions related to gender studies (2003 situation) (Gender in Research 2003, 50–60):

- The Department for Gender Studies, at the Institute of History and Area Studies in the Faculty of Arts at the University of Aarhus, was established in 2002.
- The Department of Women and Gender in Medicine, at the Institute of Public Health at the University of Copenhagen. The work of the department consists of exposing women's conditions and promoting understanding of the differences between the two genders with respect to social equality. The goal is

to assist future doctors, health workers, and researchers in developing an understanding of gender differences and relations and their significance for illness and health.

- The Research Centre on Gender Equality at Roskilde University carries out research and development projects and distributes information on gender equality. The centre brings together expertise on the sexualization of the public space, trafficking in women, violence against women, mainstreaming, reconciliation of family and work life, new masculine roles, and general gender theory.
- The Department of Contemporary Cultural Studies, Media, Gender, Children and Youth, General Education and Design University of Southern Denmark. In 2000, the former Centre for Gender Studies merged with the Centre for Cultural Studies. Today the centre offers both a special post-graduate degree in Cultural Communication, and a Masters in Gender and Culture.
- The Centre for Women's and Gender Studies at the University of Copenhagen, Amager, functions as a framework for interdisciplinary research and teaching. The goal is to discover the significance of gender within the field of humanistic research.
- FREIA—the Centre for Gender Studies at the University of Aalborg is an interdisciplinary research centre at the Department for History, International, and Social Studies at the University of Aalborg. Approximately 10 scholars cover the fields of sociology, political science, statistics, cultural sociology, anthropology, and history.
- The Network for Research on Men and Masculinities (NeMM) brings together and supports researchers in Denmark who do scholarly work on men and masculinities. The goal is to increase knowledge of the field in the population at large, and thereby to increase awareness of issues concerning men and masculinities.
- The Association for Women's Studies in *Finland* started in 1988 with its local associations and began to publish a scientific journal entitled *Naistutkimus–Kvinnoforskning* (Women's Studies) in the same year. This association, *Suomen Naistutkimusken Seura* (SUNS), has become increasingly important in developing links and cooperation between the university units and research networks, while institutes for women's studies have been established in several universities. The first university study modules in women's studies were introduced in the latter half of the 1990s and several local associations for women's studies were established in universities. During the last ten years, cooperation between the units and networks as well as between individual scholars and students has also been facilitated by virtual links and Internet-based communication. An electronic discussion list for women's studies was established in 1993 as the first one of its kind in Europe. In addition, the units maintain their own websites and most of them have established local e-mail discussion and information lists. (Kurki et al. 2001, 8 and Academy of Finland 2002, 16)

The universities of Helsinki, Tampere and Turku and Åbo Akademi University have established administrative units for women's studies comparable to university departments. The first unit was founded in 1986 at the Swedish-language Åbo Akademi University. Thereafter, units have been founded at the University of Tampere (1990), the University of Helsinki (1991) and the University of Turku (1995). At the other universities (i.e., the universities of Joensuu, Jyväskylä, Kuopio, Lapland, Oulu and the Swedish School of Economics in Helsinki), women's studies has been organized within larger departments or as cooperative groups and networks. During the 1990s, the field was institutionalized through the founding of eight earmarked fixed-term professorships funded by the Ministry of Education for a five-year period. These professorships were established at the universities of Helsinki (Faculty of Law), Tampere, Turku, Jyväskylä, Oulu and Joensuu as well as at Åbo Akademi University and the Swedish School of Economics. The continuation of the eight professorships is dependent on funding from the regular budgets of the universities themselves. In 1998 the Academy of Finland established a time-limited (a five-year so-called 'Academy' professorship) research professorship in women's studies and gender equality research. This Minna Canth Academy Professorship serves, amongst other things, postgraduate education (Academy of Finland 2002, 13).

The bulk of the work in women's studies in Finland is carried out within ordinary university positions, i.e. as part of the ordinary workload of professors or senior and junior teachers of the mainstream departments. Since their positions are not specifically designated for women's studies, the situation is vulnerable and

dependent on the individual teachers' interest. During the 1990s, women's studies achieved the disciplinary status of a "large minor"(30-40 credits) at seven universities. At present, it is not possible to choose women's studies as a major for a degree at the Master's or postgraduate level. (Academy of Finland 2002, 14–15) Many universities have equality committees, one (Helsinki) has a full-time gender equality adviser, and several have conducted gender equality surveys (Ruest-Archambault et al. 2008, 65).

In science, as a part of the Finnish WiTEC branch, there are projects for women in science, such as the TINA project, whose aim is to reduce the division between men's and women's professions. The Weme.fi web community is dedicated to supporting the networking of women in engineering fields as well as their career promotion. Women Researchers in Helsinki is a re-established association which brings together women from different scientific disciplines and at different stages of their research careers. New mentoring programmes for women researchers are being launched by universities, who also offer support in research project management (Ruest-Archambault et al. 2008, 64).

Today, the Association for Women's Studies in Finland (SUNS) cooperates with universities (Helsinki, Joensuu, Jyväskylä, Lapland, Tampere, Turku, Oulu and Åbo Akademi), colleges, research units, the University Network for Women's Studies (HILMA) and the administration of education. The Council for Equality (TANE), in particular its research division, are important partners. The Association also cooperates with different women's organizations and is a member of The Coalition of Finnish Women's Associations for Joint Action (NYTKIS) and the Federation of Finnish Learned Societies (TSV).<sup>18</sup>

In *Iceland* the research in the field of Women's studies and feminism has been carried out at the University of Iceland since the early 1970's. Research within the university developed either as part of specific disciplines (e.g. literature, sociology) or as an independent discipline. Initially, the research focused primarily on the status of women, based on the ideals of equal opportunity. An important support for this research was the inauguration of the Library for Women's History in 1975 by a private individual. It has proved to be a valuable repository for the documentation of feminist concerns in Iceland. The library has now been incorporated into the National Library, affording more and better access to students and nonprofessionals alike.<sup>19</sup>

Since 1980, various departments at the University of Iceland, especially in the humanities and social sciences, have offered feminist courses. However, these courses are not part of the regular curriculum; they depend on the initiative of their respective lecturers. In 1991, the Centre for Women's Studies (RIKK) was established as an independent research unit on the initiative of a group of feminist researchers at the University of Iceland. RIKK acts as a hub for a network of feminist/gender researchers. Its main purposes are to promote research in the field of women's and gender studies and to disseminate information. RIKK designs, administers and provides funding for local and international research projects and hosts international and local conferences, workshops and seminars. These are interdisciplinary in scope, relating to women's studies, feminism, gender studies and equal rights. In addition, RIKK publishes reports and books, including papers from conferences held under its auspices. The centre is administered by a six-member board of representatives from the four research fields at the University of Iceland.<sup>20</sup>

RIKK endorsed the first formal programme in gender studies at the University of Iceland in 1996. The programme is interdisciplinary in scope and leads to a minor in a BA degree, or 30 credits out of 90. To ensure the interdisciplinary nature of the programme, it is administered by two faculties: the Faculty of Social Sciences and the Faculty of Humanities. Aside from the programme proper, courses in gender studies are now offered in many disciplines within the four research fields at the University. Courses in gender studies are now offered in the following disciplines: comparative literature, medieval Icelandic literature, literary theory, history, anthropology, political science, education, sociology, nursing, theology, philosophy, law, media studies and information and library science.<sup>21</sup>

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<sup>18</sup> <http://www.nt-suns.org/eng/index.php?pid=37> and <http://www.nt-suns.org/eng/index.php?pid=29>

<sup>19</sup> <http://www.arnastofnun.is/page/RIKK-english>

<sup>20</sup> <http://www.arnastofnun.is/page/RIKK-english>

<sup>21</sup> <http://www.arnastofnun.is/page/RIKK-english>

Gender research in Iceland has employed contents from literary criticism, medieval studies, and studies on women's movements and politics. The feminist emphasis is increasing rapidly in social sciences and nursing, for example in studies of gender and education and the ethics of nursing. In the last few years many doctoral dissertations and M.A. theses have been written from a feminist point of view. RIKK is preparing a databank of Icelandic research with abstracts in Icelandic and English. It will provide an overview of this rapidly increasing body of literature and research. RIKK has instigated and launched, in 2001, along with several collaborators, a 'Database on Women Experts' at [www.kvennaslodir.is](http://www.kvennaslodir.is). The database contains the names and curriculum vitae of women experts in a wide range of professions. Its aim is to aid institutions, corporations, and the media in the search for women participants on boards of directors, councils, and committees.<sup>22</sup>

RIKK's Centre of Excellence in Equality and Diversity Studies has been awarded with a Centers of Excellence and Research Clusters grant from the Icelandic Science and Technology Council (Rannís). Funding will be provided for up to seven years, starting with 35 million kr. for the year 2009. Centers of Excellence are a new model for research programmes in Iceland and such centres are established in cooperation with specialists/scientists, institutions and businesses in Iceland and abroad.<sup>23</sup>

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In terms of the organization of the field as a distinct discipline and the institutionalization process, women's studies has followed a similar path in all Nordic countries. Since the 1980s, specific women's studies centres or units have been set up in universities all over the Nordic countries as part of the institutionalization of the field. With the exception of Sweden, the Nordic countries have not yet developed full degree programmes in women's studies and gender research. To date, students at Nordic universities have not been able to take a degree at the MA or Ph.D. level in women's studies; however, they have been able to take subsidiary or minor degree studies, often consisting of relatively extensive study programmes at several Nordic universities. According to the Academy of Finland (2002, 23–24) there are some variations between the individual countries:

- In Norway the women's studies centres developed undergraduate teaching activities later than elsewhere. Large umbrella projects in women's studies funded by the National Research Council have a long tradition in Norway. In addition, the independent research institutes outside universities have sponsored much gender-orientated research.
- Sweden has the highest number of professorships in women's studies.
- While such professorships have also been established in Finland and Norway, this has not been the case in Denmark.
- In particular with regard to permanent senior or postdoctoral positions, growth has been modest in Finland as well.
- The organization of the information and documentation activities within women's studies is clearly underdeveloped in Finland compared to the other Nordic countries.
- The field of women's studies has a relatively long history of organization in Finland, e.g. in the form of national associations, national coordination, networks and e-mail lists.

The Nordic countries have a long tradition of working together in many societal areas, and this is also reflected in the collaboration within the field of women's studies. This kind of cross-national and regional cooperation, encompassing researchers, teachers, students and administrators, is unique from an international perspective. An institutional basis for strengthening this cooperation began in 1991, when the inter-governmental Nordic Council of Ministers agreed to finance the position of Coordinator for Nordic Women's Studies. Later, in 1995, the Nordic Institute for Women's Studies and Gender Research (NIKK)

<sup>22</sup> <http://www.arnastofnun.is/page/RIKK-english>

<sup>23</sup> <http://www.rikk.hi.is/Apps/WebObjects/HI.woa/wa/dp?id=1008411>

was founded. The Nordic Association for Women's Studies and Gender Research publish the English-language journal NORA: Nordic Journal of Women's Studies (Academy of Finland 2002, 17).

Gender and science-related studies are largely connected to the development of feminism, public higher education and the welfare state. Equality and universality as the developmental principle of public policies has given space to women's studies and, later, gender studies at the Nordic universities and institutions of higher education. This has led to a strong position of gender perspectives in the social and human sciences. In medical sciences (Denmark) and technical sciences (Norway and Sweden), there exist institutionalized activities as well. Women's studies has evolved over time into gender studies (not nominally in Finland) as research has moved from women to the relationships between the sexes and the existence of a gender system. The institutionalization of masculine studies has been strongest in Denmark. The private sector with R&D orientation, however, has not opened up to the integration of the gender aspect or to a larger proportion of female researchers. Only Norway appears to be an exception to this rule.

It now appears that Nordic gender studies and its "dual strategy"-based institutional position is being challenged by the liberalization and market orientation of the higher education sector. Gender studies are not on the main agenda, when research directly funded by the state is opened up to competition. Moreover, the emphasis on R&D and innovations directs funding away from the social and human sciences to other fields. Support for gender equality issues in science is rather weak in the "official" literature and policy reports of Nordic countries. Action is limited to the political rhetoric of gender mainstreaming. The practical operations consist merely of measuring gender divisions of scientific bodies and research funding, and there are plans for improved monitoring of data and developments in this area. The greatest achievements can only be on the administrative and bureaucratic level— for example, the creation of gender units in the ministries. The institutionalization of gender studies is considered synonymous with the achievement of gender equality in science, while at the same time study departments units are disappearing and merging with the classic disciplines. To sum up, the problems of gender equality in science are often seen as administrative and related to secondary aspects, such as data monitoring. A deeper understanding of science policy processes and their outcomes is needed, despite some positive actions in the Nordic countries.

Many gender researchers complain about the marginalization of the gender aspect within mainstream institutions, disciplines and research. Hence, there are those who claim that gender researchers need their own academic frameworks and institutions that are not framed by traditional disciplinary boundaries, theories and methodological approaches. It is important too to note that the business enterprise research sector is usually unconcerned with gender equality policies and is guided more by the market and the innovation mechanisms of industries and R&D practices.

## 1.5 Central policies and research trends of gender and science

In the Nordic countries, the research policies of gender and science are usually conducted by the ministries of education and related affairs. Moreover, equality-related issues are typically guided by the ministries of social affairs and related matters. Under the ministries, there are often different units supporting science and education and their relation with equality issues. In some cases, there are also political ad hoc committees supporting gender equality in science, such as gender mainstreaming committees. The main responsibility for public research funding typically lies with the national Research Councils. The Councils are also responsible for gender research and gender equality issues in science. This responsibility is exercised as a part of general research policies and strategic planning efforts that include the initiation, implementation and follow-up of research. Gender mainstreaming is one of the main principles of these strategies and programmes. Gender equality efforts are framed by the Acts on Equality and Acts on Higher Education (See e.g. European Commission 2008, 19, 23, 40, 93, 96).

Another feature that is typical of Nordic countries is the setting of gender quotas for scientific bodies and in science policies as a result of the general Equality Acts. Ideally, each body should have at least a 40% presence of the minority sex and this should finally lead to an end to gender segregation in science. This affects universities, university colleges and research institutes as well. The construction of statistics supports the calculation of quotas and the follow-up of gender equality efforts. Moreover, the Nordic universities have implemented action plans for equality and most universities have central gender equality committees. These

action plans provide recommendations and financing for many positive measures supporting gender equality in science and higher education. These methods vary in time, financing and intensiveness and sometimes by country. Finally, frequently cited measures to support gender equality in science are family allowances and paternal leaves as well as positive actions and research funding. The universal Nordic policies of reconciliation of work and family life are seen as supporting gender equality in science and there are plans to remove the barriers that prevent women researchers from continuing in working life (See, for example, European Commission 2008).

This research policy structure of ministries and research councils produces different types of action plans, strategies and positive measures to support gender equality in science. There are different emphases at different times and even examples of booms in the support for gender equality. In the case of *Norway*, the Research Council has a Gender Equality Plan including monitoring activities, discussions of evaluation criteria, research management developments and educational activities. The main positive actions in Norway, according to Gulbrandsen (2001, 5) have included:

- Economic rewards to institutions with a greater number of female graduates and doctorates
- Personal promotions from senior lectureship to full professorship for female researchers
- Earmarking of grants and positions for female researchers.
- Mentor projects and courses and projects to build self-esteem, motivate and qualify women for a research career or management positions in trade and industry
- Improvement of supervision and work conditions, including measures against sexual harassment.
- Campaigns to recruit female students into fields with a low percentage of women
- Opinion-forming activities such as conferences and seminar.
- Information campaigns in the various media
- Prizes and rewards

## Norway

### **Melby, K. 2007, Gender balance in academia – golden opportunities, Committee for Mainstreaming – Women in Science, Oslo.**

There is unequal distribution of men and women in large parts of academia in Norway. Women in particular are underrepresented in scientific positions in a number of disciplines, and the distortion increases higher up in the system. Still, a large majority of Norway's professors are men (83), and the development towards increased gender balance proceeds slower than we could have expected based on demographics, including the large increase in female students over the last two decades. In a governmental report about women in research from 2002 a suggestion was made to establish a committee for mainstreaming, and this is the final report from this committee. The mandate of the committee was to support and give recommendations that could contribute to mainstreaming and equality work for institutions in the university and college sector and thereby also to increased equality. The committee was also instructed to contribute to a general increase in focus on challenges related to the unequal gender balance in academia. The work for equality requires constant renewal and new thinking, thus the committee was also encouraged to have an international focus. Equality in academia is about justice, the committee leader Kari Melby writes in this report. It is about reaching national research political goals. We can not afford to lose so many talents and we are dependent on recruiting and retaining women. The forthcoming generational shift combined with good access to qualified women gives a golden opportunity to succeed in the goal of reaching a gender balance. Political acknowledgment of the problem is necessary, but not sufficient to succeed. The challenge in the future is to turn knowledge into action.

The continual updating of the Equality Plan of the Academy of *Finland* (the national research council) is based on the principle of mainstreaming and its focus areas are: 1) preventing discrimination and harassment, 2) recruitment and advancement in research careers, 3) reconciling work and family life and 4) gender balances among evaluators and reviewers. The Equality Plan expresses the positive selection (posts, research funding) of a minority-sex candidate in the case of equally qualified candidates or candidates who differ only slightly in their level of qualification. A target for gender balance among the reviewers is also included, but has not been reached thus far. The Equality Plan also includes ambitious aims for the annual monitoring of gender equality development and gender equality indicators (European Commission 2008, 23, 25, 97). The funding period granted by the Academy of Finland may be extended based on maternity, paternal and parental leaves. The Academy of Finland entitles researchers with minor dependents to a 20% increase in grants in accordance with the Equality Plan 2005–2007. (Ruest-Archambault et al. 2008, 65)

Important achievements in Finland towards greater gender equality in science include (Kurki et al. 2001, 3, 8):

- 1990 - Guidelines for universities issued by the Ombudsman for Equality
- 1997 - The working group of the Academy of Finland to advance women's careers in research created.
- 2000 - The follow-up group of the Academy of Finland to monitor the advancement of women's careers in research created.
- Updated Equal Opportunities Plans for the Academy of Finland 2000–present.
- 1995 – New system for postgraduate training launched. Finnish graduate schools have also assisted women in improving their opportunities for more efficient doctoral training.

## Finland

**The Finnish Research School in Women's and Gender Studies** is a collaborative, interdisciplinary doctoral programme for women's and gender studies. The research school's core operations include regular scholarly courses and theme seminars, annual work and follow-up meetings as well as individual dissertation supervision. The doctoral programme encompasses the discipline of women's studies at the universities of Helsinki, Joensuu, Jyväskylä, Lapland, Tampere and Turku as well as at Åbo Akademi University. The doctoral programme currently includes six doctoral students funded by the Ministry of Education from 2007 to 2011 as well as 12 doctoral students working under other funding. By spring 2007, the doctoral programme had produced 20 doctoral dissertations. The doctoral candidates' salaries are paid by the Ministry of Education and the affiliated universities, and on funding from the Academy of Finland. The doctoral programme has been operating since the establishment of the doctoral research school system in Finland, initially (1995–2006) under the name Gender System Graduate School.

<http://www.naistutkimuksentohtorikoulu.fi/english>

*Swedish* policies for gender equality in science have been innovative on the global scale. The Helsinki Group, Sweden (2001) describes these in its report at the start of the millennium. The Swedish government financed specific post-doctoral fellowships for women during the period of 1995–2000 to increase and facilitate the achievement of higher qualifications by women in academia. Simultaneously, the Government financed specific guest-professorships for (foreign) women researchers to come to Sweden. To increase the number of female post-graduate students obtaining their degrees, the Government has provided 30 million SEK per year since 1995. The support is given especially to research areas in which there are few women.

During 1995, the Government created 32 posts at full professor level especially for women. Men were allowed to apply for these "Tham-professorships" but could only be given the position if there was no suitable female candidate. The professorships also had extra funding of 73 postdoctoral fellowships. The financing of the full professorships 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, overturned this Tham measure. A discussion is continuing in Sweden about whether the laws really need to be changed to apply this type of positive action. (Ruest-Archambault et al. 2008, 115)

The peer review groups at the Swedish Research Council and the two smaller research councils generally have an equal representation of men and women, except for the groups for the natural sciences and engineering (European Commission 2008, 125). The government has set a recruitment target of female professors at universities and university colleges for the period 2005 - 2008. The target varies from 17% to 36% depending on the area of education. The government has also set an overall target of 50% of each sex for the recruitment of staff in universities. The universities are bound to state in their annual report how they have acted to reach these targets. (Ruest-Archambault et al. 2008, 115)

In 2006, the Swedish Research Council founded 3 Centres of Gender Excellence, which received SEK 60 million. These are the ones previously mentioned (Ruest-Archambault et al. 2008, 115):

- The Uppsala Centre for Gender Research
- Umeå University
- Linköping University in cooperation with Örebro University.

In addition to these centres, the Ministry of Education allocated new funds totalling SEK 22 million for gender research for the year 2005. Special funding is available for women in science and can be used by agencies when necessary. Vinnmer is a large programme promoting postdoctoral women researchers and was launched in 2007 by the Swedish Governmental Agency for Innovation Systems. The programme will run until 2014 and the total budget is just over SEK 600 million (Ruest-Archambault et al. 2008, 115). Vinnova (The Swedish Governmental Agency for Innovation Systems) started this Vinnmer programme especially for promoting the career development of female researchers after the postdoctoral career phase. The long-term objective is to help to increase the number of postgraduates who can become 'leaders of the future' in academia and industry (European Commission 2008, 25).

## Sweden

### Centers of Gender Excellence

The Universities of Uppsala, Umeå and Linköping were the winners of the call for proposals for "Centers of Gender Excellence". The international panel of judges was impressed by Swedish research. The most important criterion was the groups' potential to become leaders in the international field. One of the most important objectives of the call for proposals is to increase internationalisation of Swedish gender research. A total of 60 million will be distributed to these Centers of Gender Excellence. They will each receive 20 million SEK over a five-year period 2007–2012.

The three chosen environments are:

- Nature/Culture Boundaries and Transgressive Encounters, Uppsala Centre for Gender Research
- Challenging gender - a research programme at Umeå advanced gender studies, Umeå University
- Gendering EXcellence - GEXcel: towards a European Centre of Excellence in transnational and transdisciplinary studies of changing gender relations, intersectionalities and embodiment, Linköping University in cooperation with Örebro University"

<http://www.genus.se/english/resources/gender-research-in-sweden/gender-excellence/>

### VINNMER

Promotions for VINNMER Fellows (female researchers) via strategic collaborations for milieus as the part of VINNOVA action.

The long-term objective of the VINNMER programme is to help to increase the number of postgraduates that can become the leaders of the future at universities/colleges, centres, research institutes and companies. VINNMER aims to increase the opportunities for women postgraduates to qualify as researchers after gaining their PhDs.

The programme is primarily aimed at women who have a PhD and who have completed their Post Doc qualification. The programme applies to qualification for people who conduct needs-driven research within one of VINNOVA's operational fields and in co-operation between a university/college and operations in the Private/public sector.

The programme will run over the period 2007-2014 and the total budget, including co-funding, is just over SEK 600 million. The programme budget is strengthened by the European Commission People FP7 - Marie Curie Actions - with €5 millions.

<http://www.vinnova.se/In-English/Activities/Strong-research-and-innovation-environments/VINNMER/>

In *Denmark*, the Minister of Research and Information Technology launched a research programme called FREJA (Female Researchers in Joint Action) for young female researchers in 1998. The funding was 78 million DKK and the aim of the project was to get more good female researchers into Danish research. Later the Ministry of Science, Technology and Innovation launched a research programme for young female researchers. In the period 2006-2008, DKR 45 million were granted to research projects in natural and technological sciences. Both men and women were welcome to apply for the grants, but if two applicants are just as qualified, the applicant from the underrepresented gender will receive the grant. Like other public institutions in Denmark, the universities must account for their achievements in gender equality every second year to the Ministry of Science, Technology and Innovation. Based on the feedback from the universities, the ministry writes a report on gender equality to the Ministry for Gender Equality (Ruest-Archambault et al. 2008, 59).

**Denmark****FREJA (Female Researchers in Joint Action)**

The Universities In 1998 the Minister of Research and Information Technology allocated 78 million D.kr. on the Finance Bill for the so-called FREJA-projects. The aim of the FREJA-programme was to get more good female researchers into Danish research, to make them more visible, and to ensure more role models for female university students. Hence the projects were to be given to small groups instead of individual researchers.

The frame of the FREJA-programme was very broad. Researchers from all areas of research were given the possibility to apply. The programme was open to both men and women, but a dispensation from the law on equality of the sexes was granted. This meant that the Danish Research Councils who distributed the FREJA grants could give priority to a female applicant if two applicants were equally qualified.

Moreover, the FREJA grant was given to a senior researcher who then received sufficient funding for a research group related to the project. The FREJA projects were running until 2002, hence. The interest for the programme was immense and the Research Councils received 327 applications who applied for 2.2 billion D.kr. 307 applicants were women. 16 researchers, all female, have received grants for research projects.

(Reuss and Madsen 2001)

In *Iceland* four evaluation panels, appointed by the national Science and Technology Policy Committee for two-year terms, perform the evaluation of applications. The governing Board is gender balanced, the Chair for 2006-2009 is a woman, and evaluator panels are gender balanced as well. There is a male majority in the evaluation group on physics and engineering and a female majority in the social sciences and humanities (European Commission 2008, 40). There have been several research projects related to gender equality in Iceland coordinated mainly by RIKK, such as: 'Towards the Closing of the Gender Pay Gap (EU-Partners)', 'Equality in Icelandic Society – Images and Reality', 'European Training to the Gender Approach' and 'Work Cultures, Gender Relations and Family Responsibilities'. In addition to research, each year RIKK offers close to 20 talks, lectures, conferences and symposia. Lecturers include both Icelandic and foreign scholars from various disciplines.<sup>24</sup>

**Iceland****The Centre of Excellence in Equality and Diversity Studies (University of Iceland)**

The Centre for Women's and Gender Studies at the University of Iceland (RIKK) has been awarded a Centers of Excellence and Research Clusters grant from the Icelandic Science and Technology Council (Rannís) to start the Centre of Excellence in Equality and Diversity Studies. Funding will be provided for up to seven years, starting with 35 million kr. for the year 2009. The grant is subjected to review after three years. Never before have such generous grants been awarded to research in Iceland. Out of more than 80 applications, 10 made it through the first round, and were shortlisted for the second and final round in October 2008. Finally, three applications were awarded grants.

This outcome represents a major turning point in Gender, Equality and Diversity Research in Iceland. It presents new and exciting possibilities for cooperation with institutions and universities abroad. The grant signifies an important recognition and incentive. Centers of Excellence are a new model for research programs in Iceland and it is a privilege to get the opportunity to establish such a centre in cooperation with specialists/scientists, institutions and businesses in Iceland and abroad.

<http://www.arnastofnun.is/page/RIKK-english>

<sup>24</sup> <http://www.arnastofnun.is/page/RIKK-english>

The following table of Ruest-Archambault et al. (2008, 42) summarizes the central gender equality policies related to general equality and science in the EU, Associated and Western Balkan countries:

**Table 2: Summary charts of equality measures (Ruest-Archambault et al. 2008, 42–43)**

Measure / Country	AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK
1- Equal treatment law	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2- Ministry for Women's affairs./ Statutory Gender Equality Agency	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
3- Commitment to Gender Mainstreaming	x					x	x	x	x	x			x	x	x	x	x		x					x	x	x	
4- Women in Science Unit	x				x				x	x			x	x				x						x	x		x
5- Quotas	x	x							x			x		x												x	x
6- Targets	x								x	x																x	x
7- Sex-disaggregated statistics	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x		x	x			x	x	x	x	x	x
8- Networks for women in science	x	x				x		x	x	x			x						x						x		x
9- Mentoring for women in science	x							x	x				x						x							x	x
10- Women Studies	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x
11- Gender Studies	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x
12- Gender equality plan in universities	x					x		x		x			x					x	x							x	x
13- Special funding available to women in science	x							x	x	x			x						x							x	x
14- Resources for returnees	x									x									x								x
15- Paternity leave	x	x				x	x	x	x	x	x	x	x		x	x			x			x	x		x	x	x

Measure / Country	AL	BA	HR	MK	IS	IL	ME	NO	RS	CH	TR
1- Equal treatment law	X	X	X	X	X	X	X	X	X	X	X
2- Ministry for Women's Affairs/ Statutory Gender Equality Agency	X	X	X		X		X	X	X		X
3- Commitment to gender mainstreaming		X	X		X			X			
4- Women in Science Unit					X	X		X			
5- Quotas								X			
6- Targets					X			X		X	
7- Sex-disaggregated statistics			X		X			X		X	
8- Networks for women in science								X		X	
9- Mentoring for women in science								X		X	
10- Women Studies	X	X			X	X		X	X	X	X
11- Gender Studies	X				X	X		X	X	X	X
12- Gender equality plan in universities					X			X			
13- Special funding available to women in science						X		X		X	
14- Resources for returnees										X	
15- Paternity leave					X	X		X	X		

Legend:	
X	: Yes, already in Rees (2002)
X	: Yes (new)
	: Partially*
Blank cell = no	

Table 2 shows that several national research councils have adopted a proactive role in promoting gender equality in research funding. These include the Austrian Science Fund (FWF), the Academy of Finland, the German Research Foundation (DFG), the Netherlands Organization for Scientific Research (NOW), the Research Council of Norway, the Science Foundation Ireland (SFI), the Swedish Research Council, the Swiss National Science Foundation (SNSF), and the UK Research Councils. Many of these have established permanent infrastructures to monitor and promote gender equality, launched action plans and set up specific measures to promote women in research. They are conducting or are planning in-depth studies and monitoring activities on gender and research funding. Most such proactive research councils are from countries where there is a political will to promote gender equality in research, and in which the overall gender gap is among the smallest in the world (European Commission 2008, 23).

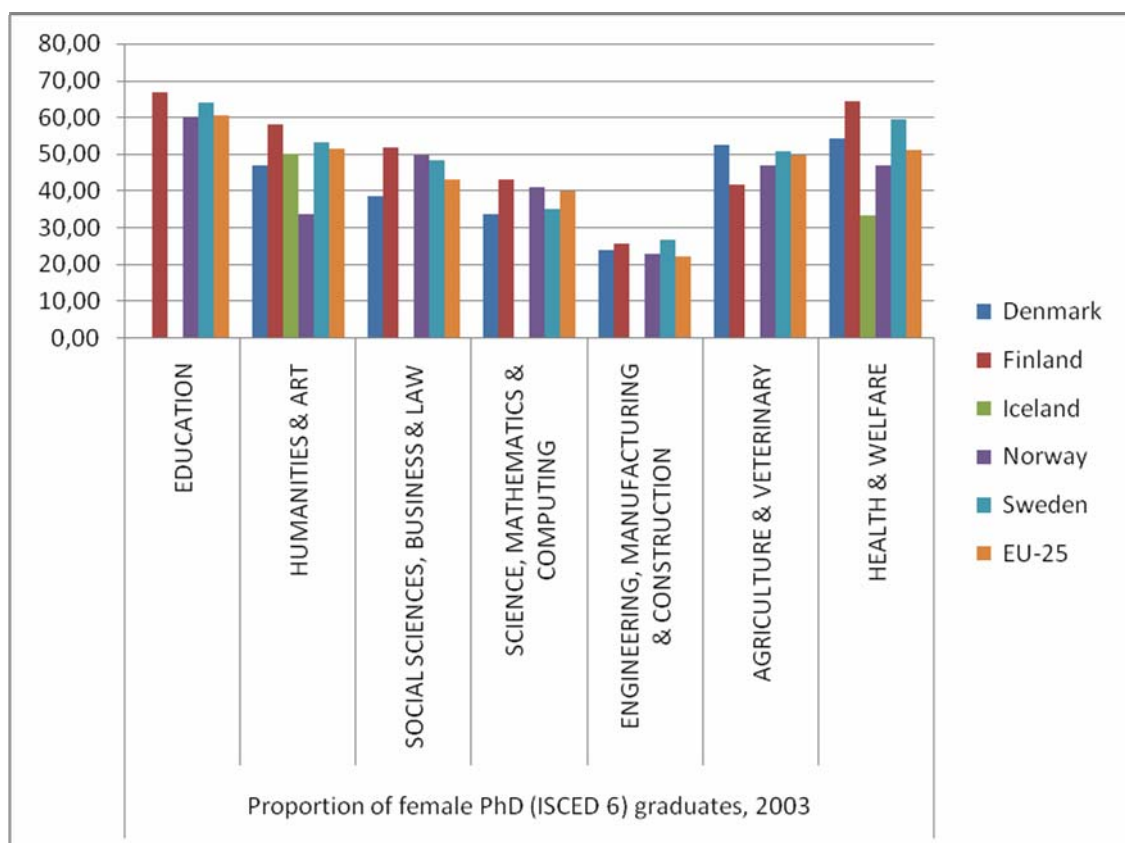
The table shows that the central gender and science policies are well promoted in the Nordic countries. However, in all the Nordic countries resources and support for work returnees are missing. In Iceland and Denmark, gender quotas for scientific bodies are lacking. In addition, the special funding for women in science and mentoring services were absent in Iceland and Denmark at the time of the chart was drafted. Iceland and Norway have a Women and Science unit in the ministry, while the other countries do not. Gender quotas are missing in Denmark and Iceland. In the Nordic comparison, Sweden, Finland and Norway are at the highest level, while Denmark and Iceland are lagging behind. According to this table, other

countries in addition to the Nordic ones with advanced gender and science policies are Austria, Germany, the Netherlands, Spain and the United Kingdom.

## 1.6 Gender segregation in science in general

Despite the political advances of the Nordic countries in the area of gender and science issues, there exists strong vertical and horizontal gender segregation in science. The position of women in science worsens the higher one goes up the scientific hierarchies. This gap between men and women has motivated Nordic gender and science-related research and shaped content and epistemological issues. Many of the studies are aimed at exploring how social and cultural factors contribute to specific patterns of gender inequality or how gender equality becomes apparent in science. Figure 2 shows the overall picture of gender segregation in the Nordic countries:

**Figure 2: Proportion of female Ph.D. graduates by research field in the Nordic countries 2003<sup>25</sup> (calculated from She Figures 2006)**



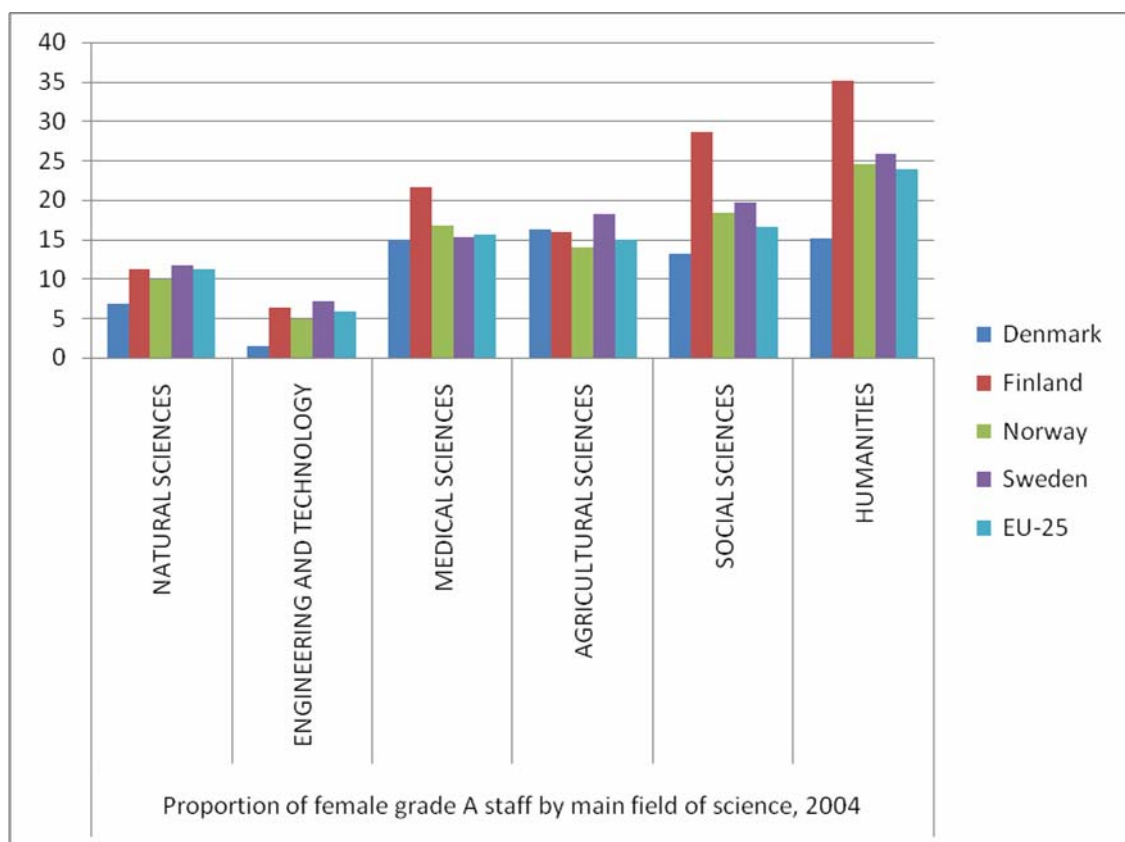
The figure confirms that there exists relatively strong gender segregation, both horizontal and vertical, in research in the Nordic countries. Despite the strong equality image of the Nordic welfare state, gender research has revealed strong gender segregation and has uncovered many discriminatory processes and hindrances for women researchers in academia. Gender segregation is extensive in the Nordic countries, and in the welfare state much of the care, which has been governmentalized and professionalized, is given by the female labour force working in the public sector. This trend has especially fostered horizontal segregation and created large occupational sectors using female labour. The phenomena of gender segregation are twofold: women are overrepresented at the lowest level of the scientific hierarchies in the “soft” sciences (education, humanities and life sciences) and underrepresented in the “hard” sciences (engineering, technology, science, mathematics and computing).

<sup>25</sup> Data missing for Iceland

Research in all the Nordic countries reveals an interest in the extent to which women are underrepresented in certain scientific and professional fields. The research focus is on identifying fields of segregation and measuring the sex composition. The “hard sciences”, like engineering, technological studies and computing, are popular fields of study. In Sweden and Norway, medicine and its internal segregation by specialization areas are studied. Another important field of study is “boy’s and girl’s” choices of studies, which lead later on to the horizontal segregation of scientific disciplines and professional careers. The idea behind this focus, in addition to general gender equality, is to enhance the recruitment of intellectual resources and the creation of innovative for the hard sciences.

The overall picture of horizontal segregation in the Nordic countries shows the divide between technical and humanistic science and a leaky pipeline or women disappearing in disproportionate numbers at each rung of the academic ladder (Figure 3):

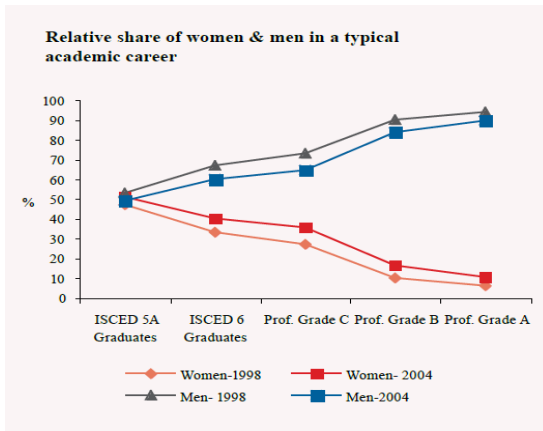
**Figure 3: The proportion of highest A grade (full professor) female staff by main scientific fields in the Nordic countries 2004 (calculated from She Figures 2006)**



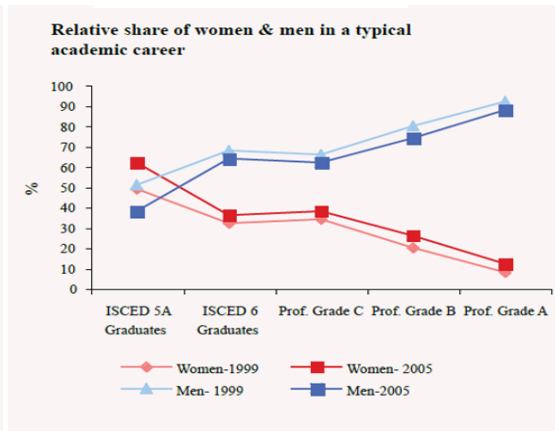
The proportion of women professors is low even in the soft sciences and especially low in natural and technical sciences. Many studies have attempted to explain this situation in the Nordic countries, which is extremely surprising in view of the strong political commitment to gender equality issues. In Figure 3, Finland appears to differ from the general picture, but there is no clear explanation for the difference. One explanatory factor could be the late and rapid expansion of the public higher education sector during the 1970s and 1980s, when all available resources were needed all over the country. This made room for women professors too. The established universities were not restricted by “old male traditions” and were strongly orientated towards welfare state professions. The “women’s disciplines” were developed, with Ph.Ds and full professorships in these fields coming into existence. Another explanation is a relatively late industrialization with an expanding public sector which created possibilities, though segregated, for women in the labour market and thus in science as well. Figure 4 shows the picture of vertical segregation in the Nordic countries compared to the EU average:

Figure 4: Vertical gender segregation in a typical academic career (compiled from Ruest-Archambault et al. 2008, 45, 59, 65, 117, 126, 131)<sup>26</sup>

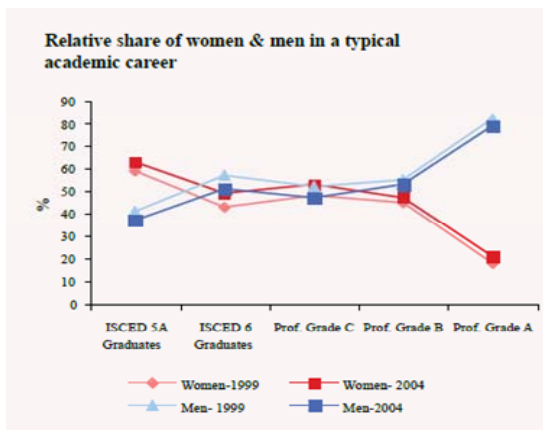
EU Member States



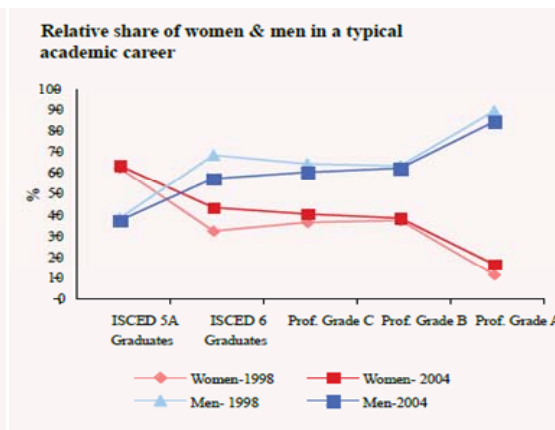
Denmark



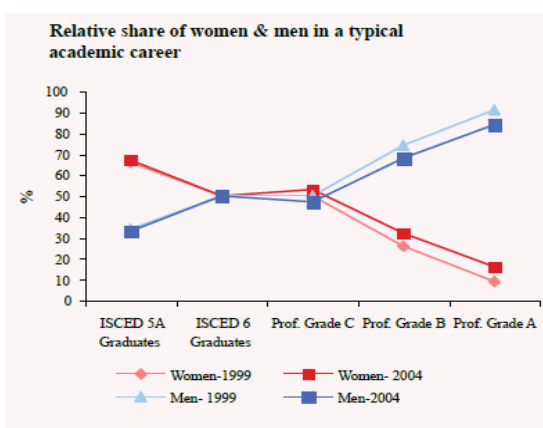
Finland



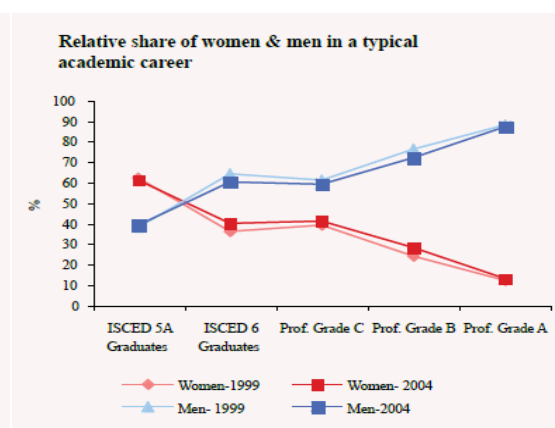
Sweden



Iceland



Norway



<sup>26</sup> Definition of grades: A: The single highest grade/post at which research is normally conducted; B: Researchers working in positions not as senior as top position (A) but more senior than newly qualified Ph.D. holders; C: The first grade/post into which a newly qualified Ph.D. graduate would normally be recruited; ISCED 6: Tertiary programmes which lead to an advanced research qualification (Ph.D.); ISCED 5A: Tertiary programmes to provide sufficient qualifications to enter into advanced research programmes & professions with high skills requirements. (She Figures 2006, 55)

This figure shows that overall vertical gender segregation in the Nordic countries is less intense than the EU average. Finland is the most equal in the early career, with segregation in academic careers occurring in the full professorship phase, and is then strong. Similarly, the early career in Iceland is rather equal but becomes unequal at the C grade. In Norway and Denmark, segregation starts in the early phase of the career. Sweden is an average country in terms of vertical segregation and between 1999 and 2004 there were no major changes. In Sweden the overall situation has improved slightly during this period, possibly because of political measures. In Denmark, the situation has worsened in the early career phase, perhaps due to the lack of political measures.

The figure shows that more women than men begin an academic career. In the Nordic countries too, the phenomena called the “leaky pipeline” is present. It is a situation where women begin scientific careers, where in some disciplines they may even be in the majority, but then disappear in disproportionate numbers at each stage of the academic ladder. The reason for this is not clear or unequivocal. This phenomenon appears to be constant across national boundaries and discipline boundaries, although there are variations in degree (Rees et al. 2002, 15–16).

In Finland, the academic career is characterized by a high degree of unpredictability until the years spent as a senior staff member, due to the extensive use of fixed-term positions, the lack of a tenure track and increased external funding. Fixed-term contracts have even been introduced at the highest academic level with five-year targeted professorships in some cases. This is also the case in the Finnish governmental research sector, where some researchers have distinctive career paths while career advancement opportunities are limited or lacking for others. Large proportions of researchers outside academia also have fixed-term contracts and combine research activities with other tasks, postponing completion of their doctoral degree for this reason. Gender equality in research careers and the promotion of women's research careers have been given limited attention and several sectoral and private research institutes lack the gender equality plan required by law. Because of the rather heterogeneous nature of business R&D, research careers in this sector vary considerably. In general, companies offer researchers career options in research but also other tasks combining research and other company activities aside from the research career (Prometea 2006, 58–60).

### Denmark

**In the case Denmark** the women share of scientific staff in academia has remained almost stagnant from 1970 to 2001 (18%-21.5%), while among Master graduates the women share increased from 22% to 57% in the same period. This means that it has become more difficult for women to become employed in academia (Henningesen 2002). Most women in the Danish academic staff are found in the fixed-contract lower positions in the academic hierarchy (research assistants, postdoc.'s, PhD students, etc.). Through university reforms in the last two decades these groups of staff have lost influence on research priorities to the permanent staff, resulting overall in a downgrading of women's research interests.

**VERTICAL SEGREGATION:** Recruitment of staff in Danish academia very often involves a relatively long recruitment period (6+ years), in which the candidate must work his or her way through untenured positions as research assistants, amanuensis, post-doc. etc. This period of untenured employment unfortunately coincides with the life phase when young researchers establish families, and many young women scientists thus give up research to opt for more secure positions in other sectors. In Denmark, the 8-year rule states that one may only apply for an adjunct position within 8 years after graduation. Hence, this rule discriminates women who take maternity leaves within these 8 years, since they will be less qualified. (Hansen 1998)

### HORIZONTAL SEGREGATION:

The introduction of access limitation to higher education has a masculine bias, since access limitation is particularly restrictive in the studies that attract many women, while the male dominated studies have grown. The educational priorities are typically projected as the results of planning to the benefit of employment and societal needs. The different educational choices of men and women, however, reflect their different societal priorities. Thus, the higher education and scientific environment maintains a male bias by prioritising men's interests to women's.

## 1.7 The extent and quality of gender and science policy – a general assessment

According to Le Feuvre (2009, 15-16), one can conclude in the light of the existing statistical data on women's academic careers that the "patriarchy" model of occupational feminization provides a rather convincing interpretative framework for the situation of women in academia in contemporary Europe. It is true that women all over the world are victims of discrimination and of the effects of patriarchal stereotypes. Often their academic careers are less "successful" than those of their male counterparts. However, there are considerable differences both between countries and within the same national context. The questions that nevertheless remain are: 1) What pattern of change should we work for? 2) Which model of occupational feminization do we want to promote? and 3) What are the most effective actions for bringing about certain forms of gender equality in academia? The exclusion/inclusion of women from academia can be achieved through several distinct mechanisms and these are not always material and symbolic foundations of the sex/gender system as a whole. In order to design effective equal opportunity policies or to improve the effectiveness of existing measures, it is necessary to understand more fully the precise mechanisms that underpin the feminization process in specific national and professional contexts (Le Feuvre 2009, 20).

The positive gender equality results expressed in the Nordic countries are usually related to developments in research funding the availability of such funding. In 2004, the Research Council of Norway received, for example, about 4700 applications for research grants; 22% of the applications came from women. For almost all fields of science, women had a higher success rate than men. In 2007, the total number of applications was 5200, of which 28% came from women. In total, women had a 3 percentage-point higher success rate than men in 2004 and men had a 3 percentage-point higher success rate than women in 2007. The Icelandic case reveals similar results and arguments (Prometea 2006, 103, 115). However, the study of Wennerås and Wold (1997) of the former Swedish Medical Research Council found that women had to publish significantly more to receive the same scores from peer reviewers. Later studies in Sweden in 2003-2006 show the men had a higher success rate than women in medicine and in 2007 men had a higher success rate than women in natural sciences and engineering (European Commission 2008, 125).

The Tham-professors in Sweden have probably had the greatest impact on gender and equality in academia. This gender equality measure started an intensive discussion on how to promote women in science. Is it possible to affect gendered structures with positive measures? Are Tham-professorships the right way? The big question in this case was whether the women appointed as Tham-professor would be as qualified as the other professors. Would there be an A and B team of professors in the Swedish research community? The Tham-professorship has become derogatory to some and complimentary to others. However, if one looks carefully, it is possible to argue that the appointed Tham-professors probably would have become professors anyway. Hence, the procedure was merely speeded up and no the A and B teams were created (Helsinki Group Sweden 2001).

One of the central European problems concerning gender and science issues is the monitoring of the developments in research funding. Only in a handful of countries is gender monitoring of major funding organizations regularly conducted. The national funding organizations in Germany, the Netherlands, Sweden and Switzerland do this most comprehensively. Data availability is the first cornerstone of gender monitoring. In earlier EU mapping exercises on research funding, many gaps in data were identified. Systematic time series by discipline and funding instrument were not available from the majority of countries. Based on the available data, one cannot conclude that women's success rates are systematically lower (European Commission 2008, 70).

In Finland, most of the public funding allocated to technological research is channelled through the National Technology Agency (Tekes), but no data are available on the allocation and use of Tekes' funding of research work carried out by women. In the Finnish research system, the way public funding affects women's research careers is a significant, although as yet uncharted, area (Kurki et al. 2001, 7). In Sweden, there are three research councils and one agency for innovation systems. There are 16 public research foundations, originally funded with state funds, but few of these funding bodies include the success rates of women and men in their annual reports (European Commission 2008, 125). In Iceland too the availability of gender-disaggregated statistics is poor and no systematic monitoring is carried out (Prometea 2006, 103).

The general assessment of science policies and positive measures affecting gender equality appears inadequate and has low priority at the ministerial level, especially in Denmark. Currently, no national body has the task of monitoring the development of the research system from a gender perspective (Prometea 2006, 96). In Norway, some positive measures have been evaluated. Many of them are too small and insignificant to form any basis for evaluation. Most of them are specific measures targeted towards 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 well they function (Gulbrandsen 2001, 5–6). In Finland, the Committee of the Ministry of Education (see Prometea 2006, 60–61) identified several gaps in the knowledge base on research careers in Finland. The knowledge base needs general improvement and should relate to the careers of women researchers. The Committee listed the following gaps, among others:

- Studies on employment location and mobility of doctors have not been conducted since 1999.
- Follow-up of research careers in different disciplines is difficult. For example, data are not gathered on age at time of appointment to the professoriate.
- Several relevant issues related to gender equality are not systematically followed up. For example, university appointments by gender and gender of evaluators and appointment committee members are not followed up.
- The international mobility of Finnish researchers lacks systematic monitoring.

\*\*\*

The elimination of obstacles and the promotion of the gender perspective with regard to research careers in the Nordic countries are primarily seen as a problem of research policy (including positive measures), research funding and research monitoring. The problems are politically related to the administrative structures, the statistical monitoring systems and the financing of research and positive measures. A larger structural analysis of the gender system is absent at the policy and the research strategy level. Only family policy and maternity leaves are seen as relevant to the support of women engaged in a research career or working in science. Gendered structures, cultures and hierarchies outside scientific institutions, probably affecting many women's opportunities to make careers in science, are beyond the scope of science policy's aims. The increasing market orientation of research is a problem, especially when science and research policy remain so narrowly orientated from the perspective of gender and capitalism. Research in the private sector is absent from discussions of gender and science policies in all the Nordic countries; gender and science policies do not affect private R&D research. Only in Norway are there examples of the private sector's interest in supporting women's research careers. In the other countries, there have been only limited positive measures used to guide girls into technical professions.

Another problem is one of discourse. The developments in the field of gender equality in science are presented through positive rhetoric. Everything is gender mainstreamed in the Nordic countries and the problems are narrowed down to technical and administrative issues. The heroic tale of the institutionalization of women's studies leaves behind all the gendered problems of science. This is one expression of state feminism—now in the field of science.

## 2. Analysis by topics

### Statistical background

The following analysis is based on the Nordic entries in the GSD-database. In the tables, it is notable that in one publication, there might exist one or more dimensions/variables, i.e., a single publication might include several research approaches. Table 3 shows first the total number of entries for the Nordic countries and then the percentage of all GSD publications corresponding to the Nordic countries:

**Table 3: Nordic entries in the GSD**

Country of publication		
		<b>% GSD publications in Nordic Cs</b>
	<b>n</b>	
Denmark	259	29.3
Finland	112	12.7
Iceland	21	2.4
Norway	185	21.0
Sweden	306	34.7
<b>Nordic Cs</b>	<b>883</b>	<b>100.0</b>
		<b>% all GSD publicatons</b>
	<b>n</b>	
Nordic Cs	883	19.4
<b>Total</b>	<b>4 549</b>	<b>100.0</b>
		<b>% all GSD publications</b>
	<b>n</b>	
Denmark	589	12.9
Finland	434	9.5
Iceland	49	1.1
Norway	265	5.8
Sweden	624	13.7
<b>Nordic Cs</b>	<b>1 256</b>	<b>27.6</b>

The Nordic countries account for 19.4% of all GSD entries and have 883 publications in the database. Most of the Nordic publications come from Sweden and Denmark. Iceland has only 21 entries due to its tiny population. The overall GSD literature analyses the Nordic countries more than their share in the GSD would predict (19.4%/27.6%). Now Sweden and Denmark again represent a relatively large share of the countries analysed, as does Finland.

**Table 4: Timelines of Nordic publications in GSD**

<b>Time trends - Average number of publications per year</b>			
	<b>Average number of publications per year</b>		<b>Ratio NCs/ACs</b>
	<b>Nordic Cs</b>	<b>All Cs</b>	
1980-1984	11.0	33.4	0.3
1985-1989	19.0	53.4	0.4
1990-1994	30.0	91.6	0.3
1995-1999	49.6	162.6	0.
2000-2004	76.2	310.4	0.2
2005-2007	84.3	338.0	0.2
2008-2009	37.0	139.0	0.3
<b>Time trends - Period analysed</b>			
	<b>Period analysed (%)</b>		<b>Ratio NCs/ACs</b>
	<b>Nordic Cs</b>	<b>All Cs</b>	
General / Not specified	1.4	4.5	0.3
Before the 18th century	1.0	1.4	0.8
18th century	1.3	1.4	0.9
19th century	5.1	5.0	1.0
1900-1945	9.6	10.1	1.0
1946-1970	12.1	13.6	0.9
1970s	19.4	19.5	1.0
1980s	37.5	33.0	1.1
1990s	52.6	49.5	1.1
2000s / Present-day	44.7	46.4	1.0

Table 4 shows that the number of publications in the Nordic countries has been increasing over the years in line with global scientific publishing activity. Compared to other European countries, there were a lot of publications in the period from 1985 to 1989. The contents are mostly related to the period of 1990 to the present, to a greater extent than in the other GSD countries.

**Table 5: Meta-research topics analysed in GSD publications**

Topic analysed		Topic analysed (%)		Ratio
		Nordic Cs	All Cs	NCs/ACs
HS	Horizontal segregation	48.2	43.2	1.1
VS	Vertical segregation	40.8	44.7	0.9
PG	Pay and funding	13.1	12.6	1.0
SI	Stereotypes and identity	64.0	54.0	1.2
LA	Science as a labour activity	23.6	32.6	0.7
SE	Scientific excellence	27.1	19.8	1.4
RC	Gender in research contents	37.3	31.5	1.2
PE	Policies towards gender equality in research	28.7	28.5	1.0

Table 5 shows (bearing in mind again that a single publication can deal with several topics simultaneously) that the Nordic publications deal mostly with the topics<sup>27</sup> of stereotypes and identity, vertical segregation and horizontal segregation. A less studied topic is pay and funding. The topics of scientific excellence, stereotypes and identity and gender in research contents have received relatively more attention compared to the other countries, while the topics of science as a labour activity and vertical segregation have been studied comparatively less.

**Table 6: Institutional sector analysed in GSD publications**

Institutional sector analysed			
Institutional sector	Nordic Cs (%)	All Cs (%)	Ratio Ncs/Acs
All/General	51.1	48.8	1.0
Other	48.9	51.2	1.0
Total	100.0	100.0	1.0
Institutional sector - Other	Nordic Cs (%)	All Cs (%)	Ratio Ncs/Acs
Business enterprise sector	9.3	10.6	0.9
Government sector	10.4	26.0	0.4
Higher education sector	94.6	86.7	1.1
Private non-profit sector	2.4	3.4	0.7

Half of the Nordic research has no specific institutional sector of analysis. The other half mainly deals with the higher education sector. The government and business enterprise sectors are studied less. In comparison to other countries, the private and government sectors are underrepresented. Studies of the government sector in particular are relatively scarce. Table 6 shows the overall tendency in Nordic studies to concentrate on the higher education sector. (Table 6)

<sup>27</sup> The contents and characters of each topic are described at the beginning of chapter 2.N level. The topics are based on a working structure of this project and that of the GSD database. See more: [http://www.genderandscience.org/doc/META\\_methodology.pdf](http://www.genderandscience.org/doc/META_methodology.pdf).

**Table 7: Scientific field analysed in GSD publications**

<b>Scientific field analysed</b>			
<b>Scientific field</b>	<b>Nordic Cs (%)</b>	<b>All Cs (%)</b>	<b>Ratio Ncs/Acs</b>
All/General	32.8	38.7	0.8
Other	6.,2	61.3	1.1
Total	100.0	100.0	1.0
<b>Scientific field - Other</b>	<b>Nordic Cs (%)</b>	<b>All Cs (%)</b>	<b>Ratio Ncs/Acs</b>
Education	23.7	20.6	1.1
Humanities and arts	26.9	18.3	1.5
Science, mathematics and computing	48.9	46.6	1.1
Agriculture and veterinary	16.1	8.5	1.9
Health and social services	28.8	21.9	1.3
Engineering, manufacturing and construction	31.4	25.1	1.2
Social sciences, business and law	41.4	34.1	1.2
Services	0.2	0.7	0.3
<b>Specific scientific discipline</b>	<b>Nordic Cs (%)</b>	<b>All Cs (%)</b>	<b>Ratio Ncs/Acs</b>
No	73.9	72.8	1.0
Yes	26.1	27.2	1.0
Total	100.0	100.0	1.0

Two thirds of the Nordic research deal with a specific scientific discipline. Most of the gender and science research is conducted in science, mathematics and computing and in the social sciences, business and law. Less research is done in the fields of agriculture and veterinary (service is not an academic discipline in Nordic countries). The proportion of gender and science research related to the fields of agriculture and veterinary and to those of the humanities and the arts is clearly greater than in the other countries. It is worthy of note that the classification is not overly broad, which reduces the role of the social and human sciences. (Table 7)

**Table 8: Methodological approach of GSD publication**

<b>Methodological approach</b>			
<b>Empirical research</b>	<b>Nordic Cs (%)</b>	<b>All Cs (%)</b>	<b>Ratio Ncs/Acs</b>
Nonempirical research	59.1	50.6	1.2
Empirical research. Quantitative techniques	9.9	17.9	0.6
Empirical research. Qualitative techniques	21.7	22.7	1.0
Empirical research. Quali-quantitative techniques	9.4	8.8	1.1
Total	100.0	100.0	1.0
<b>Approach</b>	<b>Nordic Cs (%)</b>	<b>All Cs (%)</b>	<b>Ratio Ncs/Acs</b>
Conceptual	53.7	39.1	1.4
State-of-the-art	39.7	40.4	1.0
Compilation of statistics	13.7	20.7	0.7
Constructing gender indicators	2.5	2.8	0.9
Empirical research. Quantitative techniques	19.3	26.7	0.7
Empirical research. Qualitative techniques	31.1	31.5	1.0

Most of the Nordic research is nonempirical. In empirical research, qualitative techniques are preferred to quantitative techniques. Compared to other countries, the low use of quantitative techniques is clear, while the practice of nonempirical research is more common. The use of nonempirical research is in connection with conceptual and state-of-the-art research approaches. The conceptual approach is clearly more used than in the other countries. Proportionally less used approaches are the compilation of statistics and quantitative techniques. The construction of gender indicators is almost completely absent from the Nordic and all other countries. (Table 8)

**Table 9: Empirical research techniques used in GSD publications**

<b>Empirical research techniques</b>			
<b>Quantitative techniques</b>	<b>Nordic Cs (%)</b>	<b>All Cs (%)</b>	<b>Ratio Ncs/Acs</b>
Representative sample	61.2	57.0	1.1
Micro-data	33.5	48.6	0.7
Longitudinal/cohort	6.2	8.2	0.8
Multivariate analysis	30.6	30.8	1.0
<b>Qualitative techniques</b>	<b>Nordic Cs (%)</b>	<b>All Cs (%)</b>	<b>Ratio Ncs/Acs</b>
Biographical research	15.6	17.6	0.9
Case studies	14.9	15.4	1.0
Content analysis	25.4	15.4	1.7
Interviews	60.5	64.8	0.9
Observations	21.8	15.2	1.4

The most frequently used of the quantitative techniques is the representative sample. Less used are longitudinal/cohort methodologies. In comparison to other countries, microdata and longitudinal/cohort studies are less used. The most favoured qualitative techniques are interviews, content analyses and observations. Compared to other countries, the Nordic countries use proportionally more qualitative content analyses and observations. (Table 9)

## 2.1. Horizontal and vertical segregation

The topic of gender segregation in science relates to the underrepresentation of women in higher scientific positions in all research sectors and is a kind of overall description of women's weaker situation in science. The phenomenon of the leaky pipeline describes women's tendency to drop out when moving up the scientific ladder and their slower advancement in the academic career (see Langberg 2006, Henningsen and Højgaard 2002, Rogg 2003, Melby 2007, Johnsson 1997, Högskoleverket 2008 and Husu 2001). In the Nordic countries, the leaky pipeline clearly exists, despite policies and positive actions aimed (albeit ineffectively) at preventing this development. Another aspect is horizontal segregation, with certain scientific disciplines and institutional sectors recruiting and supporting mostly men. It is difficult for women to enter these "male bastions" reproducing the gender relations of science. There appear to be special mechanisms and structures favouring men (see e.g. Grønbæk Hansen 1993b and Dahlerup 1993). Moreover, women tend to select disciplines and professions that have low status in the Nordic labour markets and are strongly gender segregated. It is claimed that more women need to study engineering, technical sciences and computer sciences and that there should be policies and positive actions to guide them (see e.g. Kvande 1984, Henningsen 1993, Teigen and Tvede 1993, Lagesen 2003, Bjarnadóttir and Hallgrímsdóttir 1989 and Näätänen 2000). The problem of segregation is persistent and an increasing number of studies show that the phenomenon is difficult to resolve with state-of-the-art policies (see de Coninck-Smith 2003). Moreover, gender segregation exists within disciplines as, for example, across specialities in medicine. This has been, observed especially in Norway and Denmark (Annfelt 1994 and Henningsen 1998).

**Table 10: Publications dealing with gender segregation in science**

<b>Publications dealing with horizontal segregation</b>		
<b>Number and percentage of publications</b>		
	<b>n</b>	<b>%</b>
Denmark	226	38.4
Finland	200	46.1
Iceland	26	53.1
Norway	121	45.7
Sweden	341	54.6
<b>Nordic CS</b>	<b>606</b>	<b>48.2</b>
<b>All Cs</b>	<b>1 965</b>	<b>43.2</b>
<b>Publications dealing with vertical segregation</b>		
<b>Number and percentage of publications</b>		
	<b>n</b>	<b>%</b>
Denmark	237	4.2
Finland	196	45.2
Iceland	27	55.1
Norway	100	37.7
Sweden	267	42.8
<b>Nordic CS</b>	<b>513</b>	<b>40.8</b>
<b>All Cs</b>	<b>2 035</b>	<b>44.7</b>

Table 10 shows the publications which deal entirely or partly with gender segregation in science. The topic of horizontal segregation (HS) is analysed relatively more in the Nordic countries than in all countries on average. It is proportionally most studied in Sweden and Iceland and least in Denmark. The treatment of the topic of vertical segregation in the Nordic countries is below the average for all countries. Vertical segregation is proportionally analysed most in Iceland and Finland and least in Norway.

**Table 11: Publications on gender segregation dealing with other topics**

<b>Publications dealing with horizontal segregation</b>		
<b>Number and percentage of publications</b>		
	<b>n</b>	<b>%</b>
Denmark	226	38.4
Finland	200	46.1
Iceland	26	53.1
Norway	121	45.7
Sweden	341	54.6
<b>Nordic CS</b>	<b>606</b>	<b>48.2</b>
<b>All Cs</b>	<b>1 965</b>	<b>43.2</b>
<b>Publications dealing with vertical segregation</b>		
<b>Number and percentage of publications</b>		
	<b>n</b>	<b>%</b>
Denmark	237	4.2
Finland	196	45.2
Iceland	27	55.1
Norway	100	37.7
Sweden	267	42.8
<b>Nordic CS</b>	<b>513</b>	<b>40.8</b>
<b>All Cs</b>	<b>2 035</b>	<b>44.7</b>

Table 11 shows that the Nordic publications that deal with horizontal segregation issues typically deal as well with the topics of stereotypes and identity and vertical segregation. Publications on vertical segregation also typically deal with the topics of horizontal segregation and stereotypes and identity. The table shows that in the Nordic countries there is considerable research combining the issues of horizontal segregation, vertical segregation and stereotypes and identity. This also suggests that in reporting it is reasonable to combine horizontal and vertical segregation, as they tend to be combined in many Nordic studies.

**Table 12: Average number of publications per year on the topic of gender segregation**

Average number of publications per year		
Horizontal segregation		
		<b>Average</b>
1980-1984		5,0
1985-1989		10,2
1990-1994		13,8
1995-1999		23,0
2000-2004		33,0
2005-2007		47,3
2008-2009		19,5
Average number of publications per year		
Vertical segregation		
		<b>Average</b>
1980-1984		3,2
1985-1989		6,8
1990-1994		8,4
1995-1999		21,6
2000-2004		31,8
2005-2007		38,3
2008-2009		19,5

The number of publications per year on the topic of gender segregation is gradually increasing, in line with general global scientific publishing activity. The jump in the number of publications occurred especially in the mid 1990s and was most pronounced in publications on the topic of vertical segregation. There were an especially large number of publications in the Nordic countries on horizontal segregation between 2005 and 2007. (Table 12)

### 2.1.1 Research questions

With regard to research questions, it is possible to identify three general lines. The first line examines women's slower advancement and weaker position, especially in academia. There is a special focus on Ph.D. students and their career opportunities and preferences. The second line studies the problem of the absence of women in some fields, especially the technical sciences (physics, engineering, ICT). The research focus is on analysing schoolgirls' attitudes towards technology studies and their experiences as students in technology education. The emphasis here is also on the development of the pedagogy of technology studies. The third line studies women's roles and experiences in the professional fields where they are a minority. Gender differences and structures in medicine are the focus in Denmark, Norway and Sweden, but not in Finland or Iceland.

## 2.1.2 Research approaches

The following two tables calculated from the GSD database show the proportional division of research approaches in the Nordic countries. Here, the main topic is divided into horizontal and vertical segregation. Values are presented as relative numbers and include the use of multiple research techniques.

**Table 13: Methodological approaches of studies on gender segregation**

<b>Methodological approach</b>		
Horizontal segregation		
<b>Empirical research</b>		<b>%</b>
Nonempirical research		59.1
Empirical research. Quantitative techniques		11.4
Empirical research. Qualitative techniques		20.0
Empirical research. Quali-quantitative techniques		9.6
Total		100.0
<b>Approach</b>		<b>%</b>
Conceptual		55.4
State-of-the-art		39.8
Compilation of statistics		19.1
Constructing gender indicators		3.1
Empirical research. Quantitative techniques		21.0
Empirical research. Qualitative techniques		29.5
<b>Methodological approach</b>		
Vertical segregation		
<b>Empirical research</b>		<b>%</b>
Nonempirical research		57.1
Empirical research. Quantitative techniques		9.6
Empirical research. Qualitative techniques		21.2
Empirical research. Quali-quantitative techniques		12.1
Total		100.0
<b>Approach</b>		<b>%</b>
Conceptual		43.5
State-of-the-art		44.2
Compilation of statistics		23.8
Constructing gender indicators		4.3
Empirical research. Quantitative techniques		21.6
Empirical research. Qualitative techniques		33.3

In the field of gender segregation in science the research is usually nonempirical; thus the research approaches are conceptual and state-of-the art. In addition, qualitative techniques are preferred to quantitative techniques. Quite often the empirical research is based on qualitative approaches. The techniques of constructing gender indicators and time series are seldom used. Table 13 seems to indicate that much of the research is based on conceptual and theoretical thinking, presenting feminist ideas of segregation. There is also room for sophisticated empirical research approaches, indicators and timelines. (Table 13)

**Table 14: Empirical research techniques of studies on gender segregation**

<b>Empirical research techniques</b>		
Horizontal segregation		
<b>Quantitative techniques</b>		<b>%</b>
Representative sample		54.3
Micro-data		2.1
Longitudinal/cohort		11.0
Multivariate analysis		25.2
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		19.0
Case studies		15.1
Content analysis		32.4
Interviews		57.5
Observations		20.7
<b>Empirical research techniques</b>		
Vertical segregation		
<b>Quantitative techniques</b>		<b>%</b>
Representative sample		63.1
Micro-data		29.7
Longitudinal/cohort		9.9
Multivariate analysis		18.0
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		22.8
Case studies		14.6
Content analysis		27.5
Interviews		61.4
Observations		9.4

Both in studies of horizontal segregation and of vertical segregation the relative number of research techniques used is similar. With regard to quantitative techniques, the technique most frequently used to obtain data is the representative sample. Of the qualitative techniques, the most frequently used is the interview. Longitudinal and cohort studies are less used. Observations are more commonly used in studies on horizontal segregation than in those on vertical segregation. (Table 14)

The country-specific GSD analysis not shown in these tables shows that in Norway there are lot of state-of-the-art studies on this topic, revealing the interest in studying women's presence in its main industries and industrial sectors. The studies in Denmark and Sweden reveal an interest in studying vertical segregation as a theoretical and structural concept. In Finland and especially in Norway, state-of-the-art studies are the most commonly used to describe the overall situation of segregation. In Sweden and Norway, there are a relatively large number of qualitative studies.

To sum up, available standard statistics are applied in most cases in studies of horizontal segregation in academia and in different scientific fields. Descriptive statistics are used to demonstrate differences in the proportions of men and women in these fields. In Finland, the university database KOTA is also available and in Denmark survey material is used to analyse the situation. In Denmark and Norway, several qualitative studies use multiple methods to study the occupational choices of boys and girls at school and the experiences of academic personnel with regard to their employment and career choices.

The main line of research on vertical segregation is statistical analyses of the positions of university personnel, science policy makers and students. General official statistics are usually used and the analysis is based on descriptive statistics. Multiple qualitative methodologies are applied when analysing women's experiences, plans and choices in academia. Many of these qualitative studies are done by individual enthusiastic women working in academia and wanting to share their experiences and feelings. These studies

are not always simply state-of-the-art analyses, but also describe visions of the future and include personal suggestions for improvements.

### 2.1.3 Findings

The Nordic research shows strong horizontal gender segregation across scientific fields and scientific professions, in spite of apparent freedom to choose one's education and career, equality tradition and awareness of gender equality. One reason for segregated labour market is that a care work is in most cases performed by women. Another common finding is that the share of women is smallest in "hard" natural sciences, technology and engineering. Women are overrepresented in arts, social sciences, human sciences, medicine, pedagogic and "soft" natural sciences. The explicit reasons behind this pattern are educational choices and school orientations.

Henningsen and Højgaard (2001) sum up the Nordic research by saying that there is no single cause of the problem of leaky pipeline. Differences between men and women are found on all steps of the academic ladder. The "leaks" results from cultural prescriptions of gendered subjectivity and identities, organizational understandings and procedures embedded in university cultures, traditions of science disciplines and the systemic logic and political rationale of the education and research system.

Women usually need support in their work organisations, because they have more home and care duties and their working organisations both in academia and outside are usually organised according to masculine principles. Especially in Denmark and Iceland the raising of families and childcare requirements are emphasised in research. It looks critical to support women's flexible opportunities to combine work and family life.

In Denmark and Finland, it is observed more often, that the academia has its own masculine language, tradition, culture, nomenclature and disciplinary rules. The alleged scientific neutrality and objectivity confirm this structure. Moreover, cultural factors and gendered structures outside the academia reinforce this totality. In Denmark, the reason of segregation is highlighted as the masculine hegemonic norms inside the academia, meaning e.g. procedures of financing, personnel selection and career promotion.

The internal segregation in medicine is studied more systematically in Norway and Denmark. There is a divide between clinical and research medicine and specialities. Women's weaker career advancement and orientation to clinical work and less valued specialities is presented in these studies. One reason for this is the women physicians home and care duties.

One important area in the Nordic studies is to get girls to study engineering, technical sciences and ICT. One reason for their absence is women's subjective choices, ambitions and interests not to study these subjects. There are also culturally determined socialisation mechanisms behind the choices. To get women to enter in the technical field, different quotas and positive selection procedures with positive observed results are mentioned especially in Norway. Predominant male values and masculine contents in ICT and computing are presented too as the reason of fewer women.

To mention the timelines of research activities, one can observe, that the discovering of gender segregation in science was the main topic of first studies. The following studies were interested in the causes of segregation. The last studies are more interested in the women's absence in technical sciences, affected by the Knowledge Based Society discussion.

## Segregation in general

A common finding in the Nordic countries, where education as a social equalizer is emphasized, was that despite the growing number of women in tertiary education, their proportion decreases at every step of the academic hierarchy. The growing number of women was first noted in Denmark, where Ståhle (1993) found that the growing proportion of female postgraduates gave rise to the expectation of a future increase in the proportion of women hired in scientific positions. Husu (2002) explained that most of the students in Finland were women, except in the fields of natural sciences and technology. However, women were still underrepresented in the power hierarchies and the central positions of universities. In the European comparison, Finland came out on top regarding the proportion of women professors--the percentage is higher than in any other EU country.

Pórisdóttir (2002) describes the female revolution in Icelandic universities. In 1985, female students became the majority group at the University of Iceland and have remained so ever since. They are now in the majority across most disciplines except in engineering and computer science, where their proportion is 26% among students and 15% among teachers. Einarsdóttir's and Magnúsdóttir's (2005a) chapter points out that women currently represent around 60% of those enrolled in secondary and university education and that the gender distribution across disciplines is parallel to that found in the labour market with regard to occupational distribution. The authors find no support for the discourse on the feminization of the university; for them, it is still an institution of male values and culture.

Henningsen's and Højgaard's (2002) analysis showed that the "leaks" results from cultural prescriptions of gendered subjectivity and identities, organizational understandings and procedures embedded in university cultures, traditions of science disciplines and the systemic logic and political rationale of the education and research system. Thomsen (2002) continued to argue that a major cause of the low proportion of women in tenured positions in academia is the differences in interests of men and women. Women take a detour or move further towards the real world away from the traditions of their institution, while men tend to stick to their institutions' thematic tradition. Women seek wider and more remote connections and value interdisciplinarity. This is not the most efficient way to make a career in academia.

Henningsen (2004, also Henningsen 2003) identifies three causes for the underrecruitment of women: 1) the limited access to certain disciplines hits women harder, because it has been introduced primarily in the subjects that women choose to study, 2) the uneven distribution of Ph.D. scholarships (in natural science 25% of the graduates obtain Ph.D. scholarships, while only 5% of the graduates in the humanities do) and 3) the long recruitment period for tenured positions coincides with the time when women start their families.

Finally Hakulinen et al. (2007) see motherhood as the main reason for vertical segregation, but identify the gendered structures of research institutions and science policies as another.

## Women scarce in natural and technical sciences

The underrepresentation of women in the Nordic countries is found mainly in the technical sciences and can also be seen as a consequence of general labour market segregation in the Nordic welfare states. The general problem is to get women to study technical and hard natural sciences, especially when there is a labour shortage. Also of interest is the question of the gendered characteristics of technologies. Vilmundardóttir (1980) discusses the status of women in natural science in Iceland. From 1946 to 1971, only 20 women completed a university degree in natural science and engineering. From 1972 to 1979, one fourth of BS graduates in engineering and natural science were women. At public institutions in the field of natural science and engineering (15 institutions, around 300 employees), women represented only 13% of the staff members in 1979 and many of them worked part-time. According to the author, the reasons for this trend are to be found in women's responsibilities in the home and for childcare.

In Denmark, Henningsen and Sjørup (1997) found that the strategies to get women to enter male-dominated disciplines were both misplaced and unsuccessful, because of a simultaneous increase in the labour-market demand for graduates in the female-dominated disciplines (the humanities, health care, pedagogy, etc.). On the contrary, at that time many of the male-dominated disciplines (natural and technical sciences) were characterized by high unemployment. The report of Menntamálaráðuneytið (2002) also reveals an unequal

gender distribution amongst scientific disciplines. Women remained concentrated in disciplines which they had traditionally dominated and were underrepresented in research-intensive disciplines.

Sassi and Simpanen (2006) note that the proportion of women in higher technical education in Finland increased in the period from 1995 to 2005. In 2002, the proportion of women graduates in engineering was 18%, 22% of the higher technical degrees were earned by women and their number in higher education increased slightly. It can be said that the work of breaking down gender segregation in engineering in Finland has progressed in recent years, because the proportion of women students and applicants have increased. However, there is still work to be done, because many of the women candidates do not choose to study engineering.

Gunnes and Hovdhaugen (2008) present the current situation of horizontal gender segregation in Norway. The overview of the proportions of women in different positions is based on long-time series from 1981. There are differences between the newly employed in different disciplines, with the largest recruitment of women in the field of medicine and health and the lowest in technology. These numbers show stability over time. The proportion of newly employed women is higher in lower positions and decreases in higher positions. The authors conclude that different positive measures need to be developed for different disciplines, and that "one size does not fit all". Teigen (2000) studied recruitment and equality policies at the Norwegian University of Science and Technology (NTNU). She found that in 1996, only 6% of the new students were women, but that in 1997, after an earmarking initiative, the proportion of women increased to 38%.

### *Reasons*

There are several reasons behind the lack of women in technical sciences. Bjarnadóttir and Hallgrímsdóttir (1989) point out in their Icelandic conference report that childcare is not available for people doing shift work. In many industrial and technical occupations, shift work is the norm and is unavoidable. Rienecker (1996) states that there is a lack of integration between everyday consciousness and science, between one's own language and the jargon of the discipline. The students were alienated when trying to combine their own language with the language that had been developed by generations of academics. The female students in particular were uncomfortable with the language of the university. Kolmos (1996) studied young engineers from the gender perspective. The investigation confirmed many prior assumptions: female engineers were, to a large degree, employed in the public sector, where they worked as advisors and administrators. They felt that their possibilities for professional development and promotion were lower. They were more responsible for a number of domestic tasks. In summary, female and male engineers did not have equal opportunities to achieve a career.

Þorvaldsdóttir (2001) interviewed focus groups of 15 female engineers and computer scientists. In both professions, there were "soft" and "hard" fields and women were more likely to be found in the "softer" fields. The reasons were either that they chose that field or were selected for these types of jobs. Their own choice was due either to their field of interest or to their circumstances. Family responsibilities were an important factor and it was clear that many of the women were reluctant to choose jobs that required travelling. All the women were satisfied with their choice of profession and indicated that their education gave them opportunities to work in different kinds of jobs.

Finally, Jiehua's (2009) thesis focuses on the career experiences of women managers in the IT industry in China and Finland. The main argument in this thesis is that culture plays a crucial role in making sense of women's career experiences, although its role should be understood through its interrelationship with other social processes, e.g., institutional relations, social policies, industrial structures and organizations, as well as globalization. The interrelationship of a series of cultural and social processes affects individuals' attitudes to, and arrangement and organization of, their work and family lives. The results of this study emphasize the need, when discussing women managers' careers, to understand the ways by which gendering is produced rather than merely examining gender differences. The importance of self-knowledge is critical. Further, the environments can differ greatly: China and Finland are very different—culturally, historically and socially. The findings of this study should, therefore, be understood as holistic, specific, and contextually bound.

One reason behind the underrepresentation of women is the educational system reproducing gender differences and horizontal segregation in education. This topic is discussed in greater detail in section 2.3. "Stereotypes and Identity".

*Discipline specialities*

In the Nordic countries, the move to support women's opportunities emphasizes certain technical disciplines more than others. One of these is ICT and computer science from perspectives of the knowledge-based society, labour shortage and the gendered contents of computing and ICT technology.

Corneliusson's (2003a) interest in Norway was in male positioning strategies in relation to computing. She highlighted how the informants shared not only a number of understandings of gender and computing, but a hegemonic discourse as well. The male students showed different ways of "being men" in relation to ICT, thus illustrating the individual's freedom as well as variations within the gender category. However, all of them also used the hegemonic discourse as the background principle for their own positioning strategies.

As a part of the Finnish ICT boom and labour shortage, the WomenIT-project (2005) argues that the attitudes of girls and women reflect cemented attitudes on culturally segregated gender socialization, gender-based expectations and gender-based exclusions. The operations of school and working life seem to produce, enforce and sustain the systems and divisions between the genders. This is one of the reasons for the low number of girls in ICT. Paloheimo and Stenman (2006) show that in computer science classes, the typical gender distribution (majority male) lowers the comfort level of all students and the performance of weak male students in comparison to classes with an even gender distribution. In light of this research, the study concludes that both male and female students would benefit from a greater number of women in computer science studies.

The report of Fanngeirsdóttir (2003) introduced a study exploring the reasons why so few women enrolled in the Department of Computer Science at Reykjavík University. The female students demonstrated less confidence in their computer skills and experience. Their access to computers during childhood was more limited and they came into possession of computers at a later age than men in their age group did. Female students showed more interest in a new course linking computer science with social sciences and in courses dealing with design and operational concept documentation, while male students preferred programming.

There are other segregated disciplines as well in which the gender aspect is studied, but less systematically. Lähdetie (1986) argues that there are many gender-related problems in the field of biomedicine in Finland. Usually there are fewer women researchers, although over half of medical students are women. The discrimination of women has been hidden; it has often been a question of self-confidence and support. There is a need to create a scientific community which understands the right to leisure and childcare, mental freedom and, in brief, the freedom to choose one's own way.

Ihalainen (1987) studied women foresters, who have a master's degree in silviculture in Finland. Men and women possessed the same expectations and the same motives for their professional plans. Differences in the family and social backgrounds of the sexes were found when considering the choice of main subject and in employers and tasks. Compared to men, women preferred Forest Products Marketing to Forest Engineering and Business Economics of Forestry at university. For example, research and training recruited women and men equally, whereas planning, monitoring and wood procurement were markedly male tasks. Furthermore, women were placed outside of forestry, working in jobs that were not included in the traditional spectrum of the forester's profession.

Women in the engineering profession and the status of female engineers in Iceland were discussed by Árnadóttir (2004). Engineers in Iceland are usually involved to a large extent in R&D in their specific field (high-tech hydropower construction). The importance of networking for female engineers is undisputed, since research has shown that a lot of recruitment occurs through informal networks. As a minority in the engineering profession, women need to tend especially to their work-related networks for their career advancement. They often find themselves the only woman at work. This excludes them from certain activities and spaces, such as the changing room, where a lot of informal discussion takes place and vital information is exchanged.

Larsen (2006) writes about the historical developments in Norwegian economics. For a long time, the study of economics was a male-only arena. Since the late 1960s and early 1970s, the proportion of female students has increased dramatically. Here Larsen discusses the feminization of the Norwegian School of Economics and Business Administration, and the silent revolution that led to this development. But this was not really a new phenomenon. Business studies was, from its start in the late 1800s, a field that attracted

both men and women who wanted to work in an office. Only those institutions that had a higher goal, like educating the future leaders of commerce, maintained a masculine image. This gave Norwegian education in economics/administration a two-gendered structure, where women and men were educated in separate, although highly complementary, spheres.

### Finland

This review of the problems of women's careers in science focuses on 1) the reasons why the position of women in science is an important issue, 2) reviews the state of the art of research in this field and 3) indicates the major problems and gaps in our present knowledge, and outlines some directions future research may profitably explore. A comparative perspective is needed to overcome potential gender biases. Most of the empirical research on the problems and obstacles of women's careers in science focuses only on women, and the problems revealed are assumed to be particularly those of women scientists. From a methodological point of view, the validity of generalizations concerning women scientists must rest on the demonstration that they are gender specific. This implies the need for systematic comparisons of men and women scientists. A review of literature shows that most research on women's careers in science is concentrated on academic women. However, in the contemporary world of science and technology, a considerably greater share of research and development activities is done outside the universities. Yet, there is very little information about women scientists working outside the halls of academe, in independent public or private research institutions or in the research institutes and laboratories of the productive sector. The obstacles presented by the social organization of science and culture of the scientific community to women's equal participation have not received sufficient systematic attention. Only by focusing on how these social processes of the scientific community affect women scientists will we be able to identify the problems faced by professional women that are specifically associated with being a scientist. The extent to which women scientists are represented in the scientific establishment participating in advisory and decision-making bodies is also a hitherto neglected research area.

Stolte-Heiskanen, V. 1988, Women's participation in positions of responsibility in careers of science and technology: obstacles and opportunities, Tampereen yliopiston sosiologian ja sosiaalipsykologian laitoksen työraportteja, sarja B 26/1988. Tampereen yliopisto, Tampere.

### Medicine

Internal segregation in medicine has been one of the topics of Nordic research. In Norway, Steinsholt et al. (1990) conducted a study on women in the medical profession in which they found that while during the period 1972–1986 the proportion of specialists increased, this increase was most pronounced among male doctors. Marked differences between the sexes were found within the medical profession. The Norwegian NAVF's Secretariat for Women's Studies (1991) pointed out that for centuries medical education had been created by male researchers. Thus, the myth of scientific objectivity and neutrality reflects the generic use of "man". Annfelt (1994) argued that this hegemonic masculinity has contributed to the definition of what good medical practice is.

Henningsen in Denmark (1998, same finding in Colding and Henningsen 1999, Henningsen and Colding 1999) argues that there has been clear internal segregation within specialities. In many respects, the women in the medical faculties have occupied a peripheral position. Relatively few have a medical degree, they have generally not been employed in traditional medical research areas such as physiology and anatomy, and there have been disproportionately fewer women among the professors. The paper argues that the position of women as non-doctors in lower status areas has resulted in a lack of influence and access to resources.

Georgsdóttir's (2001) survey in Iceland reveals that women need more support from practising female physicians. In 2001, there was an equal proportion of women and men graduating from the Faculty of Medicine of the University of Iceland. Women represented approximately 18% of specialists and this proportion had risen dramatically since the 1970s. The rise in the number of female physicians led to a

parallel rise of women in management and teaching positions. The glass ceiling is evident and men constitute the majority of managers and teachers both in hospitals and in the Faculty of Medicine of the University of Iceland. Finally, female physicians themselves need to coordinate their actions to gain more influence and power.

Gjerberg (2002) continued the studies of women in medicine in Norway and the differences in male and female doctors' choice of speciality. The thesis demonstrated that female doctors specialize just as much as their male colleagues do. Moreover, women doctors in the youngest cohort spread their choice of speciality over more fields than their predecessors had. To date, doctors' choice of speciality has been strongly gendered. Women doctors still specialize more frequently in fields related to women, children and the elderly, and less in hospital-based specialities like surgery and internal medicine.

Fridner (2004) analyses career paths in academic medicine in Sweden. In three consecutive cohorts, there were no gender differences in the academic positions in relation to the number of female and male graduates. But male physicians more often held senior positions at university hospitals, and at a younger age. Women physicians had two careers, one as a scientist and the other as a physician, whilst some men dropped out from medical training and concentrated on a career in pre-clinical research. The in-depth interviews also indicated that female physicians have had to adapt to a traditional scientific organization created by men. In Sweden, there is no 'leaky pipeline' in academic medicine after graduation, but women have to conform to existing male norms. Schlichting et al. (2007) found that there was no gender difference in the desire to have an academic career in medicine, and thus combined positions of clinical and academic medicine were sought after. Women miss positive signals from the academic environment, e.g. being wanted as researchers.

### Norway

This article is based on a career history study of gender differences and similarities in recruitment to and transitions between specialities among Norwegian doctors. A questionnaire on career and family history was sent to all Norwegian doctors authorised in 1980-1983. Descriptive statistics and logistic regression were used to describe and analyse completion of specialisation in the specialty in which they started their career. Survival analysis was used to analyse transitions between medical specialities. The findings clearly contradict the idea that the low proportion of women in male dominated areas of medicine reflects women's lack of interest in specialities like surgery and internal medicine. Women were as likely as men to start their career in these fields. The problem is their not completing specialist training. A far higher proportion of men than women completed their specialist training in surgery. The reasons for this are complex. Heavy work loads with duties and nights on call make it difficult for women to combine childcare and work and make them change to other specialities. Also, female specialists in surgery and internal medicine postpone having their first child compared to women in other medical specialities. However, the fact that some women change from surgery to gynaecology and obstetrics, a specialty which to a considerable extent are comparable with surgery with regard to duty and work loads, indicate that structural barriers in combining childcare and a hospital career do not fully explain the flux of women. The possible existence of other closure mechanisms in surgery, as indicated by some doctors in this and in other studies, has to be further explored.

Lie, Gjerberg, E. 2002, 'Gender similarities in doctors' preferences: and gender differences in final specialisation', *Social science & medicine*, vol. 54, no. 4, pp. 591-605.

## Women pioneers

Women's entry into universities has been another strand in Nordic research. Haavind (1984) writes that women's first entry into Norwegian universities occurred in the 1880s. Haavind discusses the conditions of these first women in universities--the conflict between work and family life, which meant that the pioneers were more often unmarried and childless, or that those who had a family had to rely on a housemaid. The road to gender equality as an ideal was long and winding. The autumn of 1982 marked the 100th anniversary of the acceptance of the first woman, Cecilie Thoresen, as a student at the Royal Fredriks University (Universitetet i Oslo Likestillingsutvalget 1984). In 1993, it was 100 years since the first female doctor, Marie Spångberg Holt, received her degree from The Royal Frederick University in Christiania. Women were granted access to the university in Norway in 1882. By 1900, 18 women had graduated in medicine. The pioneers were interested in women's diseases, midwifery and childhood diseases. It was also striking that many of the early female doctors were active in the women's movement. Work dominated most of these women's lives. Only eight of the 18 pioneers were married, and only one of those eight stopped working upon marrying. (Schjøtz 1993, see also Schei et al. 1993)

Kærgård (1990) describes the entry of women into the Danish educational system, with special attention to the study of economics. The principal conclusion is that women fought to achieve formal rights to education and access to occupations in the period from 1870 to 1920. From 1920 to the 1970s, there was little progress and considerable growth in the number of female economists and female university teachers of economics did not really occur until the 1970s. The author observed a significant trait in the history gender equality in Denmark, where the women's movement was central and education for women merely instrumental.

A paper on 'Women as Architects in Finland from the 1890s to the 1950s' was presented by Suominen-Kokkonen (1992). In the period, from 1879 to 1917, there were only two professors of architecture in the whole country. The eleven women of this study were all pupils of Professor Nyström. By focusing on the work of women as designers, this study attempts to outline the role of women as the "other of the discipline", a different picture of Finnish architecture and its background, both as art and as an area of social responsibility. The areas of social interaction defined the ways in which women found their place. Winter-Mäkinen (1995) writes about women jurists as a group and a society. The history of women jurists in Finland is a short one--only a few decades--but change has been rapid and now half of the graduating jurists are women. However, the reappearance of women in a faculty of law and in the scientific field of law was a question of emancipation at the end of the 19th and the beginning of the 20th century. It was also, as it remains, a challenge to the contents of the science of law, as the women's perspective in the science of law and in jurisdiction as its practice is always seeking out its modes and practices, although the presence of female jurists today is evident.

The science of history as a male bastion in Finland was the topic of Katainen et al. (2005). Women's contribution to the writing of history in Finland in the past has remained obscure; their gender prevented them from being active in this area. In Finland, three of the four women who earned their Ph.D. between the two world wars chose themes related to the history of education, but their dissertations did not open up an academic career for them. Nor did the economic and social histories pursued by male historians integrate women as active agents into national history. Women historians were a distinct minority in Finland until the last decades of the twentieth century. The situation has also been gendered in terms of the subjects of the historical discourses: academic research on women's history remained marginal until the 1990s. A further example of women's marginalization is historiographical research, in which women historians have been left aside in the position of bystanders. Even the most recent global presentations and special studies ignore women historians and their production. Although 10% of the 186 individuals who wrote their doctoral theses between 1890 and 1970 were women, in the field of historiographical studies there were no women at all. Since the 1980s, the research on women's history done by women historians has progressed, but only when they have researched women's own history. In Finland, the academic community of historians remained a male-dominated one for a very long time. This is proven by the fact that it was not until 2003 that the first woman to receive a permanent professorship in Finnish history received her chair.

The historical status of Icelandic women within the scientific community interested Einarsdóttir (2000), who noticed that the status of women within the university community needed to be analysed, as nearly a century had passed since women had been granted access to universities. One way to do this was by comparing the situation in Iceland to the situation prevailing in the other Nordic countries. Sweden was the first Nordic

country to grant men and women equal rights to education in 1873, while Iceland was the last. The proportion of women in Nordic universities was low until the 1960s, when the number of university students of both sexes increased. Today, more women than men attend universities in the Nordic countries. The author claims that the explanations for the differences between the Nordic countries are manifold and are interwoven with political and historical factors in each country. Within the scientific community, disciplines were found to be highly gendered, as was apparent from the high proportion of male students studying natural sciences and the even higher proportion of female students studying social sciences.

Markusson Winkvist (2003) studied female pioneers in Sweden. In the period 1883–1949, 104 women completed their doctoral degrees. Women never made up more than 5% of post-graduates, and only a few found their way into a continued career in academia. The female holders of doctoral degrees on the academic labour market were a threat to current power relations. The partial inclusion of women in the academic system and the origin of the legislative changes were made possible by the fact that it was expected that there would be only few women. These "exceptional" women were allowed some space—albeit limited—in academia. Their position within and in relation to academia was not only a result of adjustment to the system, but of the fact that the system could only accept those who had already adapted to it.

### 2.1.4 Gaps

In the Nordic countries, research on gender segregation in science is concentrated on the university sector and studies of private and other public research institutions are scarce. Empirical studies are standard statistical cross-sectional analyses and there are no gender indicators, time series or longitudinal analyses. In addition, more sophisticated and in-depth research methodologies and settings are needed, e.g. time-series, longitudinal studies, barometers and indexes.

Most of the empirical research on the problems and obstacles to women's careers in science focuses only on women scientists. Research solely emphasizes women's conditions and research on men's conditions in segregated sectors is omitted. From a methodological point of view, the validity of generalizations concerning women scientists must rest on the demonstration that they are gender specific. This implies the need for systematic comparisons of men and women scientists (Stolte-Heiskanen 1988). Men's share and role in the segregation process, and not only the situation of women, need to be highlighted. Also, the gender system as a whole and as a social construction is an important concept for research.

Many of the articles involve discussions, comments and suggestions on strategies and research questions rather than focusing on producing new empirical material and thus new knowledge. In-depth studies seeking explanations for gender segregation in academia and especially in the R&D sector are almost non-existent, in spite of extensive educational, sectoral and occupational segregation. More in-depth analyses of the forces influencing women's educational and career choices are needed. The methodological approaches need to extend beyond analyses of statistical information. The research also needs more comprehensive theoretical frameworks, such as concepts and theories for studies of the labour market.

There is a strong tendency to study gender in organizations, while the other spheres of life, such as the family of the individual researcher, are neglected. The impact of other external factors on the professional career, in both the short and long terms, remains outside the scope of the research. Processes, social institutions and actors of social construction outside the academic institutions have not been studied, but are only mentioned in some articles. Methodological developments and different thematic frameworks are needed in order to identify these external factors.

## 2.2. Pay and funding

The pay gap is seen as an instrumental source, as well as an indicator, of inequality. One research line involves the evaluation of academic research policies and the strategy plans of research councils. In addition, funding programmes have been evaluated in order to identify what characterizes the flow of resources in research. Most of the publications focus on gender and access to funding in relation to research policy and gender equality action plans at the national or institutional level. The salary differences between men and women (typically very strong in the general Nordic labour markets) -- the traditional gender pay gap in working life--is the second concept and line of study.

Table 15 from the GSD database shows that pay and funding in science is little studied in Europe and in the Nordic countries:

**Table 15: Publications dealing with pay and funding in science**

Number and percentage of publications		
	n	%
Denmark	82	13.9
Finland	59	13.6
Iceland	14	28.6
Norway	14	5.3
Sweden	111	17.8
<b>Nordic CS</b>	<b>165</b>	<b>13.1</b>
<b>All Cs</b>	<b>571</b>	<b>12.6</b>

A relatively large number of studies on pay and funding issues come from Iceland and relatively few from Norway. In absolute numbers, most of the studies are from Sweden and Denmark. It would appear that the theme of the gender pay gap is studied more on the level of the general labour market rather than that of the narrower area of science. The table suggests that more detailed studies of pay and funding issues in science are needed.

**Table 16: Publications on pay and funding dealing with other topics**

Relation with other topics	
	%
Horizontal segregation	60.0
Vertical segregation	70.3
Pay and funding	100.0
Stereotypes and identity	45.5
Science as a labour activity	38.8
Scientific excellence	43.0
Gender in research contents	23.0
Policies towards gender equality in research	50.9

Table 16 shows that studies analysing pay and funding quite often deal simultaneously with the topics of gender segregation and policies towards gender equality in research. This is an indication of the strong position of gender segregation studies in Nordic countries and of the fact that pay and funding issues are discussed in connection with studies on segregation.

**Table 17: Average number of publications per year on the topic of pay and funding**

Average number of publications per year		
		Average
1980-1984		1.4
1985-1989		1.4
1990-1994		2.2
1995-1999		6.4
2000-2004		12.2
2005-2007		13.0
2008-2009		4.0

There were few publications dealing with this topic before the 2000s, but it appears to have gained importance after the turn of the millennium. Forthcoming studies will have interesting research questions, such as the wage differences in the Nordic universities having fixed salary tables or how the salary gap between the sexes differs in the business sector. (Table 17)

### 2.2.1 Research questions

Here, the main research line involves an evaluation of academic research policies and strategy plans of research councils. In addition, funding programmes have been evaluated in order to identify what characterizes the flow of resources in research. Most of the publications focus on gender and access to funding in relation to research policy and gender equality action plans at the national or institutional level.

### 2.2.2 Research approaches

**Table 18: Methodological approaches of studies on pay and funding**

Methodological approach		
		%
<b>Empirical research</b>		
Nonempirical research		71.5
Empirical research. Quantitative techniques		15.2
Empirical research. Qualitative techniques		8.5
Empirical research. Quali-quantitative techniques		4.8
Total		100.0
<b>Approach</b>		
Conceptual		61.2
State-of-the-art		36.4
Compilation of statistics		23.6
Constructing gender indicators		4.8
Empirical research. Quantitative techniques		20.0
Empirical research. Qualitative techniques		13.3

Table 18 shows that studies related to pay and funding are quite often nonempirical and thus conceptual and state-of-the-art. The use of quantitative techniques exceeds that of qualitative techniques. Gender indicators and time series are little used. This is interesting, as pay and funding issues are typically observable in quantifiable parameters and numbers.

**Table 19: Empirical research techniques of studies on pay and funding**

Empirical research techniques		
<b>Quantitative techniques</b>		<b>%</b>
Representative sample		81.8
Micro-data		21.2
Longitudinal/cohort		12.1
Multivariate analysis		18.2
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		4.5
Case studies		9.1
Content analysis		27.3
Interviews		72.7
Observations		0.0

In the qualitative research on the topic of pay and funding, clearly the most frequently used technique is the interview, followed by content analysis. Other research techniques are seldom used. In the quantitative research, clearly the most frequently used technique is the representative sample; less used is the longitudinal/cohort technique. More quantitative research is needed on this issue. (Table 19). Many of the quantitative entries are analyses of standard statistical data, while there are some survey studies of access to funding. Existing registries of academics and doctoral candidates, of the distribution of research funding etc., and to some extent of surveys targeting academics in permanent positions are used.

*Iceland* has gathered statistical information on those applying for and receiving grants from the Icelandic Research Council. The study on the work evaluation system involves an analysis of pay information of those permanent employees receiving extra pay for their research activities at the University of Iceland. Survey information on the working conditions within the university was also used for a more in-depth analysis of the data on pay.

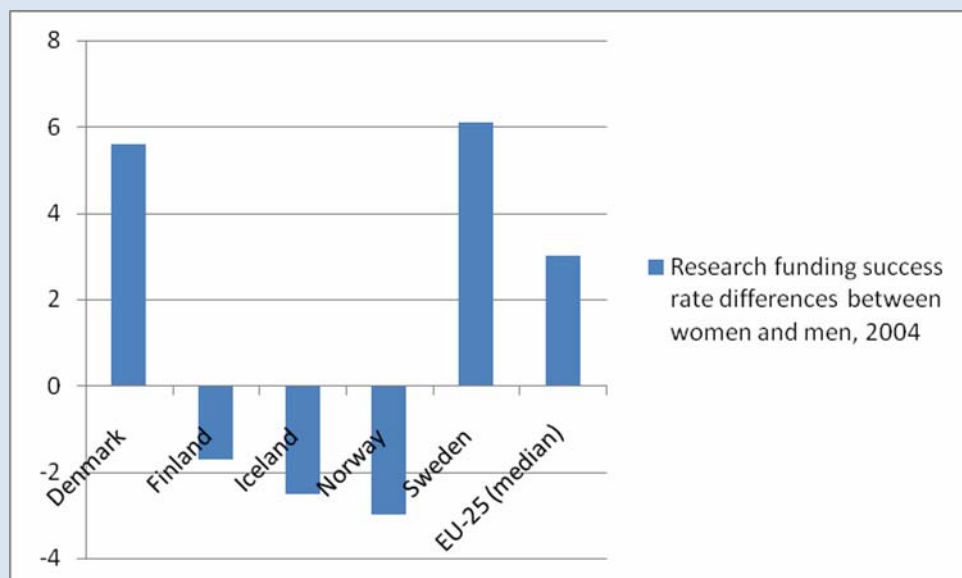
In *Sweden*, both quantitative and qualitative analyses are applied, such as in-depth interviews and large surveys. Commissions have been established by the Ministry of Research and Education that have initiated investigations and evaluations to give a coherent picture of the allocation of economic power and economic resources between women and men.

### 2.2.3 Findings<sup>28</sup>

**Figure 10 Research funding success rate (success rate men minus success rate for women) in the Nordic countries 2004 (calculated from She Figures 2006)**

Common to research findings on this less researched topic in the Nordic countries is that there exists male bias in researcher’s salaries, except for Iceland. The hypothesised reason is that men are to greater extent engaged in more advantaged and typically mono-disciplinary research proposals and thus have progressed linear in their careers. The women’s research funding is not so binded to narrow “disciplinary promotion orders”; they lose their career advancement possibilities by acting in the larger field. In addition, men are in most cases evaluating the research proposals and their evaluation criteria are gender biased as they are influenced by their different research orientations and disciplines. There are several reasons behind women’s lower pay and job insecurity as, e.g. lack of work autonomy, male-biased rewarding systems, traditional division of labour, restricting working arrangements, greater teaching and administrative responsibilities, less extensive participation in research networks and fewer hours for publishing activities.

The following figure 10 (opposing partly the previously mentioned) shows how women have been relatively more successful in receiving funding in Finland, Iceland and Norway and that the funding gap exists in Denmark and Sweden:



The findings of *Danish* research prove that women’s weaker funding opportunities (and higher level of job insecurity) results in dependency and lack of autonomy. This can lead women to adjust their career path according to family expectations and societal traditions. The funding gap is thus instrumental in producing a traditional division of labour, where women are economically dependent on their partner. Several studies detected a male bias in research funding. During the period 1998–2002, the National Research Council for the Humanities allocated, for example, DKK 4.95 million to women applicants, but DKK 44.9 million to men. Men’s applications were often favoured over women’s, because (Nexø Jensen 2003b):

- men engage in the highest prestige and central research fields within a discipline;

<sup>28</sup> Here the report differs from the GSD entries (where there are entries only for Iceland and Sweden) and is derived from the national country reports, where there are results from the other studies not classified only in the pay and funding category.

- more often than women, men engage in individual research projects or mono-disciplinary research, while women more often design cross-disciplinary and cooperative research. The funding and career prospects in the latter are probably weaker.

The FREJA programme in particular was deemed successful, since it involved a competition for funds and thus the prestige of being rewarded was maintained. The funding allowed the development of women's research interests, which tended to be cross-disciplinary or in marginal fields of a discipline. De Coninck-Smith (2000) evaluated the progress made since the launching of Jytte Hilden's 11-point plan. The study of programmes funded by the research councils showed that women had a high success rate in their applications for a little money, but not in those for larger amounts. Many of the programmes for funding were so narrow that there was little, if any, competition for the money and thus the women applicants had a higher success rate, if they applied for small amounts. Thus the evaluation revealed that the small and specific funding programmes were often so narrow that they counteracted competition.

In *Sweden*, studies also found that resources for post-doctoral research have been unequally distributed between male and female researchers and a clear discrimination exists in higher education and research. Wennerås and Wold (1997) in their article "Nature, Nepotism and sexism in peer-review" proved *that female applicants had to be 2.6 times as productive as their male competitors were in order to be regarded equally productive*. They concluded that the reason is not the "glass roof" but an existing "leaking pipeline". There is a distillation causing a predominance of men in measuring male applicants using another scale than female applicants.

In *Norway* too, women received less research funding than men, in particular external funding, resulting in women advancing slower than men in the academia do. It is supposed that this is a result of women teaching more than men, their greater participation in committees and their less extensive engagement in national and international research networks as compared with men. Other probable suggested causes have not been systematically studied.

In *Iceland*, it appeared that fewer women than men applied for research grants during the period 1996–2003, while women and men were equally as likely to receive funding from the Icelandic research council. The positive sign is that the proportion of women among the applicants was on the increase. Men were more likely to hold higher positions within the university, independent of education or age. The proposed reason for the gender pay gap produced by the work evaluation system is that women publish less than men do, as they are less likely to be professors who have the greatest amount of time for research. The question then arises of why women are hindered in their progression to higher-level jobs. It is remarkable that only in Iceland has the pay system at the university been analysed in terms of gender equality and changed.

**Iceland****Gender differences in the work evaluation system for university staff**

This is an article discussing the work evaluation system at the University of Iceland from a gender perspective. In 1989, a work evaluation system was introduced at the university and a study of the system in 1994 revealed that women were less likely than men to receive extra pay for their academic research activities and the payments they received were lower. This finding led to further analysis of the work evaluation system at the university. During the period from 1992-1997, 80% of all applicants for extra pay for research activities received payments. Among the 20% not receiving payments, women were more numerous. Male staff at the Department of Social Science received the highest payments and the staff at the Human Science Department received the lowest amount. The gender gap in these extra payments was the largest among the scholars, lowest in the occupational hierarchy and almost non-existent among professors. A possible reason for the gender pay gap in the work evaluation system is that women publish less than men as they are less likely to be professors, who have the most extensive time for research. The question then arises whether women are hindered in their progression to higher level jobs. A survey in 1996 showed that the working environment of women and men within the university was not the same. More men in lower positions had their own private offices (53%) than women who were more likely to share offices with another woman (34% with private offices). Only 11% of the female staff took research leave while 40% of men did so. A much larger share of the female staff than the male staff were of the opinion that teaching preparations and interaction with students took too much of their time. An important finding was that men were more likely to hold higher positions within the university independent of education and age. Education pushed men further up the academic hierarchy than women.

Einarsdóttir, Þ. 1999, Kynjamunur í vinnumatskerfi háskólamanna, University of Iceland. Available at: <http://www.hi.is/page/vinnumatfrettabref> .

The *Finnish* studies show that although the institutionalization of gender studies is progressing, the funding of these studies is still relatively low. Only 5% of the total funding of sectoral studies was targeted to equality research in the strict sense (the main fields are R&D and “social technology”). A general recommendation of the sectoral studies report (Takala 1998) is that gender mainstreaming measures are needed universally to foster gender equality research. Gender sensitive research must be implemented as one of the main targets in all administrative fields of usually state-financed sectoral studies. Overall, the committee of the Ministry of Education (Opetusministeriön työryhmä 2004) regards the greatest challenges of a research career to be short-term employment, difficulties in combining external research funding and career development, the career advancement of women researchers, the economic position of researchers and the volume of research training.

**2.2.4 Gaps**

In all Nordic countries, there are relatively few studies that analyse differences in salary between men and women in science. It has been observed that highly educated women are demanding and receiving lower salaries than men in the same position and that employers offer women lower salaries. The reasons why this is the case should be examined more and in greater depth. New research in this field should seek answers to the questions of whether women in managerial positions receive the same economic compensation as men and whether women in male-dominated sectors are paid the same salary as men. Research on the pay gap could also be extended to analyses of the difference between the mobility of women and men across institutions and the significance of this for career opportunities. The gender pay gap exists in spite of the Nordic equality laws granting men and women equal pay for equal work. Today, income from the universities does not only involve monthly wages associated with particular positions, but also rewards for supervision, publications and extra administrative efforts. Hence, there are plenty of opportunities to reward individuals on the basis of their sex rather than their efforts. Studies mapping the total picture of pay and funding in academia are needed. Moreover, there is a need for more advanced research extending over a long period and involving more comprehensive mapping of the problem at hand, explanations and solutions.

In *Iceland*, the statistical analysis of the gender differences in monthly wages and rewards for supervision, publications and extra effort is well documented at the University of Iceland. However, comparable

information is not available for private universities and research institutions. Studies of research funding in the private sector in Iceland are nonexistent, as in the other Nordic countries, while the standard information on public funding is easily obtainable and published regularly.

## 2.3. Stereotypes and identity

The main topic of stereotypes and identity is complex and related to the development of science, its contexts and to scientists themselves. It can be seen as one factor behind gender segregation in science. It can be argued that gender should be seen as a phenomenon within, among and outside agents. In the process of becoming a culturally intelligible agent, gender is integrated into the identities, understandings and agencies of the individual, thereby becoming a phenomenon located within the person. As they integrate an individual version of the gendered subject positions available in the culture, the agents encounter reactions and reflections from their surroundings. (Søndergaard 2000)

There are cognitive sex differences that may influence the differential success in science and engineering of women and men, but at the same time research has shown that systematic sex differences do not exist with regard to most cognitive functions. There are no significant biological differences between men and women with regard to performance in science and mathematics. (Meta-analysis 2008, 20–21) On the contrary, empirical evidence shows that social and cultural factors appear to have more influence on boys' and girls' motivations and preferences than their underlying abilities (NAS 2006). This theoretical framework analyses the way in which individuals build their identity in a social context and considers the way in which social values and beliefs affect scientific and technological fields. Three main approaches appear in this theoretical debate: the construction of gender stereotypes, theories of human capital and role modelling. (Meta-analysis 2008, 20–21)

Gender stereotypes support the continuity of specific gender roles and occupational gender segregation. Some authors assume that gender stereotypes are formed during the socialization process, whereas others suggest a lifelong process of production and reproduction of gender roles. According to this approach, the different choices of men and women are associated with stereotypical male and female characteristics. Thus, engineering is associated with male rather than female stereotypes and professions in engineering tend not to be a woman's first choice. Fascination with technology and technical skills are attributes which are assigned to men, while being a woman is strongly connected with smoothness, social abilities such as caring for family/relatives, housekeeping and a certain fear of technology. (See *ibid.*)

One important area of studies in this topic is education and the educational choices that lead to segregation in education, science and finally in the labour market, including scientific professions. In spite of the fact that the school has a responsibility to mediate and shape the foundations for equality in the Nordic countries, there is little school action in the field of gender equality rights. At the same time, it is obvious that students take a great and sincere interest in equality issues when given the opportunity. On close examination, there are considerable deficiencies in the awareness of the gender dimension of education—for instance, in fundamental perspectives on sexual variations in identity, self-image and expectations. These could be attached to gender structures and notions of “male” and “female” in history and in the patriarchal social order. (Franck 2007)

GSD entries on stereotypes and identity are divided by subtopics in the GSD database. The subtopic *cognitive abilities* refers basically to research studying cognitive differences between the sexes and thus scientific and educational performance. The *social construction of identity* deals with those individual and structural factors that affect men's and women's educational choices, life courses and performance. The *social construction of science* is related to epistemological questions of constructing science from the gender perspective or how the gender system affects the formation and construction of science.

**Table 20: Publications dealing with stereotypes and identity**

Publications dealing with stereotypes and identity		
Number and percentage of publications		
	n	%
Denmark	312	53.0
Finland	239	55.1
Iceland	25	51.0
Norway	161	60.8
Sweden	391	62.7
<b>Nordic CS</b>	<b>804</b>	<b>64.0</b>
<b>All Cs</b>	<b>2 458</b>	<b>54.0</b>

Over half of the Nordic studies deal at least in part with the issue of stereotypes and identity and thus the topic is the focus of considerable attention. Over 60% of the studies are related to this topic in Norway and Sweden. The topic also receives relatively more attention in the Nordic countries than the European average. (Table 20)

**Table 21: Publications on stereotypes and identity dealing with other topics**

Relation with other topics		%
Horizontal segregation		49.5
Vertical segregation		30.3
Pay and funding		9.3
Stereotypes and identity		100.0
Science as a labour activity		19.8
Scientific excellence		28.4
Gender in research contents		44.2
Policies towards gender equality in research		21.5

The studies analysing stereotypes and identity most often deal at the same time with the topics of horizontal segregation and gender in research contents. These studies are less connected with the issues of pay and funding, science as a labour activity and policies towards gender equality in research. This implies a causal relation between horizontal segregation and the factors behind gender stereotypes and identities. (Table 21)

**Table 22: Average number of publications per year on the topic of stereotypes and identity**

Average number of publications per year	
	Average
1980-1984	8.6
1985-1989	14.2
1990-1994	22.2
1995-1999	30.0
2000-2004	48.0
2005-2007	53.3
2008-2009	14.5

Publishing activity on this topic has been extensive in the Nordic countries and has increased gradually over the years. An especially active period was the early 2000s, in which publishing activity on this topic nearly doubled. (Table 22)

### 2.3.1 Research questions

In this section the explicit research questions on stereotypes and identity presented in the GSD abstracts are analysed<sup>29</sup>. There are no single common patterns of research questions in the Nordic countries, but different divisions exist. One single clear research area is “classroom studies”. These studies are carried out in the field of education and pedagogy in primary and secondary schools. Girls’ and boys’ roles, orientation and behavior in the classroom are analysed. The pedagogical questions are: 1) how do boys and girls differ in classes? 2) what kind of pedagogy is suitable for equal tuition? and 3) what should the contents of technology and natural science teaching be in order to motivate girls to study them in school and later in vocational education? This type of research is carried out in Sweden and Denmark and to a lesser extent in Norway. Boys’ and girls’ performance in school education, as in the PISA study, are studied especially in Denmark.

The next area is “polytechnic studies”, in which women in male-dominated learning environments are studied. Their diverging interests, identities, perceptions and future orientations are analysed. These studies seek to develop the pedagogy of technical education, especially in engineering and physics. Of special interest is the question of why so many women are dropping out of courses. Such studies are carried out in Denmark and, to some extent, in Finland.

The third area is “higher education studies”, which focuses on women students in male-dominated disciplines, and also on academia perceived as a male-dominated area. A particular focus is on the role of language, traditions and the teaching of technical and natural sciences in the exclusion and marginalization of women. Gendered and male-dominated culture and power arenas of academia are also studied. This research area is a Danish specialty, but is also studied in Norway and Finland.

A contribution of women’s studies has been the feminist epistemological questions concerning relevant scientific knowledge and the role of subjectivity in research. These have challenged the traditional neutrality and objectivity of science and opposed male structures. Women’s studies has tried to affect science policies and change paradigmatic traditions. Epistemologically-orientated women’s studies has been especially popular in Norway and Finland, but practiced less in Sweden and rarely in Denmark and Iceland. Feminist-orientated women’s studies evolved into the more general gender studies during the late 1990s. Now, the focus of interest is more on both sexes, studying gendered identities, a construction of gender and femininity, queers, men’s and sexual bodies. Post-structuralism and social constructivism are affecting the epistemological background and interdisciplinarity is more integrated into current gender studies. Norway is the Nordic “leader” in epistemological gender studies, but they are also carried out in Finland and Sweden and mentioned in Denmark. Epistemologically-orientated men’s studies reflect on men’s role in the gender

<sup>29</sup> These are not fully in line with the findings of this topic due to the limited contents of the GSD abstracts.

system and the overall need for men's studies to be an academic discipline. Moreover, the relation with feminism is questioned and the need to establish male-orientated welfare policies is being considered. Epistemological men's studies are practised to some extent in Finland and mentioned in Denmark and Norway.

The gender-related contents of ICT and ICT systems are studied especially in Norway and the topic is mentioned in Iceland, Finland and Sweden. Technological milieus and women's role in innovation and creation is a topic dealt with in Sweden.

### 2.3.2 Research approaches

Table 23 defines the division between methodological to the topic of stereotypes and identity approaches among the Nordic countries:

**Table 23: Methodological approaches of studies on stereotypes and identity**

Methodological approach		
<b>Empirical research</b>		<b>%</b>
Nonempirical research		5.1
Empirical research. Quantitative techniques		8.8
Empirical research. Qualitative techniques		25.0
Empirical research. Quali-quantitative techniques		9.1
Total		100.0
<b>Approach</b>		<b>%</b>
Conceptual		60.7
State-of-the-art		35.7
Compilation of statistics		8.3
Constructing gender indicators		1.4
Empirical research. Quantitative techniques		17.9
Empirical research. Qualitative techniques		34.1

The studies on stereotypes and identity are usually nonempirical and thus conceptual and state-of-the-art. The empirical research of primary sources is usually qualitative. The construction of gender indicators and a compilation of statistics are relatively little used. The factors and social constructions behind gender stereotypes and identities are very complex and thus an increased use of sophisticated quantitative methodologies, in addition to qualitative methodologies, is recommendable.

**Table 24: Empirical research techniques of studies on stereotypes and identity**

<b>Empirical research techniques</b>		
<b>Quantitative techniques</b>		<b>%</b>
Representative sample		63.9
Micro-data		36.1
Longitudinal/cohort		6.3
Multivariate analysis		34.0
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		15.7
Case studies		13.1
Content analysis		21.5
Interviews		64.2
Observations		27.7

In the quantitative empirical research on stereotypes and identity, the technique most frequently used is the representative sample. Longitudinal/cohort studies are seldom used. Among qualitative techniques, interviews are used most often. Less used are biographical research and case studies. (Table 24)

The conceptual studies are related to the theoretical and conceptual thinking about women's role in research and gender-related aspects of science. Hence, all the epistemological thinking of feminism, post-structuralism and social constructivism belongs to this approach. Qualitative techniques are frequently used in Sweden, Norway and Denmark in studies on differences between girls and boys in schools, in technical education and in higher education. Qualitative approaches are also used to describe gender differences in education and science and girls' preferences and choices in these areas.

The least frequently used research approach in all countries is the construction of gender indicators. This points up the overall problem of continuity and the lack of systematic approaches, time series and barometers. In addition, quantitative methodologies, including the compilation of statistics, are relatively little used; this points to future opportunities to advance by applying them in a more systematic and broader way.

### 2.3.3 Findings

When comparing the Nordic countries on the central findings of the topic of stereotypes and identity, one can argue that, there are no common trends in research findings across the countries. This means that not all research areas are practised in the similar manner and the focus and the time span vary. In addition, to similar findings there are different research lines.

The largest research area practised in Finland, Norway and Sweden is the epistemological and practical foundation and development of women and gender research. Here, the findings are guiding the theoretical and methodological principles of how Women's studies can challenge traditional scientific paradigms and science structures. One presents how the establishment of interdisciplinary Women's studies as the university subject is reasoned. Women's studies oppose the traditional male dominated science and its apparent neutrality and objectivity. The central concepts derived from philosophical feminism are gender system, gendered division of labour, emancipation of women and interdisciplinarity. Women's own knowledge and experiences are the sources of proper scientific knowledge. Political influencing was one goal, but tensions existed between women's movement, academia and state.

During the late 1990s, the principles changed and the Women's studies evolved into Gender studies. Instead of feminism, post-structuralism and social constructivism became the main theoretical background. An analysis of language and especially discourse analyses became popular methodological approaches. The central concepts are sex, gender and body. Sex represents biological aspects, gender social and cultural aspects. By using the concept of sexual body, the research tries to avoid biological and mechanical determinisms. The main goal of Gender studies is still to promote gender equality in all spheres of society, but its position is becoming more vulnerable as a part of science community.

The three studies belonging to Men's studies come from Norway and Finland. The aim is to understand masculinities and the man. In addition, the role of Men's studies as a part of gender studies is discussed. It is claimed that Men's studies should study men's experiences and social realities. Male researchers must also conduct the research.

Commonly researched area at mid 2000s in all Nordic countries, to a lesser extent in Finland, is the boys' and girls' performance and choices in school classes. The research shows that both sexes require special attention when developing tuition, pedagogy and didactics, because the ordinary tuition might reproduce inequalities unconsciously. The girl friendly feminist pedagogy makes education interesting and motivating. It takes into account girls' experiences, interests and values. Especially important is to motivate girls studying technical topics. In Norway it was too pointed out that policies recruiting women to technical studies are based on dualistic notion: men are associated with technical skills and women with social skills.

In Denmark and Sweden, there was a lot of research on why girls do not choose technical subjects in school and further education. The reasons for this, in addition to the positive subjective orientations, were 1) general youth culture and its trends were not favourable to technical subjects, 2) the bad overall reputation of natural sciences, 3) girls' lower self-confidence to be successful and 4) lack of professional visibility of technical disciplines. In addition, parent's education, immigrational status and personal willingness to take risks in career choices affected girl's/women's choices.

In Denmark, Finland and Sweden, there were some studies on women researchers in academia. It was found that the women's disciplines usually have lower prestige. In the discourses of research, women are hidden, and if they are presented, usually their private life is central. The communicative culture of academia benefited men, as well as the individualised competition inside the academia. There was strong, powerful and influential male networks supporting men's careers by guiding different kind of resources and academic positions to them. The gendered structure of care work and women's lower self-esteem hindered also women's opportunities. The Danish extensive research of students in academia finds similar results of male oppression, which marginalises women students from academic discourses and power structures.

The gendered construction ICT was studied especially in Norway, but less in the other countries. There are different orientation between sexes when using computers and making information systems. Besides the stereotype of male nerd, there are female nerds too, young girls using and creating ICT in new ways. However, the nerdy label of “male hackers” hinders many girls from choosing ICT as a profession. Another observation is that the professional networks of ICT are strongly male dominated and it is very difficult for women to create career in these networks.

Danish research has also studied engineering education and women’s and men’s different profession position in this area. Men and women are choosing different kind of subjects – men more technical and women more social. There are gender differences in the learning styles and the development of pedagogy is needed to prevent women from dropping out from their studies. In addition, men and women create different kind of social subgroups inside the polytechnics.

A central focus of Danish studies is the measuring of school performances between boys and girls using large surveys like PISA, TIMM and ROSE. There are slight differences between sexes: boys are more theoretical, girls more problems oriented in practical questions. Boys appreciate technological aspects, while girls appreciate health and corporal issues. Generally, the tuition partly fails to capture pupils’ interests and motivation; this rejects especially girls’ willingness to continue in technical topics. Despite these statistical findings of difference they are narrowing and in some cases nil in the Nordic countries. Also these findings usually describe national system qualities, not personal qualities.

How to get women to study mathematics in further education is a Finnish subject. The research finds that girls have less confidence to continue in mathematics studies and they lack supportive social networks of doing this. Moreover, girls do not like the abstract theoretical world of mathematics, although there are no observed intellectual differences between men and women according to one study. Besides the social and cultural factors, it is a problem of didactics and a general weak reputation of mathematics as a difficult and abstract discipline without practical connections. Parent’s role is important when getting girls to study mathematics as well as the fostering campaigns.

### Epistemology of gender research

Haavind (1986) and Rantalaiho et al. (1986) presented one of the first epistemological arguments in the Nordic countries for women’s studies found in the GSD. Women’s studies opposed the mainstream production of knowledge, now in the context of the Nordic welfare state. A critique of the traditional argumentation based on the philosophy of science had become necessary. It was important to defend women’s research and counter the claims of those opposed to it. The specific role of the social sciences in this regard is to bring to light the everyday life and experiences of women. Women’s studies must uncover these unfamiliar areas of life. Another more theoretical interest is the gender system, which provides a theoretical method for the analysis of the multiple-level relations between women and men. Finally, women’s studies represents a paradigmatic challenge to social sciences in general.

Rantalaiho (1988; similar arguments as well in Ruoho 1990, Elverdam and Hertzberg Johnsen 1990 and Saarinen 1992) specifies the role of women’s studies. She sees the major contribution of women’s studies as the unveiling of the gaps and silences of traditional science. Women have been missing from social research and its data. Men have represented the norm and humanity in general, while women have been seen as insufficient, incomplete or deviant. The criteria of science are drawn from men’s lives. One of the aims of women’s studies is to strip away certain illogical aspects of “normal” male science and thereby renew it. Holter (1989) goes on to claim that the most important standpoint behind women’s studies was interdisciplinary feminist theory. Women’s studies had methods for revealing problems across disciplinary boundaries. This feminist thought was exemplified by emancipation theories, theories of patriarchy, and theoretical approaches in which gender was a basic concept. NAVF’s Secretariat for Women’s Studies (1991) in Norway declared that gender neutrality was one of the most important scientific virtues threatened by women’s studies. Halsaa (1993) concluded that women’s studies had reached the status of a new and cross-disciplinary discipline, at least in Norway. However, not everyone acknowledged this and some even resisted the idea of women’s studies as a new discipline within academia. Despite good results, women’s studies was still marginal, and its economic and institutional foundation was unsteady and vulnerable.

Koivunen and Liljeström et al. (1996) developed the theme of women's studies further. In their collection of articles, they present new concepts of the gender system, otherness and sexuality and the body.

The possibility of women's studies affecting science policies in Norway was dealt with by Rogg (1998; same topic in Halsaa 2003 and Lilleaas 2004), who pointed out that while the presence of female researchers does not guarantee that certain political research questions will be raised, it is unlikely that those questions would have been asked without female participants. There were also differences between researchers in women's studies and female researchers in general, some based on generation, and others on how near/far away from the established women's research milieus the researchers experienced themselves to be. Rolin (2000) suggested that arguments based on values internal to scientific communities (such as objectivity, rationality and truth) can be utilized to bring the goal of gender equality closer to practising scientists. The scientific community is a large one and this community can be made more equal and trusting. A prerequisite for this is trust between actors and trust in their skills regardless of their sex. Halsaa (2003) claimed that women's and gender research had developed in a three-way field of tensions between the independent women's movement, academia and the state. Halsaa discussed the dual nature of women's and gender studies--as a feminist knowledge/ political movement and as an academic project. Even though women's and gender studies was a field of its own, separate from the women's movement, there was something that disturbed the research community in the border between science and politics. Finally, Larsen and Widerberg (2007) criticized the disciplinary structure of Swedish universities that makes interdisciplinarity burdensome, and in which there seems to be a tension between gender studies and some dominating theoretical paradigms. Thus, interdisciplinarity in Swedish universities be little more than a political slogan, with some theoretical perspectives, methods, themes and norms remaining restricted.

### School and university – tuition and pedagogy

Especially in Denmark, much research has been carried out in the field of gendered tuition and pedagogy. In a study of polytechnics pedagogy, Kolmos (1989) found a discrepancy between self-awareness and the action of the individuals. There was only a slight difference between the attitudes of men and women towards the content and the pedagogical structure of engineering studies. However, men and women chose different subjects. In engineering, women primarily chose planning and environment and men primarily chose electronics and mechanics. The changing and developing engineering culture in Denmark gave women the opportunity to become engineers.

Benckert and Staberg (1990) observed that school books clearly showed that the scientists were men. The only historic female scientist was Marie Curie, but she was only mentioned in the physics book. The chemistry book in which there was a table of important elements and their discoverers did not list radium or polonium and thereby omitted Marie Curie. The books on integrated science that discussed many historic scientists, both well-known and lesser known, did not mention any women. The message is that there have not been any female scientists, except perhaps Marie Curie. Ericsson et al. (1993) argued then that there are four problem areas in history writing: the position of women's history within the subject, periodicity, the patriarchy debate, and the theory of gender systems.

Vedelsby (1991) studied the phenomenon of women dropping out of school and argued that in order to prevent students from dropping out, the quality of tuition must be raised. This entails giving lecturers courses in pedagogy, including understanding of gender differences in learning style and attitudes towards education. The size of classes must also be reduced to ensure that students get the necessary feedback. The most important factor however, is changing the image of particular subjects and the myths surrounding them.

In examining the didactics of nature/technology tuition in schools, Sørensen (1995) found that girls need more time to assimilate such knowledge and this is more easily accomplished if they are segregated from boys in group work. Girls and boys organize themselves differently in play situations, and this is carried through to the organization of group work. Boys often play in larger groups, where the participants have different functions which are hierarchically structured. Girls often play in smaller groups. It takes a longer time for girls to agree on which functions the different participants should have. It is important that tuition try to strengthen the weaknesses of both boys and girls. Girls focus on the task set by the teacher while boys are fascinated by the technical and experimental.

On the topic of higher education studies, Hasse (1998a) argued that male and female physics students adjusted differently to the learning of the social codes of physicists at a physics institute. As women in

particular did not seem to engage in the same activities as most male students, they did not seem to learn the virtues of the student physicist shared by most male students and teachers. This might affect their sense of belonging in a community practising physics at the university level. Hansen (1999) found that young people do not necessarily choose studies leading to highly-paid and high status positions, as they choose their studies based on personal preferences rather than on the status attributed by society to the field. An interest in natural science is mostly prominent among the dwindling lower social classes, where practicality is more pertinent because the students' financial situation is worse. The higher social classes are more interested in their own social status and seek power through political subjects. There is a need for basic education in the philosophy and way of thinking of natural science, so that young people no longer think that it is removed from "feminine" values and are characterized by "nerds".

Gomard (2000) studied male and female Ph.D. students in chemistry and found that the research groups were highly ambitious, multi-faceted, close-knit communities of practice, catering for both the academic and social needs of their participants. However, all group members did not master all relevant types of academic discourse. The more structured the interaction, the more opportunities there were for everybody. Nevertheless, when spontaneous contributions were expected, some group members, among them all the women, were marginalized. In the comparative analysis of humanities and arts and natural sciences, Gomard and Reisby (2001, see also Knudsen et al. 2001, Reisby 2001a and 2001b) observed that male students tended to make themselves more noticed than women, that they were more attracted to research-orientated fields and were more active in seeking out individual and professional social environments. Women needed more reassurance from their teachers. They may be good enough, but often lack confidence; women with potential for research in chemistry, for example, did not take advantage of it. Female researchers in the arts were very much alone, particularly if they experienced problems with their supervisors. Both in the arts and the sciences, men obtained positions as full participants, while women remained peripheral. Learning how to act in all the relevant discourse situations in academia is an important part of the process of obtaining a research position.

Gender-segregated tuition was the topic of Sendrup and Frimodt-Møller (2001). They see that it is of immense importance, particularly in the sciences. In the segregated classes, confidence and success are better established. It is important to create a safe environment without prejudices. Interdisciplinary tuition makes the students more responsible and creates a tolerant environment. Many small successes help eliminate the hierarchical position of the "hard" subjects so that more pupils dare to understand and choose these subjects and go on to natural scientific studies.

Second wave feminism inspired Hasse (2003), who saw the interpretation of body language in some cultural connections as exclusive to female students. The lack of social acceptance may influence their potential for professional growth. The empirical investigations showed that the social category of a "physics student" is in constant development. The students learn that there are "right" and "wrong" ways of being a physics student and that they may fall into either category. The "right" students are characterized as clever and the "wrong" ones as stupid. Actions that show ignorance may label one as stupid. The women do not understand the cultural codes and what is relevant knowledge. Thus, they are excluded from the category of "good student" even though they are good at physics. Female Ph.D. students may be seen as pariahs, even though they are obviously both talented and successful.

Upper secondary school was Lund's (2005) target; she suggests that upper physics in secondary schools should be re-structured so that girls and boys are taught the same subjects. The most important step, however, is to motivate girls by making physics more meaningful to them, e.g. by accentuating physics' relevance for society in general. Møller Jensen's, on the contrary (2005), was worried about the silent or frustrated boys who cause disturbances in class and who do not fit into an increasingly feminized school system. As a result, it is time to consider today's elementary school critically and assess whether the content of education is gender neutral. This focus has become relevant with the introduction of a Danish literary canon, with only one female exception to the rule that a great author is a man. The committee that created the literary canon has mismanaged its task by failing to consider how boys' and girls' identity will develop when only the masculine norm is presented in the literary canon.

Tolstrup Holmegaard (2007) studied girls' cultures in technical high schools (HTX) and found an alternative girl culture developed as a counterculture to mainstream girl culture. This new culture is inclusive of many girls who have felt alienated in school, while at the same time excluding mainstream "girliness". Many of the girls have chosen HTX because they dislike the mainstream youth culture characterized by cliques, a

dedication to fashion, and a lack of dedication to school. This goes for the boys as well, metrosexuality is banned and the pupils in general have a slightly “nerdy” image. Conversely, this culture excludes girls that are interested in science and technology but act and look different from the HTX culture. However, the interests of boys and girls at HTX differ. Girls are primarily interested in health, while boys are primarily interested in technology. This is also reflected in their career choices.

In other Nordic countries, Knudsen (2004) pointed out in Norway that gender awareness comes into focus in analyzing the differences between girls and boys, and women and men. The author found that the gender neutrality paradox became apparent when students and teachers claim that there were no differences between girls and boys in the classroom. Simultaneously they constructed gender differences in their interpretations of teaching situations, other students, and other teachers. However, when students and teachers put their efforts into neutralizing gender, they not only constructed gender differences, but also gender stereotypes.

In Sweden, Hedlin (2004) argued that legislation obliges teachers to work for equality between men and women. It is clear that teachers know the current gender pattern and have knowledge of gender identity and its impact on learning. However, teachers need more than everyday knowledge in order to be able to distance themselves from ingrained opinions and help the students. Power and social superiority/subordination are important theoretical concepts for understanding the gender structure of society and school. Björnsson (2005; same topic as well in Franck et al. 2007) illustrates that this difference between girls and boys also exists between students of different ethnic backgrounds. The report throws light upon the relatively limited amount of research available concerning gender differences, gender identity and school success, given that girls' identification has changed and adjusted. Encouraged by society, girls have broken new territories, which has not been the case for boys. This is a success for the women themselves and for the educational system. Boys' more distanced and eventually negative attitude toward school work is a challenge for schools, parents, associations and others to work on. Berg (2006) too has found different conditions of girls and boys at school, and this has alerted and created a new interest among teachers, researchers and politicians. The first steps in this process are to provide teachers with the required knowledge/awareness and to create a global picture of the present situation. According to the curriculum, the school has a responsibility to counteract traditional gender patterns.

Einarsdóttir and Magnúsdóttir (2005b) studied the Icelandic primary school as a feminized institution. Research shows that in primary schools female teachers constitute 78% of the teaching staff. One solution to this unequal distribution is to raise the low salaries of primary school teachers. The main argument is that girls do better academically than boys, which has been attributed to the high number of female teachers who are not attuned to the special needs of boys. The authors argue that primary schools are not feminized institutions, as the principals and managers are mostly male. The official curriculum decided on by the Ministry of Education is not biased towards feminine values and the teaching material often depicts traditional gender roles and values. Their conclusion is that factors other than the alleged feminization of primary schools contribute to the lower rate of academic success among boys and that the discourse should seek another argument.

The status of women as teachers was also the topic of Þórðardóttir's (2005). In the educational science professions, it often appears that men are working in welfare science and women in a caring profession as teachers. This depiction of the teaching profession reflects a lack of respect for female teachers, whereas the male teachers tend to receive more respect in their disciplines, which are considered more serious. The increase of women in the areas of teaching in which they predominate (especially primary school) is followed by a relative fall in wages.

Salminen-Karlsson (2007) reflects on what should be stressed in the teaching of women engineers in Finland. It is important to notice the social environment surrounding the studies created by different teaching methods. The basic problems are related to a masculine surrounding, in which women are a minority. Woman-friendly tuition has the possibility to combine private life with education. It should be possible to live one's private life and teaching schedules should be realistic. The traditional marking of examinations may be gender discriminatory, as it often reflects men's way of thinking and understanding topics. It is a task of teachers to make women's perspective visible and respected and, in any event, to notice the context of women and men working together and on an equal footing.

**Denmark**

Kruse, A. 1996, *Pigepædagogik og drengpædagogik*, Cekvina (Center for kvinde- og kønsforskning i Aarhus), Aarhus, vol. 24.

**Girls' Pedagogy and Boys' Pedagogy**

The author presents her own and other educational researchers' experiences with gender segregated tuition, which she appreciates and supports. Initially she tried gender segregated tuition in consideration of the 'quiet girls' in class, but later she discovered how also boys benefited, since both sexes require special attention in ways different from the 'unisex' tuition. In the authors view, the main objective of gender segregated tuition is to enhance the competences of both sexes, without one sex being overshadowed by the other.

The author presents her proposal for a feminist pedagogy, developed on her own experiences and visions as teacher. Feminist pedagogy builds on girl friendly pedagogy, which mainstreams the feminine gender's demands and requirements in order to make education interesting and motivating: Education and rehearsals departs on what is perceived as girls' experiences, values and interests. Furthermore, it must be fitted to girls' style of learning and internal non-hierarchical organisation. Feminist pedagogy further entails development of personal competences (assertion, self-confidence, conflict resolution, etc.) and a constructive-critical approach to content of education.

Finally, a discussion of boys' pedagogy follows - a recent but controversial topic in discussions among the, predominantly female, kindergarten and elementary school staff. Danish educational and gender research meets their greatest challenge in the fact that the expectations to boys are that they remain in fixed roles, whereas girls are expected to change and assimilate, the author observes. Gender segregated tuition must simultaneously enhance the child's work with identity but also challenge gender roles and gendered behavior.

**Educational and career choices**

Another important subtopic here is girls' preferences and occupational outcomes when deciding on and embarking upon future careers. One key school subject is mathematics. Kupari (1986) noted a decrease in the number of girls studying mathematics when the subject is chosen by the student. In Finland, this phase is in high school, where fewer girls' selected long mathematics and more moved towards short mathematics, although there were no factors showing any intellectual differences between boys and girls in their understanding of mathematics. One factor was that the writing of the history of mathematics is male dominated--no women are mentioned. There has also been a historical stereotype that women were not suited to the study of mathematics because of their nervous system and intellectual abilities. There were also connections with parents' conceptions and attitudes towards the subject choice possibilities of their children. Another source of the stereotyped understanding of choices was boys themselves, who expressed the feeling that mathematics belonged to the masculine sphere of life. In addition, teachers of mathematics treated gifted boys more positively than they did gifted girls.

Silvennoinen (1992) studied higher education hierarchies, gender and social background. The research material consisted of all people who completed a basic or postgraduate degree course in Finland in 1985. Academic success was not randomly divided among different socioeconomic groups, but was dependent on cultural capital, including gender identification acquired in the home, and on the investments made in education. In terms of social background, including gender, university and college graduates were still a select group. Among holders of master's and doctoral degrees, there were far fewer people with of a working-class background and far more of a white-collar background than at other levels of higher education. People from highly educated families graduated at a younger age and more often obtained better-paid jobs. Higher education served not only the interests of business and the national economy, but just like other levels of education, it continued to form an integral part of the process of cultural and social reproduction. Education for research should also be seen as part of the process by which high-status families transfer their power and capital, through education, to their progeny.

Technically-orientated education at upper levels of Swedish compulsory school was Staberg's (1992) topic. In the classroom, girls engaged in group discussions, thus fostering a responsible rationality, while boys strove to dominate in school debates. This process of shaping diligent, hard-working and responsible girls as opposed to more childish, playful and competitive boys continued in grades 7–9. Girls and boys preferred different subject areas. Boys were practical, while girls were more theoretical in relation to science. Even if there were important differences among girls, there were more significant differences between girls and boys. Girls who took an interest in physics and chemistry often had fathers who were scientists and supportive, or at least parents with a higher education. The mutual construction and reconstruction of gender and of science/technology contributed to gendered choices of study programmes in upper secondary school. Frimodt-Møller and Ingerslev (1993) found a new type of girl in high schools. These "new" girls were characterized by being very active, both at school and, not least, outside school. They planned their lives, were critical and appraising, but not negative.

Beyer (1995) continued with a gender perspective on education in mathematics and physics. She notes that in general, girls like maths and perform well, but physics is a more gender-polarizing subject. To choose a maths/physics-dominated branch of studies is equivalent to claiming that one is rather good at these subjects. The mere existence of soft and hard parallel options of selection creates gender polarization. The earlier the choices are made, the more polarized the gender differences will be in the future. Physics is the most difficult subject in science, for 2 reasons: 1) because of its hierarchical theoretical structure in a mathematical formulation, and 2) because of the inherent interplay between theory and reality. It is important for girls to perceive physics as relevant to themselves or to important problems in the environment or society.

Raehalme's (1996a) study of gifted women as doctoral students found that an environment behind the development of giftedness is shaped by the home, the school and opportunities to study. The importance of the childhood home gains emphasis as a developer of self-esteem. Of the characteristics apart from intelligence, the female doctoral candidates' strong sense of identity emerged, exemplified in high self-esteem and tolerance of uncertainty. Luck as a precondition for the development of giftedness is problematic, because the research data suggest that as a factor it could be balanced by looking at the women's activeness, high self-confidence and optimism.

Dryler's (1998) results of large survey showed that the parents' level of education proved to be the most important childhood condition in accounting for class differences. Family background accounted heavily for the gender-typed choices of study fields, partially through the role models given to children. The parents' educational as well as occupational sector increased the likelihood of both boys and girls choosing a similar field of study. A high social origin was positively associated with gender-atypical choices. The girl/boy ratio in the classroom does not seem to influence gender-typical or gender-atypical educational choices.

Lauritsen's (1999) report on gender differences in the Danish TIMSS investigation on maths and science in 1994–95 showed that girls skipped more questions than boys did. Boys performed better in physics than girls - particularly in exercises about mechanics and energy, while girls were slightly better than boys in questions about temperatures. Girls performed better in exercises that took everyday life as the point of departure, while boys performed better on theoretical questions. Boys appeared to be better at constructing experiments, while girls were better at interpreting the results of an experiment. Jacobsson (2000), on the other hand, saw that with regard to students' motivation and learning, it appeared that girls tended to engage more deeply in their schoolwork and examinations when they met outside the class, which may have given them a clearer picture of what the teacher was looking for. The results were interpreted in terms of rational behaviour within the framework generated by the gender system.

Mathematics and gender performance was the topic focused on by Töttö (2000), who showed that males more often chose the longer mathematics course in school and succeeded better in it than females. This could explain the gender difference observed in grades at the university level, assuming that there is a causal link between mathematical achievement and scientific reasoning. It appeared that differences in mathematical skills did not explain why males received higher grades for their theses. In the natural sciences and pedagogy there was a correlation between mathematical skills and thesis grades, but in other fields men with less training in mathematics seemed to have an advantage compared to men with a stronger background in mathematics. In the case of women, however, there was a strong correlation between mathematical skills and scientific achievement in every field, particularly in the social sciences, economics, and the humanities.

Näätänen (2000) highlighted the problems which the female students were facing in their studies leading to professions in which mathematical skills were needed. She is particularly concerned with how to increase women's interest in studying mathematics both at school and university. Stereotypical problems exist, e.g. in the research finance and in the forming of institutional structures. In addition, workplaces, both in research and later in occupations, are male dominated and often lack support for women workers. One reason for this stereotypical divide is the way mathematics is taught. Mathematics is seen as a "cold and distant" mechanical science that lacks areas for creative thinking, at least at school. In addition, there is a societal question: What do we understand by "the knowledge-based society"? Is it based more on information delivery or on expertise and skill? Do we prefer technical mastery or wide-ranging skills?

Holst (2001b) argued that the cause of the low proportion of female maths researchers is not that women are not interested in the subject, but rather that most women do not attempt to embark on a university career; becoming high school teachers instead. The author believes that positions earmarked for women should be introduced if the women themselves do not have the confidence to apply. The ability to be a mathematician requires will, confidence, social backing, and obstinacy. Maths in school is too operational because there are too many pupils to teach. Thus, maths becomes merely a way of counting, which is not fun for intelligent young people; they never get to the fun bit, which is the abstract universe of maths. Hannula (2006) presents two commonly-held beliefs concerning gender relations in mathematics. The first is that girls are weaker in learning mathematics than boys, although there is no proof of this. The other dangerous belief is that boys and girls are similar--this leads to actions based on boy's terms. Boys and girls differ from each other in mathematics in many ways, but the differences are not very strong. Girls are better in young age classes and tasks requiring numeracy. Boys over 15 are more successful in problem-solving tasks and geometry. The extent of gender difference varies in different countries and has narrowed in recent decades. The greatest differences are in attitudes; boys perceive mathematics more clearly as a men's subject. Girls have less faith in their mathematics skills. In the literature, there are many examples of mechanisms by which the psychosocial environment can produce gender differences in the learning of mathematics and in beliefs and attitudes. The central environments are the home, the school and the public media. Psychosocial models explain the gender differences by the different treatment of boys and girls. Models of social gender emphasize individual choices. It is important to encourage girls to embark on mathematics studies, to use cooperative models in teaching and to present positive role models in schoolbooks.

In trying to get girls to choose natural sciences, Jespersen (2002) argued that the subjects students choose in high school are based on the one hand on a general youth culture that stresses entertainment and a lack of long-term planning, and on the other hand, on their gender. The implication of the first is that few choose the natural science subjects because they are perceived as too serious, while the implication of the second is that few girls choose natural science. The reason for this is that they think they are not good at it (whereas boys think they are). This is due to the socialization of girls in their families and in society. Boys are encouraged to pursue natural science, while girls are not.

Lauritsen (2004) presented results of the Danish part of the ROSE (Relevance of Science Education) investigation, which showed that there was a large gender difference concerning natural science. ROSE is an international study, which studies pupils' interest in and opinions about teaching. The study shows that boys tend to appreciate the dramatic and technological aspects of science, such as the atom bomb, explosive chemicals and lasers, whereas girls prefer to apply their scientific knowledge to studies of health and the body, e.g. nutrition and illnesses and medicine. Science teaching partly fails to capture the pupils' interest and motivation. More boys than girls find science interesting. More girls than boys find learning science, especially physics and chemistry, difficult. Most of them reject the possibility of a future career related to science and technology. Balling Rasmussen (2005) analysed the general results of PISA, which showed that Denmark was average in reading, slightly above average in maths and problem solving and below average in natural science. In all areas, however, the girls' results were worse than expected in view of the tendency in other countries. In maths especially, there is a large difference between boys and girls' performance. In scientific literacy, Denmark is number 31 of the 40 countries, and achieved the lowest score of all Nordic countries. Overall, the PISA study showed a general pattern of gender differences in competences, in which girls were highly skilled in reading, moderately skilled in problem solving, but had weaker competences in maths and science.

Danmarks Evalueringsinstitut (2005) found that type of school, parents' educational background, immigrant status and gender were all independent explanatory factors for the career selection. This influences the access to academia and how well boys and girls fare in the academic system. Berggren (2006) found that the educational choices are still quite gender traditional, and the labour markets are gender segregated. Men

from low classes are generally not getting ahead, which limits their competitiveness. The study showed that educational paths primarily facilitated entry into the labour market for upper middle class students and, among them, men in particular.

On the choices of future studies, Jespersen (2006) says that the differences have to do with a willingness to take risks, an interest in society, and a personal confidence. **A-levels in natural sciences tend to guide boys into these studies more than they do girls. Thus, more girls with A-levels in natural sciences choose a completely different educational path. This leads the author to conclude that boys' educational paths are linear, while those of girls are more differentiated.** The interest in and attitude towards natural science is formed early in childhood, and very few pupils change their perceptions of it in secondary school. The interests of girls, however, are more changeable. This is because their interests are broader and less static. Thus, girls are more affected by cultural liberation.

Luomalahti (2005) studied female students' technological orientation in teacher education. The results show that the female students' general image of technology reflects their subjective values and priorities. Common stereotypes associated with technology become apparent as well; technology was quite generally perceived as belonging to the territory of men. Based on the results of this study, it is possible to pay more attention to female students' special needs, i.e. the female point of view, than has been done in the past when planning and teaching technological studies. Female students' participation in the technological studies of classroom teacher education is well justified: attending the technology classes will give them the opportunity to enrich the subject by bringing their own special skills and features into the traditionally masculine field.

The absence of girls from physics is the subject dealt with by Krogh Andersen and Fox Maule (2006). They found that personal values and priorities influence research priorities, and that gender differences are reflected. A major reason for the low appeal of physics for women is the lack of clarity as to what a career in physics might entail. Physics is a broad course of study and can be applied in all sorts of industries with very low rates of unemployment. However, if they identify physicists only with employment in academia and in secondary schools, or if they have no real idea of where such studies may lead, many girls may choose more clearly-defined subjects. It is important, therefore, that educators in the natural sciences inform prospective students of the future possibilities and diversity in employment offered by the subjects at an early stage. Hasse (2007) argues that the science of physics is built on heterogeneous cultural practices of inclusion and exclusion which build different conceptualizations of gender as well as of physics. These conceptualizations can be understood as particular organizational "cultural models". Therefore, internal notions of physics packaged along with "ready made" stable categories of gender place the discipline in an untouchable ivory tower of "hard science" and "high theory".

**Finland****Mathematics and gender**

The choices related to mathematics are clearly gendered in Finland. The girls are minorities among college students of large courses of mathematics in high schools and among technical students in universities and polytechnics. This is the situation despite equality objectives of Finnish educational system and the results of PISA study which shows that there are no remarkable differences between Finnish girls and boys in terms of their mathematical skills. But the differences are clear in attitudes towards mathematics, which presumably expound the divide in choices of selecting studies related to mathematical skills. One factor explaining this divide is a world of games. Boys' games are more physical, vigorous and competitive than girls' plays. Boys and men are more object oriented and girls and women more socially oriented. In the fields related to mathematics there is less need for social contacts. Also boys' orientation to games, where different kinds of quantities, measuring and spatial action is typical, leads to the different orientations in mathematics. Also gender system and social gender roles channel women to more feminine professions than to those mathematics-intensive masculine professions. This is also in connection with gender role models and expectations and social reproduction processes of gender, like education and pedagogic.

Hannula, M., Kupari, P., Pehkonen, L., Räsänen, P. & Soro, R. 2004, 'Matematiikka ja sukupuoli' in *Matematiikka - näkökulmia opettamiseen ja oppimiseen*, eds. P. Räsänen, P. Kupari, T. Ahonen and P. Malinen, Niilo Mäki Instituutti, Jyväskylä, pp. 170-197.

**Gender and technology**

Research in this area focuses on the ways in which gender affects technologies and how the relationship between gender and technology can be studied. Of particular interest are information and communication technologies. First, Elkjær (1991) pointed out that symbolically, information technology has a masculine connotation and boys felt that they had to live up to this by acting as 'hosts' in the public space, although it was neither easy nor fun to be the host in a space in which one is not fully capable. Thus, both girls and boys emphasized the necessity of taking informatics courses, although for different reasons. Girls can create a free space for themselves, because they are not burdened by a priori expectations.

Håpnes (1996) discovered how hackers constructed personalities and a culture as well as a technology. There were continuous negotiations with human and non-human elements. Håpnes found a picture of hackers that was different from the one familiar to us from the late 1970s and 1980s, as they appeared to conform more to a social than to an asocial stereotype. Håpnes discusses how this group of young men created a subculture with its own goals and individual identities and formed an alternative group at the Institute of Technology.

Vehviläinen (1996 and 1997) argued that the world of developing computers and their use is very male orientated. The power is present in the professional networks of men, to which women have no entry. Women are underrepresented in governing positions and central organs of ICT development and use. This situation remains unchanged despite the education of women. Typically, women work in routine tasks at a lower professional level. ICT technologies, systems and user interfaces reflect the behaviour and thoughts of men. Only some pioneering women, gaining independent positions, have had the opportunity to contribute to ICT development. There is a need to understand the special relationship between femininity and technology. Such an understanding requires adopting the concept of information society citizenship, which recognizes the roles of and the differences between the 2 sexes.

Corneliusson (2003a) points out that there is a hegemonic discourse that raises different expectations for men and women in relation to computing; men are expected to have interest in, previous experience with, and knowledge about computers, while women are not expected to have the same interest, experience or knowledge. Male and female computer students' individual relations to the computer were analysed based

on poststructuralist feminist theory and discourse theory, and seven different positioning strategies were identified. The hegemonic discourse is a starting point for all the informants and it illustrates the “power of discourse”. The students do, however, differ with regard to the degree of harmony with, or challenge to, the hegemonic discourse, illustrating the “individual's freedom”. Nordli (2003) searched for female hackers and found them. They did not use the label of hacker but they were as engaged with the computer and computer culture as those young men who are so labelled. However, to these young women, 16–32 years old, it was important to mark a distance from the nerdishness they associated with the hacker. One of the questions raised in the dissertation is why this is important and whether it would continue to be once the girls grew older.

Work in computing and ICT is the focus of Bergsdóttir's (2006) study. Her results show that the women were pleased with their situation during their studies and at work, although they only make up a small minority in this male-dominated profession. The reasons for their career choices have been documented in other research. These are, for example, motivation, previous computer experience, interest in a career with future prospects and interest in science. A reason given by the women for the low number of women in the profession was the “nerdy” image often associated with computer science. Moreover, they thought that encouragement is needed to attract women to the profession. They said that women were needed in computer science, but that they often had other professional interests and were seeking different types of jobs. All of the women acquired the skills needed to use the technical equipment in their homes and used them to the same extent as their husbands.

### 2.3.4 Gaps

There has not been a “revolution in science”, despite the strong influence of feminism in social sciences and the strong epistemological orientation of women's studies in Finland, Norway and Sweden. Women's studies (gender studies today in Norway and Sweden) is one kind of subparadigm in the social sciences and there has been much empirical applied research in gender studies within the social sciences. However, this has not led to empirical research in other scientific disciplines, with a few exceptions such as medicine and technology studies. In addition, the proliferation of women's and gender studies has not led to any large scale changes in male-dominated hierarchies and practices in science and in the university system (see, for example, figure 3). Today, the Nordic university system is facing large scale structural changes that are taking place without gender mainstreaming, gender policies and even without feminist objection.

In recent years, studies on men and masculinity have begun to appear. The position of men's studies is weak. It developed to add a perspective to the social relation between men and women and to highlight men's position. It is remarkable that research focusing exclusively on boys and men is practically non-existent in Denmark, Sweden and Iceland, although men constitute half of the population. Only 2 Danish entries deal with the man's view on gender identity in the labour market.

Generally, empirical research in the scientific field of stereotypes and identity is almost completely lacking in Finland and Iceland. The research in Finland is conceptual and usually motivated by feminist theories - not by empirical research findings or by other alternative epistemological orientations (despite a couple of non-mainstream empirical dissertations). In addition, it deals exclusively with academia and academic research practice. This research area has not been studied systematically. Further research needs to be undertaken in all disciplines to uncover the influence of stereotypes on how men and women identify with different scientific disciplines and professions. In addition, research on how the educational system forms gender stereotypes is scant in Finland and Iceland. The picture is totally different in Denmark, with abundant empirical research.

In Norway, the assumption that women can contribute something special because they are women is often used in the popular press and this is mentioned several times in the research literature. However, only one study (Haavind 1984) from the 1980s explores this in a systematic way. This assumption is still often affirmed and it should be researched more systematically and by different disciplines.

The main gap in this field is that the research is focused only on academia and the school system. Research on business and the public sector are lacking in the GSD. The studies of cognitive abilities are exiguous and the topic is not clearly defined and expressed as an important research target. Advanced quantitative methodologies, e.g. longitudinal studies, are lacking in investigations on the reasons for different educational choices between the sexes.

## 2.4. Science as a labour activity

This line of research starts from the need to analyse scientific activity from the viewpoint of the traditional gender division of labour and uses of time. The gender division of labour is a concept that refers to complex values, norms, rules and practices in the field of labour that produces an asymmetrical distinction between women and men. The relevance given to personal life and the volume of domestic and care work is greater among women than among men. The organizational structures of science radically separate the public and private spheres. This topic links with horizontal/vertical segregation: the issue of work-life balance is one of the main explanations for segregation, especially for vertical segregation. (See Meta-analysis 2008, 22–23)

One of the core issues to be taken into account in this dimension is how personal time is used. Time use dynamics change to become more care intensive when female scientists have children. The long years of exclusive dedication to academic life coincide with the fertile biological age of women. Sometimes women reduce their working hours or take a break in their professional careers. When this happens, it reduces women's professional status and promotion prospects. Therefore, while the 'perfect scientist' continues to be someone entirely dedicated to the professional career, it is not possible to speak of equality between men and women in this field. (See *ibid.*)

**Table 25: Publications dealing with science as a labour activity**

Publications dealing with science as a labour activity		
Number and percentage of publications		
	n	%
Denmark	123	20.9
Finland	110	25.3
Iceland	15	30.6
Norway	64	24.2
Sweden	134	21.5
<b>Nordic CS</b>	<b>297</b>	<b>23.6</b>
<b>All Cs</b>	<b>1 483</b>	<b>32.6</b>

As can be seen in Table 25, the topic of science as a labour activity is relatively little analysed in the Nordic countries compared to the European average. In absolute numbers, most of the publications come from Sweden and Denmark. Proportionally, this topic is more often studied in Iceland, Finland and Norway.

**Table 26: Publications on science as a labour activity dealing with other topics**

Relation with other topics		%
Horizontal segregation		53.2
Vertical segregation		71.4
Pay and funding		21.5
Stereotypes and identity		53.5
Science as a labour activity		100.0
Scientific excellence		28.6
Gender in research contents		27.9
Policies towards gender equality in research		34.3

The publications dealing with science as a labour activity most frequently analyse vertical segregation as well. The topics of stereotypes and identity and horizontal segregation are also often dealt with. The low number of publications in this field implies that Nordic research does not focus directly on issues of working life in science, but studies this more as a part or outcome of the general discriminatory structure. (Table 26)

**Table 27: Average number of publications per year on the topic of science as a labour activity**

Average number of publications per year		
		Average
1980-1984		2.8
1985-1989		4.6
1990-1994		5.6
1995-1999		10.2
2000-2004		18.8
2005-2007		23.0
2008-2009		9.0

The number of publications on science as a labour activity has increased gradually over the years. Publishing activity has increased especially since 1995, showing a ten-fold increase compared to the beginning of the 1980s. (Table 27)

### 2.4.1 Research questions

An analysis of the research questions in this field presented in the GSD shows that the most frequently researched area was academia as a working environment, studied especially in Denmark, Sweden and Finland. Research focuses on the conditions of women in academia and in scientific positions (and in the labour market in general), and the research reports chart the discrimination, structural barriers and career choice limitations that women in the academic world encounter and the academic hierarchies of work organizations. In addition, research questions on women's working careers and obstacles to their working in academia are presented. Motherhood and the combining of work with family life role have been seen a problem for women's work in research and for their career advancement. Another research interest is professional and a private identity ("femininity") and the subjective experiences of female researchers, especially doctoral students, within the academic community.

The topic of early women pioneers in research is present in all the Nordic countries and especially in Norway. The main focus has been on the professional and personal paths of female scientists of women being in academia since the 1880s. The studies focus on how the historical context as well as the women's social background affected their engagement in academia. The pioneers' efforts to become equal participants in academia and in community life in general are seen in relation to the shifting political, economic and social conditions of society up to the present time.

Sexual harassment at some universities is studied as a part of national equality work and administrative efforts in Finland and Sweden. The research questions chart the scale and nature of harassment and its construction within the academic setting.

In Norway, gender in relation to a medical career is a common subject, and it has been treated once in Iceland as well. Most of the studies focus particularly on the relation between career and personal life in medicine, and ask:

- What is the relationship between career and personal life for women in medicine?
- How do children affect men's and women's career paths?
- How does family life affect men's and women's specialization in medicine?

In Finland, the combination of women researcher's work and family life has been examined. The various combinations of academic work and family life have been studied. These studies open the academic environment into the outside world, which is not typical of studies on gender and science.

## 2.4.2 Research approaches

The following tables describe the research approaches to science as a labour activity in the Nordic countries calculated from the GSD entries:

**Table 28: Methodological approaches of studies on science as labour activity**

Methodological approach		
<b>Empirical research</b>		<b>%</b>
Nonempirical research		47.8
Empirical research. Quantitative techniques		10.8
Empirical research. Qualitative techniques		26.3
Empirical research. Quali-quantitative techniques		15.2
Total		100.0
<b>Approach</b>		<b>%</b>
Conceptual		42.1
State-of-the-art		46.5
Compilation of statistics		16.8
Constructing gender indicators		4.0
Empirical research. Quantitative techniques		25.9
Empirical research. Qualitative techniques		41.4

The studies on science as a labour activity are usually nonempirical and thus conceptual and state-of-the-art. Qualitative approaches are relatively frequently used here. Construction of gender indicators and compilations of statistics are relatively little used. (Table 28)

**Table 29: Empirical research techniques of studies on science as a labour activity**

<b>Quantitative techniques</b>		<b>%</b>
Representative sample		58.4
Micro-data		37.7
Longitudinal/cohort		7.8
Multivariate analysis		31.2
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		27.6
Case studies		13.0
Content analysis		21.1
Interviews		56.1
Observations		9.8

In the quantitative empirical research on science as a labour activity, the most frequently used technique is the representative sample. Longitudinal/cohort studies are little used. Among the qualitative techniques, interviews are used most often. Less often used are observations and case studies. This implies that studies related to the science as a labour activity usually use standard surveys or workplace interviews. (Table 29)

The conceptual approaches, especially in Sweden and Denmark, analyse theoretical aspects of the topic, such as discourses in academia. Qualitative studies in each country typically study work places using interviews. Large quantitative surveys have been used to chart people's opinions of their work and job satisfaction.

### 2.4.3 Findings

The general finding in the Nordic countries is that there are many obstacles for the women working in academia. There exist discriminatory practises, sexism, higher job insecurity and weaker career advancements. There are no feminine models of being the female researcher. The university is still male dominated, although it is easier today for women to achieve academic university degrees. Most women share the common experience of being outsiders in the academic community. The statements of the women show that there is a male resistance against women when it comes to their positions, power and influence – even if some women deny the discrimination. The women's narratives reveal how particular fields and institutions restrict (or facilitate) research designs typically adopted by women researchers. Sexism and a hidden discrimination continue in the daily life of academia, but academic women continue to challenge this various ways. The sexual harassment clearly existed in the universities and the majority of victims were women.

In the Nordic countries, women are found predominantly in the lower positions in the academic hierarchy, in untenured positions and in part-time positions. This implies a high level of job insecurity. In the Nordic academies, there are relatively long recruitment periods for tenured positions, until which the candidates work in untenured positions as research assistants, amanuenses, post-docs etc. This recruitment period coincides inappropriately with the time when many women have children and are taking the parental leave.

Having children is an impediment only for women's research career: Gender differences in working hours are largest between researchers with or without children. The ideal researcher is often self-disciplined, hard working, persevering, competitive and goal oriented, and must work long hours. Several studies show that women researchers do not want to be kind of this and it seems that there is a lack of feminine models of being a researcher. More women than men have embarked on a PhD courses as an alternative to unemployment. There is a call for a structural reform of the research sector in Nordic countries in order to change the traditional, male-biased ideal of the researcher. Many researchers, especially women, complain about a marked loneliness in research work.

Norwegian and Icelandic studies in medicine demonstrate gender differences in ways doctors combine work and family obligations. Research results indicate that female physicians, largely than their male colleagues, have to choose between family and career. Among the women doctors, the probability of becoming a specialist decreases with the increasing number of children. A larger percentage of female than of male physicians live alone in Norway, perhaps indicating that the career is demanding higher price for the former.

In the cases of early women pioneers, it was found in all Nordic countries that they had to fight against the practises of social, cultural and historical contexts. The women entering the academia in the early period were pioneers for whom it was not obvious right to study and their history can be seen in a relation to historical, social and cultural context. At the early stages of academic professionalization it was impossible for women to reach any remarkable positions and later too it was difficult to achieve both professional and academic posts too. This has affected the contents and paradigms of research. The appearance of women to the scientific field was an emancipatory question at the end of the 19th and early 20th Century and today the female professionals are self-evident.

## Women's poorer working conditions and career options

Another strong strand in Nordic research is women's poorer working conditions, both in academia and in working life after graduation. Bruun et al. (1982) first observed that the acknowledgements in dissertation prefaces of male and female doctoral candidates hardly differed from one another. The gratitude of women authors was nevertheless distributed more diversely among the different levels of the university hierarchy than that of men. Women also thanked women more often than men did because women would remain "invisible" without these "extra plaudits". The principle of universality in science, according to which careers must be open to all talented individuals, must also apply to women. This study demonstrated that women were outside the decision-making institutions of science. This lack of power was reflected in unofficial interaction. Only a scientific community comprising both sexes can produce socially relevant knowledge.

Kolmos (1995) observed that female engineers had fewer working hours and job-related travel activities. Women engineers worked fewer hours than men did and had a significantly stronger wish for working fewer hours than the standard working week (37 hours). Children were also influential factors on this issue. Women engineers had a slightly higher unemployment rate and generally lower salaries than male engineers did. At work, women engineers were less engaged in leadership functions than men were, but more engaged in consultant and administrative functions than male engineers. The majority of female engineers had a dual career strategy, which combined work and family.

Gjerberg and Hofoss (1995) observed that female physicians specialized to a lesser extent than their male colleagues, although the percentage has increased in recent years. The gender difference in frequency of specialization was not an effect of female physicians' spending a longer time on specialist training. The results indicate that female physicians, more than their male colleagues, had to choose between family and career. A larger percentage of female than of male physicians lived alone, perhaps indicating that a career demanded a higher price of women. However, the percentage of singles was larger among older than among younger female physicians. The researchers interpret this as indicating that the need to choose between career and family was not as strong as it used to be. Later, in a study of female physicists and chemists, Benckert and Staberg (2000) found that everyone got support from home and from their spouses' at whatever educational level they were. In addition, the teachers supported their careers. All the women who were also mothers discussed the problem of combining family and career. Many questioned whether they were willing to accept the conditions of an academic research career. Their statements showed that had met with resistance from men regarding positions, power and influence. Georgsdóttir's (2001) survey of female physicians also revealed that women experienced difficulties during their studies and at work when trying to combine work and family. The women also claimed that they needed more support from practising female physicians when filling vacant positions.

Sexual harassment and disturbance at the University of Helsinki was Mankkinen's (1995) topic. Sexual harassment clearly existed; during the previous two years 6.8% of the personnel had suffered it, 78% of whom were women and 22% men. Of the students, 2.7% had been victims of sexual harassment and the majority of them were women as well. The forms of harassment were multiple and diverse. Harassment was divided into: 1) serious harassment, 2) the overemphasizing of sexual roles, 3) an ambivalent disturbance and 4) a disturbance on the part of a student. The harassment could be 1) a continuous process, 2) a demand for sexual favours in return for advancement or 3) single harsh incidents. Usually the victims evaded the disturber and did not talk about the incident publicly. They felt that they were isolated from the work community and the importance of work disappeared. Female students felt that their motivation to study diminished and the period of study was prolonged. It was difficult to start actions against the disturber due to the shame of the victim or institutional practices and traditions of covering such incidents up. An important way to prevent harassment is awareness raising, talking about what it is, how it is practised and, finally, what its consequences are.

The Danish Minister for Research, Hilden (1997) discusses the benefits of research schools and the relevance of earmarking research positions for women. She foresaw that the research sector would have to allow the possibility of doing a Ph.D. degree or doing research on a part-time basis. It is important to communicate the fact that other ways are possible—today, research work can be flexible. It can be done as teamwork; technological tools also serve to make a researcher's work flexible. The current system, in which young researchers must work many years in time-limited jobs before they 'earn' a permanent position, needs to be changed.

Andersen (1998) points out that in academia more women than men had temporary contracts. Women worked fewer hours per week, especially during recruitment courses. However, the relative research time was equal for both women and men. Contrary to international findings, Danish men and women seemed to publish scientific articles to an equal extent, just as equal proportions of the two sexes have obtained Ph.D. and doctorate degrees. Women emphasized the pertinence of the support of social relations to their choice of career, and relations of cooperation at the work place seem to be more important for women than for men. Neither men nor women thought gender has an influence on power relations at the workplace, although women tended to stress the gender factor slightly more than men did. Nexø Jensen (2002) continued the assessment of gender in the academic organization and found that among doctoral students more women than men were employed outside universities, chose the Ph.D. as an alternative to unemployment and were undecided about their future workplace.

Rasmussen and Rittenhofer (2001) conclude that women researchers' status in higher education was lower than that of men. Firstly, the female researchers were associated with low-prestige categories of research; secondly, for three decades women had been invisible in discourses on research, and even though their gender is now considered with respect to research, there are still stereotyped perceptions of the qualities and positions of men and women. For example, when female researchers are mentioned, the focus is on how they juggle their professional and private lives.

Bencker and Staberg (2001) point out that there were male networks in academia. Men helped and supported each other. A resistance towards women was seen most clearly in research positions, research resources, power and influence. The gendered structure of care work put men at an advantage in their careers. The culture of science is not woman-friendly. The road for most women is a winding one, and not the straight road that would make it possible to decide suddenly in secondary school that one wants to carry out research on the basic problems of physics. It is much more common for boys to opt for a research career early on and to go straight on to that goal.

Pórisdóttir (2002) discuss women's education in terms of career and wages, which appeared to be lower than that of men with comparable education. The glass ceiling was apparent both in the universities and in the labour market, since women did not seem to be able to progress easily from middle to high positions in the occupational hierarchies. The author discusses those gender scholars who rejected the idea of a male conspiracy against women. These scholars argued that the underlying reasons a mixture of culture and traditions, subjective and objective barriers, and gendered discourses. In some disciplines, such as the medical profession, gendered discourses have made it difficult for women to undertake studies in male-dominated specialities such as surgery and instead women tended to opt for specialities that were less prestigious, such as general practice or gerontology. The author calls for measures to help teachers at the university to raise their gender awareness and to ensure that they treat female and male students on an equal basis. Research shows that male teachers are more likely to refer to their male students as "comrades" and take greater interest in their studies.

Gomard (2002) found that the communicative culture of academia is not gender neutral, as it subtly benefits men with a high profile and greater visibility. This is a typical masculine position, which fits in very well with the ideal of a researcher. By contrast, women in the study contributed less often, and tended to undermine their own authority as researchers. Thus, the competitive, individualized social interaction that traditional in academia is favourable to men, because it does not conflict with their gender role. Bloch (2003) found 'me first' and 'you first' strategies in academia. These are ways of relating to others, either accentuating oneself or the other. The 'me First' handling of emotions has masculine connotations, which means that they are legitimate for men but not women. Women who use such strategies with masculine connotations are perceived as arrogant, embarrassing or overreacting. When women try to negotiate egalitarian forms of handling emotions, it is perceived as a sign of weakness. Thus, women lose their social positioning no matter how they handle emotions. Koski and Tedre (2003) observed that gender seemed to be simultaneously absent and present, and vanished whenever it was about to be found. One aspect of the hiding of gender is the difficulty of generalizing personal and individual experiences as female experiences and of specifying the ways in which gender presents itself in the university. The group studied had misgivings about gender explanations; rather than relating the experiences under discussion with gender, they saw them as consequences of a particular personality.

Søndergaard (2002; on discourses in academia, see Højgaard 2003) states that in male-streamed academia woman is "the other". Women had to convince academics that they not only mastered their academic fields,

but that they had an immediate and naturally integrated relation to it. Women were expected to remain in the marginalized areas of academia and to negotiate their position as “the other” through the existing paradoxes and oppositions. Those who are “other”, only the official discourses are available; the implicit latent discourses remain hidden and unavailable. Therefore, many of the real selection criteria for positions (nepotism etc.) were not used in favour of women. Women who “politicized” were perceived as personally ambitious, which was not considered legitimate in Danish academia. The men were freer to make available discourses their own, while still being perceived as relevant academic actors. Mählck’s (2003; see also Bondestam 2004) results indicate that gender inequalities are produced within seemingly gender-neutral every-day working situations. The feminine ‘other’ is constructed in relation to masculinities in everyday working situations and constitutes an obstacle for collegial relations. Both women and men use the discourse of gender equality to reproduce gender inequality; this is done by excluding women in subtle ways or by internalizing superiority or inferiority. The reluctance to consider gender as relevant for academic career opportunities focuses attention on two social constructions: academia as an objective and gender-neutral institution where meritocracy rules, and the norm of gender equality. Gender inequality in academia becomes something that is outside the norm of equality.

Another aspect specific to the university in which gender is hidden is the multiple formal and informal hierarchies of the university. Saarinen (2003) argues that women’s narratives reveal that the research process is a multidimensional and complex one. The participants represented different academic fields, and their narratives draw attention to how their particular fields and institutions restrict or facilitate research designs typically adopted by women researchers. One of the critical stages in doing research proved to be gaining a comprehensive picture of one’s research, a difficulty that can be attributed in part to the researchers’ efforts to reconcile multidisciplinary approaches. Julkunen’s (2004) study of female Ph.Ds shows that the university is still male dominated, although it is easier today for women to obtain their doctorates. Working in the university requires a competitive manner, flexible working arrangements, a marginalization of private life and complete devotion to one’s work. Combining work and family life is difficult. To become a mother in this kind of environment is risky from the perspective of furthering one’s career. Fixed-term work contracts are available for only a few Ph.D. holders and do not help the situation either. On the other hand, women who were satisfied with their career were also found.

Sexual harassment in academia was explored by Carstensen (2005; same topic in Andersson 2007), who showed that sexual harassment can be defined by subjective standards and objective standards. When women speak about their own experiences of sexualization in academia, the idea of sexual harassment is invalidated through the arguments of the male harasser, the influence of alcohol and the level of violence/coercion. When all frames of interpretation are considered together, the space for drawing a boundary and naming some type of behaviour sexual harassment seems to be minimal. The informants’ use of sexual harassment as a concept is partly informed by the assumed gender neutrality of the professional order and partly by what are culturally expected interactions between women and men. Finally, the contextual analysis shows that due to the double meaning of the Swedish gender equality discourse, sexual harassment tends to become “everything” and “nothing” at the same time. This paves the way for the invalidation of sexual harassment as a real problem in the academic setting.

Lützen and Larsen (2005; see also Voldgaard 2005) argues that the profile of the ideal researcher is one of a person who is self-disciplined, hard-working, persevering and goal-orientated. The research environment at the university is described as competitive. Men tend to win the competition for promotion within the university, whereas women appear to have a weaker position with regard to an academic career. Women Ph.D. students’ professional self-confidence is lower than men’s; they are more sceptical of the academic environment and they do not want to sacrifice their family for the benefit of their career. Only the most dedicated women make it to the top positions, but sacrifice much along the way - so much so that they do not make good role models for other women.

Focusing on work in academia, Bloch (2007) argues that women lose social position in this context because of the way they deal with their feelings. First, pretending not to experience failure is natural to men, but not to women. Women instead show their weaknesses, and give expression to their research failures. Secondly, they do not talk about their success. Pride is supposedly unacceptable in academia, but men and, to a certain extent, a few of the women proclaim their successes. Women mostly do not do so and thus become invisible. The third way women lose social position is in the way in which they deal with anger. When men show anger they are perceived as strong and they therefore gain social status. Women, on the contrary, are perceived as weak, out of control and unfeminine, thereby losing social status.

Removed from mainstream research, the problem of working fathers was Højgaard's (1995) interest. The author demonstrates that most men find that career and family are incompatible. Most men found their work very important and were unwilling to meet family demands at the expense of their work. Furthermore, parental and paternal leave was seen by the male employees as an interruption in the stream of work tasks, not as a right to concentrate on childcare and family life. Thus, a man's wish to take parental leave, unlike a woman's, may be perceived as a signal that he is not serious about his career.

## Denmark

### Gender in the academic organisation

This series of working papers is the results of a major research project of this same name, which was carried out in 1996-2002. The project was initiated in cooperation by several disciplinary research councils and carried out by some of the most prominent gender researchers as a cross-disciplinary investigation of gender inequality in Danish academia.

The project resulted in 14 different 'working papers' addressing different aspects of gender inequality in academia:

The structural system of research policy, the handling of emotions in academia, career patterns, longitudinal studies of gender proportions in various departments, leaky-pipeline assessments, criteria in scientific excellence, etc. are investigated, including one working paper specifically on issues in biomedical science.

Each working paper constitutes an independent study with its own approach, theoretical point of departure and empirical focus.

Køn i den akademiske organisation 1-14 (1996-2002)

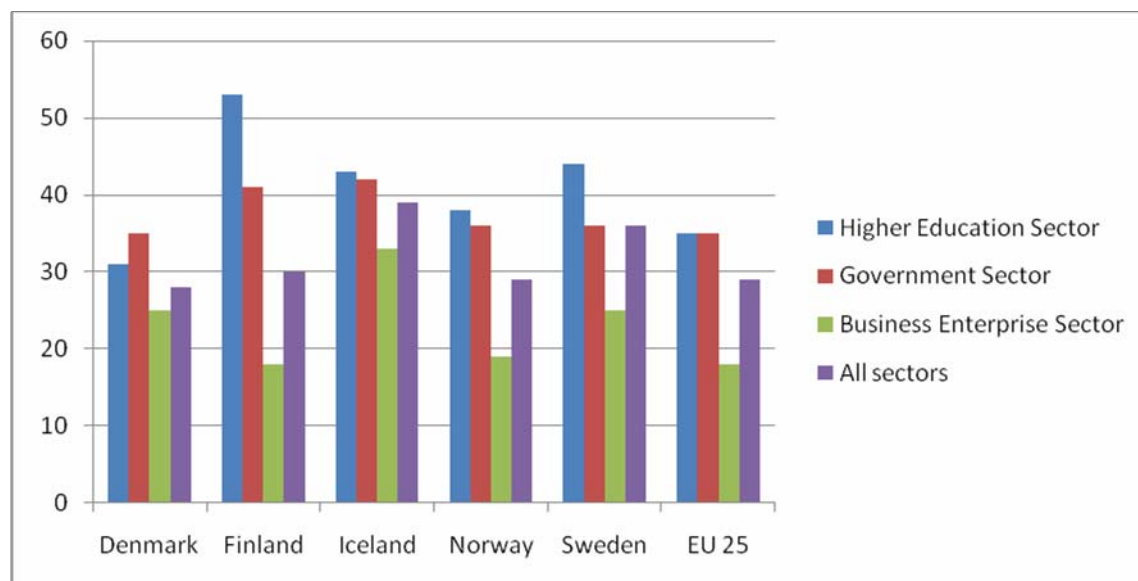
## 2.4.4 Gaps

On the whole, knowledge on specific gender-barriers in terms of working conditions is scarce and often illustrative/discursive. The situation of researchers outside academia has received little mention, with only caring and childcare apparently worth mentioning. The specific case of women researchers combining a research career with motherhood is dealt with in many entries, but not investigated fully and in-depth. In general, there is a lack of recent studies of the relationship between personal and professional life-course seen from a perspective outside academia. For example, women's professional life course needs to be studied, as it is common for women to take long study and career breaks for child bearing and rearing. It is also important to note that the situation is changing and thus more just-in-time research is needed.

There is also a need to examine the career patterns of scientific staff in untenured positions (time-limited contracts) to understand how this occupational situation influences the subsequent career. This is one of the greatest problems in making a research career attractive to both sexes. Working time and the working environment need to be studied more in detail in order to identify hindrances to women's advancement.

It is noteworthy that women especially perceive the industrial research community as more attractive than academia, but the business sector has not been studied. Figure 5 shows that proportionally most of the women work in the higher education sector, but many of them work in other sectors as well—sectors on which there has been practically no research in the Nordic countries:

**Figure 5: The Proportion of female researchers by sector in the Nordic counties 2003 (calculated from She Figures 2006)**



## 2.5. Scientific excellence

This topic/concept includes issues such as the masculine character of the prevailing model of success, the emphasis given to scientific production through publications and the bibliometric measures used to measure productivity for research personnel. But it seems obvious that the ideal scientific career is based on a masculine model of success, based on long working hours, an uninterrupted scientific career, or an active participation in extra activities such as expert panels and assessment committees. This meritocratic system strengthens unequal starting points and has particularly damaging results for many women and some men who do not meet the model of success defined as standard. The same holds true for the bibliometric measures used to count publications and citations as the most relevant ways for measuring scientific excellence. (Meta-analysis 2008, 23–24)

The second topic-- the specific procedures for assessing scientific excellence--refers to the ways in which the scientific merit of academic contributions is evaluated. Essentially, this means peer evaluations. The system of peer evaluation is based on the idea that the scientific community is the best prepared to judge other scientists (peers). However, it makes the assumption that the evaluators are free of social prejudices and thus issue judgments that are totally objective. In this regard, leading contributions, such as that of Wennerås and Wold (1997), make it clear that the peer evaluation system cannot be considered completely gender-neutral. (Ibid.)

The networks of men with informal relationships are basic to understanding who the candidates are and who the people selected are. The absence of women both in formal and informal networks has to do with the low representation of women in certain positions and the difficulty they face in getting promoted to positions with great responsibility. Senior advisors, usually men, have a huge impact on the formation of networks, the distribution of opportunities, and the provision of the tacit knowledge necessary to advance successfully in science. Gate-keeping processes restrict women's possibilities, not simply of participating in informal networks, but more fundamentally, of doing research, of publishing, of receiving citations - to stress the most relevant signs of status and performance in science. (Ibid.)

**Table 30: Publications dealing with scientific excellence**

Publications dealing with scientific excellence		
Number and percentage of publications		
	n	%
Denmark	103	17.5
Finland	116	26.7
Iceland	11	22.4
Norway	33	12.5
Sweden	222	35.6
<b>Nordic CS</b>	<b>340</b>	<b>27.1</b>
<b>All Cs</b>	<b>900</b>	<b>19.8</b>

As Table 30 shows, publications on the topic of scientific excellence are relatively more frequent than the European average. The number of publications compared to other topics is at the middle level. In absolute numbers, most of the publications come from Sweden, Denmark and Finland. Proportionally, this topic is more often dealt with in Sweden and Finland. Noteworthy is the small number of publications from Norway on this topic.

**Table 31: Publications on scientific excellence dealing with other topics**

Relation with other topics		%
Horizontal segregation		57.9
Vertical segregation		42.9
Pay and funding		20.9
Stereotypes and identity		67.1
Science as a labour activity		25.0
Scientific excellence		100.0
Gender in research contents		51.2
Policies towards gender equality in research		34.7

The Nordic publications that deal with scientific excellence tend to analyse as well the topics of stereotypes and identity and horizontal segregation. Fewer publications combine this topic with those of pay and funding and science as a labour activity. This implies similar structures and constructions behind the gender stereotypes and procedures for evaluating scientific excellence that lead in the end to gender segregation in science. (Table 31)

**Table 32: Average number of publications per year on the topic of scientific excellence**

Average number of publications per year	
	Average
1980-1984	1.0
1985-1989	4.0
1990-1994	7.2
1995-1999	14.6
2000-2004	25.4
2005-2007	21.0
2008-2009	8.0

The number of publications on scientific excellence has increased gradually over the years. The greatest increase has been since 1995, and the number is many times greater now than at the beginning of 1980s. (Table 32)

### 2.5.1 Research questions

In the Nordic countries there is not much research to be found on the topic of gender and scientific excellence. What has been questioned are the different criteria used by evaluation committees to assess the academic merits and publications of men and women. Do the evaluation committees use criteria that put female applicants at a disadvantage with respect to male applicants? A few publications focus on differences between men's and women's scientific productivity and how male and female researchers produce with different methods and constraints. In addition, inclusion and exclusion mechanisms in recruitment procedures are studied.

In Sweden, the general criteria for scientific excellence and how this should be measured are particularly questioned. The most general strand is the studies of evaluation procedures and practices when assessing and selecting academic staff. Are these assessments and institutional practices objective and if not, why? In Norway the different personal constraints of men and women and how this affects scientific work and its quality have also been studied.

## 2.5.2 Research approaches

The following tables describe the general research approaches to scientific excellence in the Nordic countries calculated from the GSD entries:

**Table 33: Methodological approaches of studies on scientific excellence**

Methodological approach		
<b>Empirical research</b>		<b>%</b>
Nonempirical research		67.6
Empirical research. Quantitative techniques		8.2
Empirical research. Qualitative techniques		15.3
Empirical research. Quali-quantitative techniques		8.8
Total		100.0
<b>Approach</b>		<b>%</b>
Conceptual		68.2
State-of-the-art		35.3
Compilation of statistics		7.1
Constructing gender indicators		1.8
Empirical research. Quantitative techniques		17.1
Empirical research. Qualitative techniques		24.1

Table 33 shows that studies related to scientific excellence are usually nonempirical and thus conceptual and state-of-the art. The use of qualitative techniques exceeds that of quantitative techniques. Gender indicators and compilations of statistics are relatively little used. Again, the table implies that more empirical research is needed on this topic and the statistical approaches, indicators and time series are relatively little used.

**Table 34: Empirical research techniques of studies on scientific excellence**

Empirical research techniques		
<b>Quantitative techniques</b>		<b>%</b>
Representative sample		77.6
Micro-data		37.9
Longitudinal/cohort		1.7
Multivariate analysis		25.9
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		19.5
Case studies		13.4
Content analysis		26.8
Interviews		61.0
Observations		12.2

In the quantitative research, clearly the most frequently used technique is the representative sample and barely used at all is the longitudinal/cohort technique. In the qualitative research, the most frequently used technique is clearly the interview and the second most usual is content analysis. The empirical studies of scientific excellence are usually based on interviews with people who have participated in the selection process or on content analyses of selection reports and processes. (Table 34)

### 2.5.3 Findings

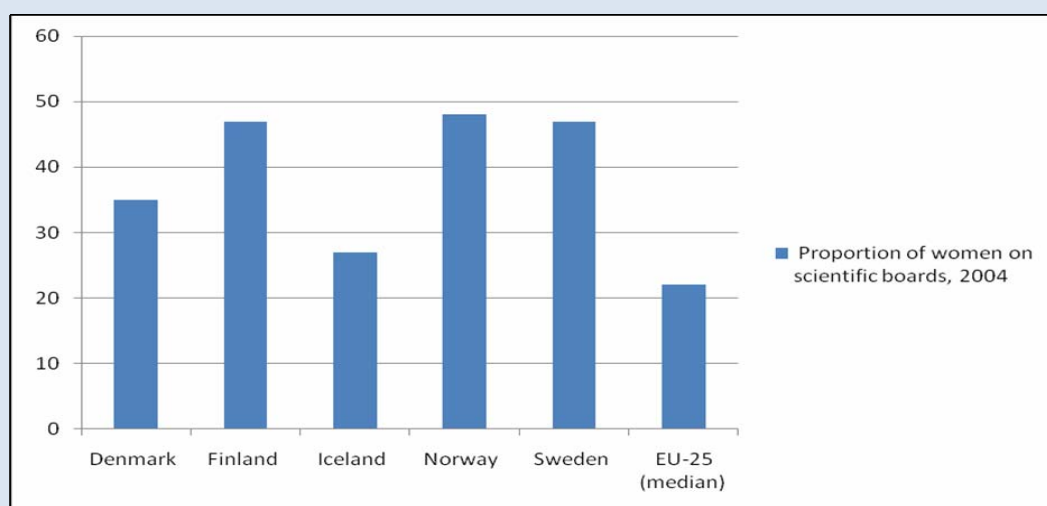
In the Nordic countries there is a male bias in understanding of the scientific excellence when related to recruitment procedures, allocation of funds and scientific productivity. Most studies have found that male researchers are more productive than female researchers are, and this tendency is also present at the Nordic universities. While most studies treat women as a group compared to men as a group, there is a clear connection between position and productivity. Professors are more productive than associate professors, who again produce more than the group below them. Women are less represented in the group of professors, thus the differences between the different positions has the impact on average of men's and women's productivity. The main finding shows that the women publish less than men do, but they are more productive than the men on their own level are. In Denmark, men and women researchers seem to have equal scientific productivity when they seem to spend equal time on research. Women with children work fewer hours, but predominantly they cut off teaching and administrative work.

Qualitative analyses of the experts' written statements in the process of evaluating the applicants indicates that women applicants are exposed to be passed over in the process, because gender becomes the frame of interpretation of the competency in the evaluations. Thus, the gender-biased language was used in the evaluation procedures, highlighting men's achievements and diminishing women's. Like in *Iceland*, it was studied that male candidates were expressed to be engaged with difficult projects. The evaluation committees valued too continuous research activities but women have greater difficulties fulfilling this requirement due to the bearing and rearing of children.

The studies show that a childcare and a lack of research collaboration are the two factors that cause significant gender differences in the scientific publishing. Women with young children and women who do not collaborate in research with other scientists are deprived less productive than their other male and female colleagues are.

The following figure 17 shows that women of Nordic countries are not the majority of the scientific boards, but the situation is relatively equal and clearly better than the EU median:

**Figure 17 Proportion of women on scientific boards in the Nordic countries 2006 (calculated from She Figures 2006)**



## Scientific evaluation practices

Nordic research on this GSD topic concentrates on two issues. First are the studies related to scientific evaluation practices and processes and second the studies assessing differences in productivity between the sexes.

In Fürst's (1988) study, a comparison between female and male applicants' chance of success in the hiring process showed that women - unlike men - met a number of barriers in the process. A qualitative analysis of the experts' written statements on the process of evaluating applicants indicated that women applicants were more likely to be passed over in the process. This had to do with the informal aspects of the employment process - and that gender had become the frame of interpretation in the evaluation of competence. Kyvik (1988) indicates that most studies about scientific productivity have found that male researchers are more productive than female researchers, and this tendency was found at Norwegian universities. In the period 1979–1980 women published on average 30% less than their male colleagues did. Central to the study were explanations of why the men were generally more productive than women. Most other studies treated women as a group compared to men as a group. There was, however, a clear connection between position and productivity. Professors were more productive than associate professors, who in turn produced more than the group below them. Women were less represented in the group of professors, thus the differences between the different positions had an impact on the average of men's and women's productivity. The main picture was that women published less than men did, but they were more productive than men on the level below them.

*Danish* research at the beginning of 1990s (Ammitzbøll 1992) criticized the work of scientific evaluation committees as being one reason behind gender segregation. In the assessments done by the committees, men's production tended to be seen as showing scope and variation, while that of women was seen as scattered and lacking in depth. Thus, there was a tendency to cast suspicion on the scientific work of women. The evaluation committees are inclined to appreciate and hire people that most resemble them, and these are men.

In Sweden, Wennerås and Wold (1997) wrote their article on 'Nepotism and sexism in peer-review' in which they found that the Swedish Medical Research Council evaluated applicants according to three factors: scientific productivity, contact with evaluator (read challenge or nepotism) and gender. *The female applicants had to be 2.6 times as productive as their male competitors were in order to be regarded as equally productive.* The reason why there were so few women in academia was not the glass ceiling but the leaky pipeline. Using different scales to measure male and female applicants led to a distillation that resulted in a predominance of men. This was the first-ever analysis of peer-review scores for postdoctoral fellowship applications and the system was revealed as being riddled with prejudice. The policy of secrecy in evaluation was current. The authors claim that the credibility of the academic system would be undermined in the eyes of the public if it did not allow scientific evaluation of its own scientific evaluation system.

On the 40 new professorships reserved for women, Wissing (1998) said that when several applicants for a position were equally qualified, he might consciously choose a woman. Now the new hiring announcements have made it possible for the universities to have the final decision rather than the evaluation committees. Inge Henningsen, a member of the Committee for Equality in Research, claims that it was a myth that the research system always hired the best candidate. She says that there are numerous examples of advertisements for positions that list qualifications that are not scientifically relevant. Drotner and Mouritsen (1999) argue that the marked gender inequality in academia means that the research areas men are interested in have tended to gain more space, prestige and funds. Men were often found to be poor at judging quality in research when it comes to subjects that are traditionally female, because they were not interested in these subjects and therefore did not pay attention to development within them. Women, on the other hand, were forced to keep up with the developments in the areas of their male colleagues if they wanted to have an education and a career. Increasing the proportion of women in scientific positions thus broadens research as well as increasing quality because female resources are utilized.

Søndergaard (2001) claims that all university cultures are dissensual. However, these environments contain a considerable degree of agreement on the central principles of their disciplines and on their procedures for advancement and decision-making. Many women and men manage to integrate efficiently and straightforwardly into the university system. Many men and women also enjoy being part of that system. However, a relatively greater number of female participants lag behind in the processes of recruitment and

advancement. This article suggests some potential dynamics and measures to be implemented in order to deal with this problem.

Gomard and Reisby (2002) observed that male students tend to make themselves more noticed than women; they are more driven towards research-orientated studies and are more active in seeking out individuals and professional social environments. This makes them able to incorporate scientific habitus at an earlier stage and gives them confirmation of their abilities and their mastery of the environment. Women need more confirmation from their teachers. They may be good enough, but they often lack confidence. The study shows that there are women with research potential in chemistry whose potential is not taken advantage of. Such women are lost to research because it is left up to the students themselves to find out about research-orientated studies. It would also be beneficial to women if personal confirmation and the experience of a professional social community were strengthened. Female researchers in the arts are very much alone, particularly if they experience problems with their supervisors. Both in arts and sciences men obtain positions as full participants, while women remain peripheral. Learning how to act in all the relevant discourse contexts in academia is an important part of the process of obtaining a research position.

Þorvaldsdóttir (2002) studied gender dimensions in the judgments of evaluation committees at the University of Iceland. The findings revealed an extensive use of gender-based language when the merits of men and women were assessed. Male candidates were said to be engaged with difficult projects (glíma við erfið verkefni) while female candidates were working at “something” (hafa eitthvað á prjónunum). Moreover, the work of male candidates was discussed in much more detail and the evaluation was less critical than was the case with the work of female candidates. When male candidates applied a gender perspective in their research, it was regarded as a sign of being open-minded, while such research undertaken by a female candidate was described as a rather narrow perspective or marginal. Finally, the evaluation committees valued continuous research activities but women have greater difficulties in fulfilling this requirement due to the bearing and rearing of children.

The Swedish Vetenskapsrådet (2006) declared that to foster gender-equal evaluation of excellence in science the most important thing is to keep doing good research and building strategic alliances while conducting and communicating this research. It is especially important to contribute to making the results of the funding of research visible.

### Personal gender-specific problems

Much of the research deals with the personal qualities of women trying to advance in the academic system. Søndergaard (1992) notes that in the gender-neutral academic environment, career paths are complicated. Some of them are subject to a double standard associated with gender, as the careers of men and women are built on different gender-specific criteria, which are often hidden; this in turn affects the way the actors orientate themselves in relation to each other as men and women and in relation to the possibilities of action within the culture. Others are apparent in the status of the academic arena both as both a professional arena and a boyfriend/girlfriend arena, where making oneself desirable as a gendered being is blended in with the other themes of the arena. At the same time, the myth of the self-chosen gender exists as a strong force. This myth, combined with the academic cultivation of individuality, independence, and will power, place limitations the responsibilities of the individual actors. Today's gender negotiations take individualized forms, rather than being based on collective formulations of problems and as collective attempts to change things.

Bendix Petersen (1999) argues that when speaking about academic qualifications, the informants resolutely exclude gender as a relevant issue. The candidates' gender has nothing to do with academic qualifications, as the evaluators gender has nothing to do with the assessment of candidates. By deconstructing these discursive practices, it becomes clear how making the gender an irrelevant issue seems to offer men and women different conditions for being, acting and feeling. Women may very well reproduce the specific cultural constructions that constitute this specific cultural context. However, it seems that they do not slide into the category of culturally intelligible academic persons in the same way as men do. Men are academic persons per se, whereas women have to go through a series of specific discursive motions to stress their academic personhood, for instance by stressing that the gender issue has lost topicality and that it is time we stopped seeing problems where there are none.

### Norway

Large differences in scientific productivity between male and female researchers have not yet been explained in a satisfactory way, according to Svein Kyvik and Mari Teigen. This study finds that child care and lack of research collaboration are the two factors that cause significant gender differences in scientific publishing. Women with young children and women who do not collaborate in research with other scientists are clearly less productive than both their male and female colleagues. In an earlier study based on data from Norwegian universities the authors suggested that child care is the most critical factor for women's scientific productivity. Whereas women with children younger than ten years of age published considerably less than their male counterparts did, women whose children were older were as productive as men in the same family situation and academic position. The authors decided to repeat this study ten years later to see whether they would find any changes in men's and women's productivity, and in addition, the earlier work generated a number of new questions that deserved further investigation. The data are drawn from a questionnaire study conducted in spring 1992 among all faculty members (except technology because of low number of women) of the rank of assistant professor or higher at Norway's four universities, with a response rate at 70% for men (N = 1277) and 68% for women (N = 252). The questionnaire required that faculty members specified the number of publications during the three-year period 1989-91.

Kyvik, S. & Teigen, M. 1996, '**Child Care, Research Collaboration, and Gender Differences in Scientific Productivity**', *Science, Technology, & Human Values*, vol. 21, no. 1, pp. 54-71

### 2.5.4 Gaps

This is not really a major research area in the Nordic countries, but rather more like a subtopic of the studies on segregation and the social construction of science. The area thus lacks independent research traditions and systematic evaluation procedures with timelines and sophisticated quantitative methods. This would be an area, which would be easy to measure or study with targeted quantitative and qualitative research methodologies. One reason for the dearth of studies could be that this kind of research directly and openly intervenes in and uncovers the prevailing power structures of the research institutes. It is therefore not in the interest of power élites to finance this kind of research, which reveals how their power is used.

Again, academia is the main focus and research on the private and public sectors is lacking. There is, for example, no analysis of the practices in private sector R&D.

## 2.6. Gender in research contents

Gendering research contents entails systematically questioning whether, and in what sense, sex and gender are relevant to the objectives and methodology of projects. A number of studies have documented that gender stereotypes dominate scientific discourse, epistemological assumptions of science are gender-biased and the shaping of the scientific agenda is male dominated. A transformative understanding of gender and science includes the need to question the dominant paradigm in relation to both gender and science. Those approaches that focus on linking theory and practice, with the assumption that feminist practitioners in sciences are in a privileged position to ascertain what a gender-sensitive science might mean, seem particularly useful. These approaches point out that interdisciplinary science—linking natural, technological and social sciences—and social diversity among scientists are two major issues. The integration of the gender dimension into research content requires a reconstructive perspective in the scientific approach, focusing on interdisciplinary and transdisciplinary research and methods and integrating natural, technological and social sciences. (Meta-analysis 2008, 24–25)

**Table 35: Publications dealing with gender in research contents**

Publications dealing with gender in research contents		
Number and percentage of publications		
	n	%
Denmark	160	27.2
Finland	212	48.8
Iceland	10	20.4
Norway	102	38.5
Sweden	314	50.3
<b>Nordic CS</b>	<b>469</b>	<b>37.3</b>
<b>All Cs</b>	<b>1 434</b>	<b>31.5</b>

In the European comparison, the topic of gender in research contents is relatively frequently studied in the Nordic countries. In comparison with other topics, its treatment is slightly above the median. Both proportionally and in terms of absolute numbers, it is most frequently dealt with in Sweden and Finland. (Table 35)

**Table 36: Publications on gender in research contents dealing with other topics**

Relation with other topics		%
Horizontal segregation		41.8
Vertical segregation		26.0
Pay and funding		8.1
Stereotypes and identity		75.7
Science as a labour activity		17.7
Scientific excellence		37.1
Gender in research contents		100.0
Policies towards gender equality in research		29.0

The Nordic studies that analyse gender in research contents most frequently deal as well with the topic of stereotypes and identity. The studies are least often associated with the issues of pay and funding and science as labour activity. This implies that questions regarding the content of research on gender and science are discussed simultaneously with those on gender stereotypes and identity and are interwoven with them. (Table 36)

**Table 37: Average number of publications per year on the topic of gender in research contents**

Average number of publications per year	
	Average
1980-1984	2.0
1985-1989	7.2
1990-1994	12.2
1995-1999	18.4
2000-2004	30.0
2005-2007	31.7
2008-2009	12.5

The medium level of publishing activity on this topic has increased gradually over the years. Publishing activity has increased especially in the period since 2000, nearly doubling that of the previous years. (Table 37)

### 2.6.1 Research questions

In the topic of gender in scientific contents, there are no clear lines of research common to the Nordic countries. Especially in Finland, but also in Norway, the gender perspective in science deals with questions of how to integrate and mainstream the gender perspective into the scientific disciplines. The research is often based on a critical analysis of gender bias in scientific knowledge and points to new directions, both methodological and theoretical, in the development of research approaches. This research field considers conceptual questions of applying women's and gender studies and their epistemological background to concrete social research, its empirical settings, methodologies and argumentation. This has meant the development of the social sciences and their contents from the feminist and gender perspective and thinking about how gender is produced in the fields of the social sciences. What is the presence and meaning of women (and sometimes men) in the contents of the social sciences? What are the roles and characteristics of female and male subjects in scientific argumentation? In Norway too history as a scientific discipline has been interested in the larger gender question.

Gender-related studies in medicine in Norway and Sweden explore not only the importance of gender theory as an academic effort to increase our knowledge, but also the health-threatening consequences of not including knowledge about gender in medical treatment. This kind of research is interested in the diagnosis and clinical practices especially related to women patients and specific women's diseases that need differentiated treatment. Theoretical discussion explores the challenges of biological determinism and differences between socially constructed gender and natural scientific biological sex, as well as the perception of sexual bodies in the current social debate.

Especially in Norway, but in Sweden and Denmark as well, the masculine contents of ICT are studied. The question of how male dominance penetrates and affects the qualities of ICT systems and ICT use is explored. A special focus is women's role in computer science. How can women affect the developments and qualities that the end-users encounter?

Quite frequent in Sweden are studies on women and technologies--how women construct technologies or how they use them. Can a technology be feminine? Social scientific studies of technologies belong to this research area as well.

In each country as well, there have been publications applying the epistemological questions and findings on gender to areas other than the social sciences, medicine and technology. These have been published, for example, in the fields of archaeology, theology, history, anthropology, journalism and mass communication, ethnology, law, geography, international relations, working life studies, social economy, psychology, pedagogy, physics and philosophy.

## 2.6.2 Research approaches

Table 38 shows the methodological approaches to the topic of gender in research contents calculated from the GSD:

**Table 38: Methodological approaches of studies on gender in research contents**

Methodological approach		
<b>Empirical research</b>		<b>%</b>
Nonempirical research		68.9
Empirical research. Quantitative techniques		4.1
Empirical research. Qualitative techniques		17.3
Empirical research. Quali-quantitative techniques		9.8
Total		100.0
<b>Approach</b>		<b>%</b>
Conceptual		71.2
State-of-the-art		45.6
Compilation of statistics		5.8
Constructing gender indicators		1.7
Empirical research. Quantitative techniques		13.9
Empirical research. Qualitative techniques		27.1

The studies on gender in research contents are usually nonempirical and thus conceptual and state-of-the-art in their approach. The empirical research of primary sources is usually qualitative. The construction of gender indicators and a compilation of statistics are relatively infrequently used.

**Table 39: Empirical research techniques of studies on gender in research contents**

Empirical research techniques		
<b>Quantitative techniques</b>		<b>%</b>
Representative sample		64.6
Micro-data		36.9
Longitudinal/cohort		4.6
Multivariate analysis		24.6
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		23.6
Case studies		22.0
Content analysis		30.7
Interviews		58.3
Observations		20.5

In the quantitative empirical research on gender in research contents, the most frequently used technique is the representative sample. Longitudinal/cohort studies are little used. Of the qualitative techniques, interviews are the most often used. (Table 39)

The main research approaches are conceptual and state-of-the-art; this highlights the fact that the research is mainly not empirically orientated and is more concerned with reflecting in conceptual, theoretic,

methodological and political terms on how gender can be included in the contents of science and science policies. Qualitative methodologies are most often used in research on the gendered practices of medicine.

### 2.6.3 Findings

Here the results differentiate between the Nordic countries. The medical research in Sweden and Norway shows that there are medical oppression of women, alleged illnesses due to the female sex, incompletely researched illnesses (due to the fact that most research is made by men), and the specific life-conditions of women. The gender perspective was twenty years ago in the margin of the medical research, but is claimed today to be in the centre of understanding the human beings and is hoped to have an influence on future research design. Perhaps the most serious consequence of (not) employing a gender perspective is that women could be diagnosed and treated wrongly because medical science is not adequately taking into account differences between men and women. Also the science uses information gathered from male testees'. Studies in the medicine have shown that women often feel that their symptoms are not taken seriously by the medical professionals, and that women often care more for their family's well-being than for their own health. There is insufficient knowledge on some of the aspects of diseases or ill-health, for example those relating to pain, affecting women more often. The result of this is that women are said to suffer from "vague" or "indefinable" health problems. A research overview enlightens the various accesses to medical care of women and men and analyses the differences. Other issues put in question are health differences of women and men and a gender perspective in the quality of medical care.

Aside this medical discussion it was discussed in Sweden about the relationship between the concepts of sex and gender. The topic was important when trying to "fight against" biological determinism and create basis for the contents of today's gender sensitive sciences. The social constructs gender and the biological produces sex. Understanding of this is not clear especially in many natural sciences.

In computer science in Denmark and Norway it was emphasized, that the contents of ICT and structures of ICT systems represent male values and male thinking. There is an urgent need to get women involved in developing of ICT and that way rise the quality of systems and programs. Also the end-user satisfaction would increase. These require too methodological and epistemological developments in the computer science.

Especially in Norway it was expressed the need to involve women as the subjects of history writing and history as such. It would be possible to produce an enormous amount of new knowledge about women throughout history, about women's possibilities and limitations, about women's relations to other women, and about relations between men and women. International, cross-cultural studies and studies of cultures that appear foreign to us, also force us to rethink central concepts that might also have importance to understand our own history, society and gender relations.

In Finland there are lots of findings and ideas of how the feminine and gender could be involved in social sciences. There are many openings of e.g. how the women are actors of the welfare state and how they reproduce the system. Also one has to emphasize their role as labour, carers, professionals, but also remember women's usually weaker opportunities to ascend socially and professionally.

The contents of Men's studies were discussed in Sweden and Finland. Men's social misery and diminished life-expectancy were aspects affecting the contents of Men's studies. Also the relationship with the Women's studies and women themselves was debated.

## Contents in the human sciences

Much of the research on the GSD topic of gender in research contents is related to the human sciences, especially to the social sciences. Within the human sciences the topic most usually dealt with is contents of gender studies, mainly from the women's perspective but also from men's.

The purpose of men's studies according to the Expert Group on Men's Studies (1987) is to describe and analyse the situation of different Finnish men and groups of men. In view of the potential danger that research studies might effectively feed into self-pity and self-hate, it was important to approach such research in a positive and creative way. Men's studies should concentrate mainly on studying men's experiences, from which conclusions regarding men's social reality can be drawn. Everything men experience they experience as men, and only men can naturally conduct this kind of research. These experiences might relate to social networks, loneliness, male cultures, technology, eroticism and sex, fatherhood, or dreams of adventure and heroism.

In the field of women's studies, Peltonen (1988) emphasized the need for women's experiences to be reflected in scientific arguments. The male-created theories and generalizations do not coincide with the experiences of women and have been used to undermine women's thinking and observations as relevant scientific data. Women's perspectives have been abandoned and remain undeveloped. The prevailing research traditions have denied women's subjectivity while masking the power relations at work in science and research.

Anttonen (1988 and 1989; same topic, Nätkin 1989) have noted, however, that women's studies and feminist research have, since the 1970's, been one of the theoretical backgrounds for the social policy of science. The contribution of women's studies to the social policy of science in Finland have been 1) commenting on explanations of male science, 2) producing and evaluating methods and frameworks of women's studies and 3) listening to women's voices. Women's studies has vitally changed our understanding of social policy and the welfare state. Women became known as clients and beneficiaries of the welfare state, workers of the welfare state and carriers of sociopolitical interests. Now one of the central questions of the social policy of science is its care and its governmentalization. Women are a central part of the care workforce of the public sector and thus producers of social care. It is essential to recognize women's central role in the process of social reproduction.

Sulkunen (1988) states that the history of women in science is complicated, with different schools and traditions. The portrayal of human beings must be more diverse and human and thus take the women into account too. The male ideology and male history writing of the present must be challenged. The difficulty in women's history writing is to become conscious of an antagonistic division of writing about gender in history. Women and men are contrasted and divided into public and private spheres of life. The task of women's history writing should be to integrate women as an inseparable part of humanity; the mainstream history writing of which has been exhausted. The history of women, a hitherto voiceless group, must be made visible and connected to the common history of all humankind.

Keränen (1989) discusses men as the subjects of political science. Science systems are related to gender systems and modern science has its own gendered systems and organizations. The differentiation of subject and object in modern science created a difference between men and women and helped to create the masculine aspects of science. But political science as such is focused on understanding the state. The state is the subject of science and a gendered construction. The liberal ideology and the strength of the state push gender and gendered social relations into the background. The state institutionalizes the prevailing masculinity and uses considerable energy in controlling it and marginalizing femininity. The neutral language of political science does not solve the problems of otherness and marginalization. The voices of the underprivileged others cannot be heard in the great societal narratives.

Andenæs et al. (1992) argue that psychology has not been criticized to the same degree as the other social sciences for having ignored women, as women already played a central role within psychological research and theories – as mothers. The women are perceived as the target of feminist critique. Most psychologists today aim for gender neutrality, with not presuppositions about what men and women are or should be like.

Korvajärvi et al. (1993) point out that feminist and gender-orientated science has paid particular attention to people's everyday life experiences. Moreover, gender is one point of intersection between social structures and policy making. The researchers analysed the practices and challenges of research from the perspective of women studies and feminist practices.

Jalmert's (1993) topic was the obstacles to men's studies. Modern men's studies dates from the beginning of the 1970s, but men's studies existed before that. The central ideas of the earlier period were that women and men had to acquire their sex role identities by showing traits, attitudes and interests that confirm their biological sex. The later pro-feminists rejected the idea that their gender role is biologically guided. The author stresses the similarities between women's studies and men's studies. The most evident obstacle to men's studies today is ignorance of its existence. Organizing future cooperation between female and male researchers is essential.

Blom (1993 and 1994; see same findings on Norwegian history writing in Melby 1996, Hagemann 1999 and Hagemann 2003) presents challenges for the discipline of history in the 1990s. For many years, women's historians had made gender an important analytical category in research. By using this analytical category, it has been possible to produce an enormous amount of new knowledge about women throughout history, about women's possibilities and limitations, about women's relations to other women, and about relations between men and women. However, one still had the challenge of the main goal—that this new knowledge would change mainstream, or male-stream, history. Thus, women's studies has become a special discipline within the main discipline of history. Herein lie some of the possibilities of gender history, which emphasizes that sex and gender apply not only to women, but also to men. International, cross-cultural studies and studies of cultures that appear foreign to us also force us to rethink central concepts that might also have importance in our understanding our own history, society and gender relations.

Lundqvist and Mulinari et al. (1997; same topic in Lykke 2003) write, that in the 1970s, feminists criticized established sociology and its inability to put forward and give names to women and their lives and experiences. The critiques led to contributions to the creation of new tools and research fields. After the 1970s, traditional sociological methods were questioned, and in the 1980s feminist sociologists focused on deconstructive projects in order to show, among other things, variations among women. In the 1990s the limitations and problems of Eurocentric feminism were questioned and feminist theories were critiqued, expanded and reconstructed.

Anttonen (1997), in her dissertation on social policy 'Feminism and Social Policy' found three main gender-related discussions: patriarchy, reproduction and care and citizenship. Theories of patriarchy saw women as an end result of structural determinism. Women were not defined as individual subjects. In the theories of reproduction and care, the conceptualization of women was based on an asymmetry in gender relations, now upheld by social structures as well. Here women are active subjects, whose role is to take others' needs into account. In the citizenship discourse, women were political actors and subjects; the gender difference was realized also in the political sphere.

In Norway, Oftung (1997; same arguments later in Lorentzen 2004) sees women's studies as one of the biggest revolutions in modern social science. However, according to Oftung, the other "men's part" in this "gender blind" research has not received much attention. In large parts of the research, men are still considered actors without gender dimension. That is not the case in the new discipline of men's studies. In this article Oftung discuss three aspects of men's studies: first, its social foundations, then the understanding of masculinities, and finally the question of what role and what room there is for men's studies within gender research.

Jokinen (1999; similar arguments in Hearn et al. 2003) formulates the research questions of Finnish men's studies. Men's experiences living as men have not been considered of analytical interest in gender studies. Removed from scientific traditions, men's studies examines men as gendered beings and whose gender has an influence on their status, sex, identity and prospects as a human being. Men's studies asks what the significance of sex is for man and how man produces or constructs his gender. What is gender, in the end? And what role and possibilities does the "small" men's movement in Finland have in constructing manhood and an interrelationship with feminist movements? On average, men in Finland live 7.8 years less than women. There are many typically male social and health problems, such as alcoholism, suicide, violent deaths, cardiovascular diseases and homelessness, all of which are relevant topics for men's studies.

Gender research in the human sciences is the subject of Andersson's (2000) anthology. She notes that the distinction between sex and gender is often made with reference to biological differences on the one hand and socially and culturally constructed gender on the other. The construction of gender can be considered an ongoing process in which the content is reinterpreted, challenged, renegotiated and recreated. The anthology shows the diversity in sex and gender research on many levels: research questions, explanatory models, research approaches, the interaction between theory and empirics and the further development of theories of sex and gender.

The spheres of feminist thinking are presented by Anttonen et al. (2000; same topic in Egeland 2003 and Liljeström et al. 2004). In contemporary feminism, it is a matter of dialectics between different disciplines, theories and areas of knowledge. It is also a question of the debate around feminist strategy and theory. Traditional scientific disciplines organize knowledge according to cumulative logic and periods, while a multidisciplinary and problem orientated approach to questions is an integral part of feminist research. In addition, feminist research is politically open and active and presents visions. The power structures are questioned and subjugated groups emancipated. Aasebø (2002) argues that keywords in post-structuralist thinking are language, discourse and deconstruction. Discourses are the objects of analysis in post-structuralism. Because of post-structuralist perspectives, part of the feminist research tradition has rejected the use of 'woman' as an analytical category. The question of whether knowledge production can be supportive or liberating for women is a legitimate question. The challenge for post-structuralist research is to read the same texts about gender in a myriad of ways.

Widerberg (2003) writes about gender sociology in Norway and discovered that researchers themselves were barely mentioned in books on sociology or in the sociology curricula of higher education. This is interesting, because gender research in general has been well developed in Norway. Gender research has been visible only at the abstract theoretical and meta-theoretical levels. In Widerberg's view, it is important to consider the future of gender sociology, its possibilities and limitations in this perspective.

A perspective on women's studies in sociology was presented by Koski (2003). The starting point is that in most circumstances, women's position and possibilities seem to be weaker than men's. It is essential that gender be considered a category which permeates social structures. Central to women's studies in sociology is the problematization of the concept of gender as such. Gender is not one-sided or a biological category, but a dynamic process in time and place that is constantly changing its meanings. Many ways of thinking, institutions and practices bring to bear these changing determinations of gender. Woman, womanhood and women's positions have to be examined differently, placed in the cultural context and in a historical relationship with oppressive structures and modes of power. One central concept is that the gender system opposes patriarchal thinking. The labour market is a central point of reference of gender system thinking, where there are, for example, women's and men's professions. The educational system and its teaching contents can also be gender biased and its practices can support different kinds of gender stereotypes.

Kuronen et al. (2004) question the gender of social work studies. There are many questions related to social work and social work research which demand a discussion and a problematization of gender issues. Many social problems, such as men's abuse of intoxicants, criminality and homelessness, are gender related, but are not studied from the perspective of gender and men's studies. Also, questions of family, motherhood and children's welfare and protection are understood as feminine, but women's own needs are ignored. There is also a need for feminist social work research and theories. It is also a question of dealing with the clients of social work as men and women, with their different problems. The situation improved during the early years of the 2000s, when new researchers with a background in women's and men's studies entered the field of the field of social work studies. In the end, it is a question of developing social work from the gender perspective. How can the gender perspective be implemented in the practices of social work? How sensitive the social work should be for the gender questions? How are the customers heard as male and female subjects?

A national seminar on men's studies was held in Sweden in 2004 (Nationella sekretariatet för genusforskning 2004). Most contributions were, not surprisingly, on men's power and powerlessness. Also the connection between men's studies and feminist research was discussed. The seminar expressed the paradox and the main dilemma of men's studies-- that men, in spite of their culturally superior positions in the gender system, often consider themselves powerless and lacking influence in their own affairs as well as in social development. In the seminar there was a separate forum on men and health. This was topical, as women and men do not have the same life expectancy and also the rate of early death among men has increased.

The theoretical development of gender studies is Fjelkestam's (2005) subject. Two major theoretical shifts were analysed, namely the early theories of patriarchy and the more contemporary theories of intersectionality. A reflection on the epistemological and ontological foundations of emancipatory theory concludes the article. Forsberg and Grenholm (2005; also Liinason and Holm 2006) see gender studies as a multidisciplinary approach. On a daily basis and through research results one can see that change in gender relations is ongoing, as the sexes seem to end up in new kinds of distinctions and hierarchies. The Swedish Vetenskapsrådet (2007) concludes that the mere existence of gender equality studies is helpful in striving for gender equality. Research results and conceptual development of gender research is visible in policy texts. During the last decades, the overall gender order has changed dramatically and research may be important more in terms of analysing and conceptualizing these changes than in causing them.

Juvonen (2006b) asks where one can find the sexual body in Finnish social science and cultural studies. Researchers of the phenomenological tradition are especially interested in experiences of the sexual body. Cultural study researchers work with representations of sexual bodies and their connections with people's everyday lives. One challenge of the studies of sexual bodies is avoiding biological determinism. The avoidance of mechanistic and deterministic interpretations of sexuality can open up ways to more pluralistic perspectives on sexual bodies and their sensuality and emotional economy. In addition, there is a need to study the bodies of boys and men. The dominant view can be challenged by, for example, the narratives of old men, the handicapped and homosexuals.

### Contents in medicine

Female medical research and research on women's health is Almegård's (1995; later same findings in Sweden, Smirthwaite 2007) topic. Women are a majority in Sweden; they live longer than men, seek medical treatment more often and take more medications. The biology of men and women is different. The organs and cells vary between the sexes. *The differences between men and women are obvious from the cradle to the grave. But still the results obtained from medical research, where only men have been used for experimental purposes, have usually been transferred to women too.* Medical, biological, sociological, and psychological factors affect the patterns of illnesses in men and women differently and in a complex way. Often female conditions are neglected.

Malterud (1996) argues that the medical diagnosis can be perceived as a social construction, and clinical knowledge as a product of the cooperation between professionals and patients. If we also perceived the diagnostic process from a feminist perspective, we could explore the rules of the "game" that constitute our knowledge of women's health and illnesses, and thereby also the medical images and pathology of the female body. Here Malterud shows how the patient's experience of symptoms of illness have been considered subjective (and thus not a suitable basis for a diagnosis), while the doctor's diagnoses were "objective" traces of the illness in the body. There is a clear hierarchy of different medical signs which the process of diagnosis builds on. There is also a hierarchy between different diagnoses related to different diseases, and at the very bottom of this hierarchy we find illnesses often found in women.

Hamberg (2002) states that biological research looking for differences between women and men often became a self-fulfilling prophecy. Since biology is the usual starting point of medical gender research, it is not possible to disregard biological differences. There is a real body with ongoing biological processes. Hammarström and Johansson (2002; see also Ahlgren 2004) observed that in *Läkartidningen*, the Swedish medical journal, only 0.5% of the articles published between 1996 and 1999 dealt with gender issues. The number has increased in recent years, with articles covering such topics as 1) the medical oppression of women; 2) alleged illnesses associated with female sex; 3) incompletely researched illnesses due to the fact that most research is performed on men and 4) the specific life-conditions of women. The gender perspective, which twenty years ago was in the margin in medical research, today claims to be central for the understanding of human beings. Eriksson (2003) points out that two gendered ideals of physicianship emerge. Women physicians have a dual role—first as the practitioners of male science and then as caring women.

Later, Hamberg (2004) argued that gender scientists reject biological determinism, but cannot close their eyes to the fact that, for instance, hormones change the biological body. A phenomenon that contributes to confusion is that authors of medical literature, without reflection, use the word gender to refer to sex. Gender is considered the more modern and politically correct term. Sex is associated with sexuality, but the word gender is related to language and culture. The word gender is used in considerations or analyses of social or

cultural circumstances. The concept of gender is also, wrongly, used when studying animals, as in references to research on rats. Lehtinen (2004; see also Jansson 2008) asked whether medical researchers on gender need a partly different concept of body than other gender scientists. The body is considered a “phenomenological” problem and is not really useful in medicine. The body is taken for granted and reduced to an unchangeable substitute for the “phenomenologically real”. The undressed body – and the person it belongs to and partially identifies – is constantly invaded in medicine.

The Swedish Vetenskapsrådet (Council of Science) (2004) reiterated that in medicine, sex has been considered an expression of biology. In order to highlight the social and cultural aspects, scientists in the humanities and the social sciences have agreed on the concept of “genus”, gender. In this report, academics in medicine give their point of views on different confusing areas of sex and gender and analyse these. The central concepts are body and normalities, gender- biased power constructions in medicine, determined subjectivity, ethics and gender as construction. Bergström (2004) concludes that through the sex/gender concept, two research traditions are bound together--the positivistic tradition of natural science and the interpretive tradition of social science. However, this has caused a confusion of conceptions and the distinction between sex and gender has become problematic. The weakly defined scientific traditions as starting points for discussions on sex and gender seems to be hindering the understanding of gender in a broader sense.

### Understanding information and communication technologies

The Nordic countries have been forerunners in the social applications of information and communication technologies. This has also led to gender-orientated research. Nielsen and Roepstorff (1985) first asked why women did not choose work and education in the technical areas and in science and technology. The critique should be addressed to the whole culture of technology and to the masculine nature of the content and methods of computer science and technological development in general. Lytje (1985) too argues that computer system use and problem solving strategies differ between men and women. Verne (1988) shows how the male dominance in informatics has produced a masculine and technically-focused milieu. Criticism against informatics has pointed to how male clubs focus on topics that interest men more than women. This, among other things, has made the discipline less friendly to women than to men. Verne imagined that we could turn informatics into a discipline with more responsibility for care—a discipline with a more comprehensive view and that can be more relevant to women, meaning that computer systems cannot be based on technical criteria alone. Håpnes and Rasmussen (1990) also see computer science and computer technology as socially and historically shaped, and as a gender-powered system. Women's interest in totality and in seeing humans and society in relation to technology is important for computer science and for the criticism of poor ICT systems used in ordinary working life.

Bratteteig and Verne (1997) discuss criticisms of informatics. They emphasize how important it is that this kind of critiquing be based on internal knowledge of the field as well as stressing the value of involving feminist theory and science-philosophical criticism in this task. Bratteteig and Verne concluded that the most interesting research programme was the one focusing on epistemological development and they attempted to establish alternative understandings of knowledge. Thus, it is necessary to ask questions to challenge such basic concepts of informatics as “computer”, “information”, and “programming”.

Gansmo et al. (2003) present critical reappraisal of Norwegian studies of gender and ICT. In their article they analyse the frequent reference to the masculine stereotype of the hacker or computer nerd. The hacker's skills are admirable, but he is also seen as socially insecure, spending too little time with people. It is not the stereotype as such that interests the authors, but the way it has been used to explore and explain the relationship between gender and ICT. The stereotype has affected the way in which the problem of gender and ICT is understood among policy-makers, school authorities and in ICT education. It has affected as well the way in which many ICT users and professionals provide accounts of themselves and their relationship with this technology. Corneliussen (2003c) highlights how the way of dealing with gender has changed in Norwegian universities' computer education since the early 1980s, and she describes three discursive constructions around gender and computer technology; the gender-blind discourse, the masculine connoted discourse and the feminized discourse. Finally, Corneliussen asks whether it is possible to establish an understanding of gender and information technology that can open to door to greater diversity in both genders.

## Contents in other sciences

Apart from the above-mentioned sciences, there is less systematic content-related research in other disciplines as well. The critique of pedagogy, its role in serving the targets of public policies and its technical rationality was Naskali's (1993) interest, while Nyberg (1999) focused on gender and innovations. The mapping of gender-related references from traditional research on innovations showed a limited number of references. Most of them were found in the women/gender or feminist research and most were foreign, mainly from North America. There were, however, some Swedish references on technology in a wider perspective, when technological development and innovative enterprises were involved.

Toubro Hansen (2003) needed a theoretical discussion as a source of inspiration in the process of archaeological interpretation. Based on the research tradition and the conditions of women within the field, she concludes that the reason for the lack of discussion on gender is the majority of men in tenured positions. The gender perspective in literary research is, according to Nyman and Roivas (2003), a relatively new phenomenon. Understanding gender as a construction has paved the way for research on masculinity alongside the feminist research. Instead of incisive juxtapositions, literary research today tries to find positive interdependence between the masculine and the feminine.

Heikkinen (2003; similar arguments as well in Olsson and Willman et al. 2007) claims that the starting point of feminist folklore studies is the genderedness of traditions and culture and the emancipation of women. The research must take this into account and uncover gendered value hierarchies. Everywhere women have been forgotten and made invisible and the one-sidedness of research is evident, an ultimate consequence of malestream research.

Jyränki (2005) argues that in the Finnish context it is significant that the so-called second wave of feminism is late and the questions of body and sexuality are discussed little in jurisprudence. Queering the law is a part of post-modern jurisprudence. Regardless of its Anglo-American background, queer legal studies can be applied to the Nordic legal context. There is also a growing need for the field of the geography of tourism to take the gender perspective into account. Hottola (2006) argues that body and sexuality are concepts which are not applied in traditional Cartesian geography. The geography of tourism has emphasized gender-sensitive research, because tourism as a phenomenon is based on social interactions and social articulations of needs, motivations, traditions and mental impressions. Finally, the question of the role of social gender, sexuality and body in human geography is a theoretical and methodological one and not a political one, and it is connected to the quality of produced knowledge.

Concepts of the feminist study of international relations are the focus of Kantola, Valenius et al (2007). The feminist approach to this field dates to the end of 1980s, which was late in comparison with the social sciences. The use of 'other' in the name of the book is meant to draw attention to questions arising outside traditional world policy. With nonconformist methodologies and epistemologies, the different roles and experiences of women and men, e.g. in armed conflicts and globalization processes, can be made visible and analysed. A special emphasis is placed on questions of how feminist research broadens the questions of world policy, how central concepts are retheorized and how different methods are used. In chapters of the book, several essential concepts of international relations study are discussed from the feminist perspective. These are state, nationalism, war, peace, security, global political economy, development, post-colonialism and human rights.

### 2.6.4 Gaps

The epistemological debate on women and gender studies is a common trend in all Nordic countries and has affected the social sciences in particular. It has also had remarkable impacts on studies on medicine and technology in Sweden and Norway, but is almost nonexistent in Iceland and Denmark. Feminist epistemological ideas are predominant and the interplay between women and men in scientific contexts is usually one-sided, focusing only on women's disadvantaged position and poorer outcomes. The general position of men's studies is weak in all Nordic countries and the link between women's and men's studies is exiguous, although today we tend to speak more generally about gender studies. The current trend of studies, expressed mainly in Sweden and Finland, with the body and sexuality as the epistemological starting point is difficult or not useful to apply broadly - especially with regard to the applied sciences.

The gender-related thinking in all the Nordic countries is linked to academia and the development of academic disciplines, with no interest in research outside this area. Research on R&D and especially research on the public sector seems to show no interest in the gendered contents of science, although there would be many relevant areas to which the gender aspect could be applied.

There is a need to understand the special relationship between femininity and technology. In Norway, there are ICT-related studies and in Sweden, general technology studies with gender contents, but these are almost totally lacking in the other countries, where the technology aspect is more a question of pedagogy rather than content. The need to reflect on the gendered contents and constructions of technology is obvious, for example, for the development of better products for the end-users.

Medical gender studies are practised in Norway and Sweden, but not in the other countries. The need for such studies is clear in view of the medical, biological and social differences between men and women and the need to develop gender-differentiated medical practices.

## 2.7. Policies towards gender equality in science

Gender equality policies in science have become an important issue in all EU member states and are mainly embedded in equal treatment legislation. To implement mainstream policies to promote gender equality in science, many countries have established structures such as national committees and units dedicated to women in science in relevant government departments. Some countries have recently established national resource and coordination centers for women in science activities. At the same time, the gender mainstreaming strategy of the European Commission will affect the way in which gender mainstreaming and policy measures for gender equality in science will be developed in each country. In spite of the existence of many policy measures and initiatives, there is a call to continue working in this area, especially with regard to evaluation and effectiveness. Specific policy measures range from grants through supporting positions for women at universities to preferential policies towards equally qualified women candidates. (Meta-analysis 2008, 26–28)

**Table 40: Publications dealing with policies towards gender equality in research**

Publications dealing with policies towards gender equality in research		
Number and percentage of publications		
	n	%
Denmark	166	28.2
Finland	182	41.9
Iceland	19	38.8
Norway	64	24.2
Sweden	205	32.9
<b>Nordic CS</b>	<b>360</b>	<b>28.7</b>
<b>All Cs</b>	<b>1 296</b>	<b>28.5</b>

As can be seen in Table 40, the topic of policies towards gender equality in research is dealt with in Nordic publications relatively at the same level as the European average. In comparison with other topics treated in Nordic publications, the level is about average. In absolute numbers, most of the publications come from Sweden, Finland and Denmark. Proportionally, this topic is more often the subject of publications in Iceland and Finland.

**Table 41: Publications on policies towards gender equality in research dealing with other topics**

Relation with other topics		
		%
Horizontal segregation		53.1
Vertical segregation		58.3
Pay and funding		23.3
Stereotypes and identity		48.1
Science as a labour activity		28.3
Scientific excellence		32.8
Gender in research contents		37.8
Policies towards gender equality in research		100.0

The publications dealing with the policies towards gender equality in research usually analyse as well the topics of vertical and horizontal segregation. The topics of pay and funding and science as a labour activity are dealt with less. This implies that the publication dealing with gender equality policies in research usually deal with gender segregation or that gender segregation in science is the background for these policies. (Table 41)

**Table 42: Average number of publications per year on the topic of policies towards gender equality in research**

Average number of publications per year		
		Average
1980-1984		0.8
1985-1989		4.2
1990-1994		4.6
1995-1999		14.8
2000-2004		25.4
2005-2007		25.0
2008-2009		18.0

The number of publications on policies towards gender equality in research has increased gradually over the years. There has been an especially strong increase since 1995, and its continued expansion today shows the growing importance of the topic. (Table 42)

It would appear that this research topic has received the most systematic attention in Sweden, but relatively much attention in the other Nordic countries as well. The most frequently studied subareas are positive measures and evaluations of development initiatives. There is growing interest in promoting and studying positive measures as processes, but efforts are also directed towards direct assessments and efficiency evaluations.

### 2.7.1 Research questions

Women's and gender studies in the Nordic countries have had a strong impact on policies towards gender equality in research and education. The women/gender perspective is not merely a theoretical field, but expresses the political ambition to support gender equality. The main impetus behind policy approaches has been the fact that men have monopolized almost all high positions in universities and the problems of women have not been reflected sufficiently. The ministries and research councils felt that progress towards gender equality was too slow. The propositions were initiatives to achieve a more equal gender balance in the universities.

The research questions in this field are mainly aimed at remedying women researcher's slow career advancement in academia. There are background briefs, visions, feasibility studies and strategy analyses for implementing policies supporting women in the academia. In addition, there are evaluation studies of positive measures that attempt to assess their efficiency. The main perspective of these papers is vertical and the horizontal segregation. A specific area in Norway and Finland is to improve and foster the teaching of women's studies and direct equality actions in the universities.

One of the initiatives was concerned especially with gender research in the Nordic countries: in 1995, the Swedish Minister of Research and Education, Carl Tham, implemented a one-time venture in order to increase the number of female researchers. The political decision to contribute to local gender equality work in the universities by making new appointments possible gave rise to considerable debate. The arguments in this debate have mostly been concerned with appointment procedures and the possibility of using positive measures.

## 2.7.2 Research approaches

Table 43 shows the research approaches used in studies on the topic of policies towards gender equality in research:

**Table 43: Methodological approaches of studies on policies towards gender equality in research**

Methodological approach		
<b>Empirical research</b>		<b>%</b>
Nonempirical research		65.3
Empirical research. Quantitative techniques		7.2
Empirical research. Qualitative techniques		15.8
Empirical research. Quali-quantitative techniques		11.7
Total		100.0
<b>Approach</b>		<b>%</b>
Conceptual		51.1
State-of-the-art		50.6
Compilation of statistics		18.9
Constructing gender indicators		4.2
Empirical research. Quantitative techniques		18.9
Empirical research. Qualitative techniques		27.5

The studies on policies towards gender equality in research are usually nonempirical and thus conceptual and state-of-the-art. The empirical research of primary sources is usually qualitative. The construction of gender indicators is relatively little used. Most of the publications related to gender policies are policy programmes and policy suggestions, and thus the amount of nonempirical research is quite natural.

**Table 44: Empirical research techniques of studies on policies towards gender equality in research**

<b>Empirical research techniques</b>		
<b>Quantitative techniques</b>		<b>%</b>
Representative sample		73.5
Micro-data		33.8
Longitudinal/cohort		4.4
Multivariate analysis		23.5
<b>Qualitative techniques</b>		<b>%</b>
Biographical research		13.1
Case studies		22.2
Content analysis		44.4
Interviews		57.6
Observations		11.1

In the quantitative empirical research on policies towards gender equality in research, the most frequently used technique is the representative sample. Longitudinal/cohort studies are little used. Among qualitative techniques, interviews and content analyses are used most often. Less used are observations and biographical approaches. Most of the empirical research is done in the field of evaluations of policy programmes or development initiatives. (Table 44)

The most common conceptual research approach concerns the possibilities, requirements, needs and qualities of policies implemented or to be implemented in the future. The state-of-the art approach, also popular, describes the situation in academia and the characteristics of implemented policies. The quantity and quality of empirical evaluation studies varies in the Nordic countries and is most systematic in Sweden.

### 2.7.3 Findings

The policy development studies are in their first pages illustrating the hindrances preventing women's research careers. These are usually connected with motherhood, weaker funding opportunities, weaker working conditions, oppositions towards the support measures and policies, prejudices and even open discrimination. One factor preventing gender equality policies is the proclaimed autonomy and objectiveness of the academia. In addition, these studies present many positive measures having good impact on the gender equality. These are e.g. mentor-systems, family policies, targeted studies, positive discrimination quotas, development initiatives and an awareness rising of gender equality issues. Besides the positive measures the gender mainstreaming as the policy principle is suggested when overcoming the structural obstacles and the simply symbolic measures.

Especially there is a desire to promote positive measures helping those women, who are facing structural hindrances when making their scientific careers in the higher education. These positive measures could e.g. 1) make starting and continuing of research career easier, 2) establish positive discrimination quotas for the minority sex in academic posts, research funding and technical studies, 3) support the reconciliation of work and family life and 4) develop equality measures in the institutions.

A big problem is the lack of permanent and tenured contracts in the universities. In addition, the funding must often be achieved through hard competition, which is gender distorted both quantitatively and qualitatively. The research career with fixed-term work contracts and of continuous funding competition is today in many cases not attractive.

One of the important findings from evaluation of equality measures in Norway, Denmark and Sweden is that they are not value-neutral. Strategies to include or to retain women also contribute to the constructing of particular perceptions of gender. Despite well meaning, state feminist strategies are often built on dualistic and rather stereotypical notions of gender and are poorly equipped for making long lasting changes. Positive gender equality measures like, quotas for women, have been employed in Norway, and this as well as other measures have been debated and criticised, and have even been met with resistance. Positive gender equality measures are based on an exception from the law and are accepting a special kind of positive discrimination when the main goal is the gender equality.

Many of the policy measures are found to be just symbolic and political oratory, not having a real effect in preventing the injustice. Especially this is the case in implementing the Gender mainstreaming, but double standards exist too towards the positive measures in research organisations.

In addition to Nordic mainstream research much of the Swedish research has focused on the Tham-professorships in the mid-nineties. There are many very critical articles and reports on this political intervention to academic autonomy. Researchers state that there is a political interest of balancing the number of men and women in the most prestigious positions in the academy. The academy, on the other hand, strives to maintain its autonomy towards the political field and the freedom of research is highly regarded. The academy is not opposed to gender equality per se, but there is a fear for the loss of self-determination. This makes the implementation of positive measures very challenging.

#### Planning of gender and science policies

Many of the Nordic studies are green paper-type documents on policy planning, usually implemented by the relevant ministries. In Finland the committee of the Ministry of Education (Opetusministeriön työryhmä 1982) found several hindrances to women's research careers. These were connected with motherhood, childcare, housework, spouses and the reconciliation of work and family life. There were also personal factors identified, such as motivation and self-esteem, expectations of surroundings, expectations of role models and both covert and overt discrimination. The committee suggested that courses related to equality issues be included in the university studies in addition to specific courses in equality education. More women should be selected for research posts, post-graduate studies and research administration; in some cases it is advisable to use quotas for the underrepresented sex. More funds should be targeted to helping post-graduate students to live without outside gainful employment. There is also a need to increase personal and group-based guidance of post-graduate studies for both sexes. Different age criteria are needed for women

when hiring for research posts. The possibilities for women to take part in international conferences and seminars should be supported. Positive measures supporting the reconciliation of work and family life are needed too.

Another group of the Finnish Ministry of Education (Opetusministeriön työryhmä 1986) noted that one problematic area was the guidance of post-graduate studies and the lack of high-quality post-graduate research posts, which both needed to be increased. In addition, it is important to avoid age discrimination with regard to such posts. The follow-up group found that the selection processes for researchers had to be examined for any possible discriminatory factors. There is also a need for positive examples of research careers and for writings which describe both positive and negative aspects of women's research careers. There is a need to present positive examples for high school students too. For the higher professorship posts, there is a need to emphasize teaching qualities and skills. One suggestion was to combine parental leaves with the research posts, so that the extension of working time continued for the same amount of time as the leave. There was also a need to support women's research associations and women's studies institutes. The Finnish Academy has supported women's studies and this work needs to be continued.

On February 16th 1995, the Swedish Government delivered a proposition to the Riksdag. The government considered that the development toward gender equality had been too slow in the education sector. The government therefore proposed measures to speed up the development. The measures strengthened the gender equality measures of municipalities and universities, the main parties responsible for achieving gender equality. The proposals involved changing the education law and resources were allocated to research students, research assistants and professorships. The Minister of Education at the time was Carl Tham, and the professors appointed by virtue of this proposition were, and still are, Tham-professors. The proposition involved huge changes in university education and careers, as well as in the legislation surrounding education. The proposition claimed that gender equality is a pedagogical question and requires fundamental knowledge of predominant gender patterns. (Carlsson and Tham 1995)

A report of Denmark's Videnskabsministeriet (1997; see also Fiig 1999) presented the Minister of Science, Jytte Hilden's 11-point plan for gender equality in higher education. The basis of the plan was the recognition that women were dropping out of academic recruitment at each step following graduation. Formal inequality should be dealt with, as well as the hidden favoritism of men resulting from the composition of evaluation committees and the descriptions of quality requirements for positions. There should be incentives to further equality, but it should also be demanded from the institutions. This should take place immediately because a generational change was occurring in academia. The eleven points are: 1. Equality is a managerial responsibility; 2. More female professors; 3. A focus on position advertisements, which should be as broad and transparent as possible. 4. Both genders represented on evaluation committees. 5. Mentoring. 6. Annual status report on equality in research, including explicit measures promoting equality. 7. Prioritizing gender research--mainstreaming. 8. A parental leave fund for young men and women. 9. A sector research institute for equality. 10. The compatibility of a career in research and having children. 11. Equality at all levels and a change in attitude.

The working group of the Finnish Academy (Suomen Akatemian työryhmä 1997) suggested special support measures. These were, for example, to increase the number of women in scientific posts, organizations and decision-making bodies. This would require systematic evaluation procedures to analyse the realization of gender equality in the research support procedures of the Finnish Academy. Special measures to support women in applying for research funding are needed. For research stipend recipients a special social security model must be developed, in conjunction with connected with sick leave benefits, family allowances and childcare. It is often a question of attitudes towards women's research careers transmitted by schools and the media. There is a need to study the requirements of equality education and to increase university posts in equality education. There is a special need to develop mathematics and ADP-education, which attracts girls too, and to encourage girls to study technical and mathematical subjects.

A final report (Trojer and Swedish Research Council 2000) from a joint process of eight research councils in Sweden presented the following conclusions and recommendations: 1) gender research is a scientific area of competence; 2) gender research is in rapid development; 3) gender science has different positions and theoretical frameworks in different research areas and 4) there is a demand for political priorities in order to integrate gender research; 5) apart from being integrated into research financing activities, gender science also needs to exist on its own and 6) integrating gender research takes long-term work, competence and

cooperation. The advances of this expert group must be taken into consideration when building the new public authority for research financing.

The Norwegian Research Council, Division for Strategic Priorities (2002) in its committee report ‘Women in Research - from Quotas to Integration’ shows the pattern of vertical gender segregation in academia, with few women in leading positions, illustrating the leaky pipeline. The material also shows horizontal gender segregation, with large variations in recruitment to various disciplines. The report gives an overview of equality work at Norwegian universities. Many of the measures already put in place have been useful, and more women have permanent scientific positions as well as leading positions. However, the progress is still very slow, and a few of the measures have even been met with active resistance. The report documents that equality work in the institutions is complicated and not sufficiently integrated into academia and other activities. There is a tendency for equality measure to be seen as an alien or extraneous matter and as an external imposition. The final report of this committee in 2007 (Melby 2007) gives recommendations that contribute to the mainstreaming and equality work of institutions in the university and college sector. The committee also recommends contributing to a general increase in the focus on challenges related to the unequal gender balance in academia. The work for equality requires constant renewal and new thinking, thus the committee was also encouraged to have an international focus. Equality in academia is about justice, the committee leader Kari Melby writes in this report. It is about reaching national research political goals. We cannot afford to lose so much talent and we are dependent on recruiting and retaining women. Political acknowledgment of the problem is necessary, but not sufficient. The challenge in the future is to turn knowledge into action.

The report of Menntamálaráðuneytið (2002) suggested actions and improvements in order to achieve a more gender-balanced distribution among scientific disciplines. These involve targeting by the government concerning the number of women enrolling in each scientific discipline, finding role models and mentors and evening out the burden of familial responsibilities. The University of Iceland’s Equal Rights Committee (Jafnréttisnefnd Háskóla Íslands 2004) noted in the report concerning equal opportunities that there is a lack of coherence between the aims of the equal opportunity agenda and the funding provided for their realization. This is not only a problem of the University of Iceland but also of the government, which has been criticized for failing to provide sufficient funding to realize its goals in equal opportunity matters. When the work of the Equal Rights Committee, the equal rights representative and other relevant committees at the University of Iceland is examined, it appears that a lot has been accomplished. To name a few, attempts have been made to reduce gender segregation across disciplines, the work evaluation system has been reevaluated and the use of gendered discourse in evaluation committees has been addressed. Recently, an emphasis has been placed on equal rights in a broader sense involving the rights of people with disabilities, gays, foreign students and employees. In interviews with 17 individuals at the university, ambiguity towards equal rights affairs emerged, both towards gender equality and towards minority groups. The responses revealed ignorance/lack of knowledge and even prejudice. Hence, it is clear that measures are needed to provide education on equal rights affairs at the University of Iceland in order to inform employees and students about what equal rights work implies and what its aims and methods are. Criticism and comments about how the agenda of the University of Iceland and its equal rights committee should be adjusted do not challenge the main result of the report. It is stated that the University of Iceland has undertaken good and necessary measures to promote equal rights that need be continued if progress is to be achieved.

In her evaluation report, Rosenbeck (2003a) criticizes the Danish policy measures that have or have not been carried out in order to remedy gender inequality in academia, claiming that activity has been insufficient at the university/institutional level and the ministerial levels. She describes how policies have not been developed and action plans not followed. This is in spite of the fact that the universities are obliged to focus on equality and ways to promote it according to their development contracts with the Ministry of Science. Andersen (2004) discusses the suggestions of the Committee for Equality in Research established by the Ministry of Research of Denmark. The committee made 20 suggestions concerning how to promote equality in academia. Only one of these – suggesting the establishment of 40 professorships earmarked for women – has received any attention from the public, mainly because many people believed that it would lower quality in research and because it was discriminatory towards those women who had gained a position under normal conditions.

The third Finnish working group of the Ministry of Education (Opetusministeriön työryhmä 2004) sees that the greatest challenges of research career are the short terms of employment, obstacles of mobility between research sectors, difficulties in combining external research funding and career development, career advancement of women researchers, a low degree of international mobility, a small number of foreign

researchers in Finland, attractiveness of a research career, economic position of researchers, and the volume of researcher training. The committee proposes that a four-stage research career system should be developed in Finland. This system would encompass research careers in universities and public research institutes as well as in other sectors when applicable. It is based on the parallel development of the funding instruments of the Academy of Finland, Tekes, the Finnish Funding Agency for Technology and Innovation, and, as much as possible, also of foundations, and on the reform of research post structures in universities and research institutes. The committee suggests several actions to increase internationalization, remove obstacles to women's research careers, develop postdoctoral researcher training, and improve the database of research careers. It also proposes that a permanent and broadly based working group, which represents the broad experience of various actors, should be established to follow the implementation and impact of the recommendations.

A manual for gender mainstreaming in education (Sjørup and Schmitz et al. 2005) contains different educational modules for training in gender mainstreaming. It is the result of the international project 'GEcel' aimed at implementing the European strategy for gender mainstreaming in the educational sector, mainly in civic education. The project collected experiences from the implementation of gender mainstreaming in Estonia, Denmark, Germany, Greece and Iceland. The experiences were compared and analysed to develop standards of quality for the implementation of gender mainstreaming and to develop educational modules which were tested and translated to suit the actual situation in civic education in the five countries.

According to Pettersson's (2007) study on the general gender policies in Denmark, Finland and Sweden, gender mainstreaming can be interpreted in many ways. One useful definition that the approach of gender mainstreaming implies is the promotion of gender equality through a systematic integration into policies and ways of seeing and doing. The analyses made in this study imply that the obligation to mainstream gender has not been met. Another perspective involves integrating the gender perspective into ways of seeing and doing, into systems and structures, into all policies, processes and procedures, and into the organization and its culture. Today this is not the case: gender mainstreaming is merely political rhetoric.

### Assessing positive measures and policies

Another strand in the research on this GSD topic is the evaluation and assessment of the development initiatives and policy measures promoting gender equality. Løgstrup's (1994, later, Andersen 2004) study showed that positive measures were needed, so that women would be favoured for scientific positions. The author does not believe that earmarked positions are the way forward because the most qualified applicant should always get the position. She advocates instead the establishment of time-limited educational positions at post-doctoral level specifically for women, so that they can qualify themselves for the battle for tenured positions.

Stabel (1994) discusses and criticizes the use of gender quotas. She claims that even though many people believe that the gender equality laws impose the use of gender quotas, resulting in giving women priority for positions in heavily male-dominated fields, this is not the case. The laws maintain that men and women should be treated as equals, meaning that no form of discrimination based on gender should be practised. Gender quotas are, however, based on an exception to the principal rule of the law, which accepts this kind of positive discrimination when the main goal is a condition of gender equality. Rogg (1997) observed a decrease in the proportion of women employed at the University of Oslo despite the use of moderate gender quotas. The report illustrated that gender has been implicated in employment processes in a way that has systematically disfavoured women. A discrepancy was found, for example, between the areas in which women researchers were qualified and those in which research positions were made available, so that men in fact had the opportunity to compete for posts targeted for women.

Bondestam's (1999) opinion on positive measures was that all in all, the practice of positive measures and considerations on gender equality are few, formal and sometimes incorrect. A general tendency is that time and age structurally treat women unfairly, as is obvious in some cases. Criteria in practice mostly favour men. The overall statistics shown in this report demonstrate, as do the results of the investigation as a whole, that a greater number of gender equality measures need to be considered. Einarsdóttir (2000) notes that different measures need to be implemented if the position of men and women in the scientific community is to be equalized. The career progression system needs to be reconsidered in the context of gender consciousness and gender mainstreaming.

Jordansson (1999) claims that the term “Tham professor” has been a term of abuse at the worst, to some only a term of belittlement. However, there have also been supportive spokespersons, not least those who have been favoured. These women have the low reputation of having only now been appointed to professorships because they are women. The positive aspect, of course, is that they are always exceedingly competent, and that they most possibly could have stood against “normal” competition. Jordansson’s study implies that more studies of Tham professors and their qualities and scientific effectiveness are needed.

Salminen-Karlsson (1999) studied the bringing of women into computer engineering in Sweden. The results showed several obstacles to gender-related reforms at institutes of technology. These were, for example, stereotypical conceptions of women, lack of knowledge of gender issues among the reformers and the particular position and responsibility given to the female reformers. The recruitment programs managed to increase the recruitment of female students, but the curricula was not perceived to be especially female-friendly. In many ways, the programmes still had problems accommodating student groups that were different from the norm of the traditional male secondary-school graduate in computers. The reforms have not brought about a real breach in the gender contracts that designate computer engineering as a masculine activity, but may have brought it somewhat closer.

Wistedt (2001) did a follow-up study of the Swedish government’s initiative to recruit more women into higher education in mathematics, science, and technology. The results show that three of the seven programmes were quite successful in recruiting and retaining female students (Scientific Problem Solving at Göteborg University, Energy and Environmental Engineering, and Innovation and Design, both at Karlstad University). The proportion of female students was high, about 40%-50%, and the dropout rates were evenly distributed between the sexes. The credit productivity was also high among the female students, compared to the credit productivity among the male students. Four of the programmes were not as successful. One of these programmes was closed down in 2000. The three remaining programmes, all within the field of computer science and engineering, encountered problems in raising the proportion of women above the national average. The Research council established the principle that the funds should not be allocated to recruitment projects only, but to promote pedagogical renewal as well.

Trying to find factors behind gender segregation in Denmark, Egeland (2001) found that gender issues in academia were something external. In the discourses, they were functions of family, breeding, biology, socialization, etc. Academia itself was perceived as gender neutral. The implementation of quotas and other external policies were not the solution. Rather one must try to destroy the myth of neutrality and gender equality that exists around academia. Rittenhofer (2001) uses the concept of gender magnetism. In certain contexts gender may contribute to reinforcing or reproducing social structure, including inequality. Gender is not the most influential factor or the main reason for inequality. Thus, ‘gendering’ any initiatives based on differences between the sexes is risky. Inequality should be understood as situated, i.e. resulting from various historical causes.

Sendrup and Frimodt-Møller (2001) consider that gender-segregated education, particularly in the sciences, has immense importance. In segregated classes, confidence and success are better established. In the first year of high school, where one’s appearance and abilities are incredibly important, and where confidence in the new environment is not high, it is particularly important to create a safe environment without prejudices about which gender is better at what subjects. Interdisciplinary education makes the students more responsible and creates a tolerant environment. Many small successes help eliminate the hierarchical position of the “hard” subjects so that more pupils dare to understand and choose these subjects and go on to studies in the natural sciences. These conclusions stress that the pedagogical method and not interdisciplinary teaching alone are required for success. It is primarily the responsibility of teachers to teach students responsibility and create an appreciative and tolerant environment that optimizes the conditions for learning.

Koeller (2001) assessed the FREJA programme, which did not exclude men, but openly stated that women would be preferred if two candidates were equally qualified. The competition was just as intense as the competition for normal funds, and only the most qualified projects gained funding. The funds gave an opportunity to develop new study fields. Rosenbeck (2003a) states that the success rate for FREJA was 3.5%, indicating that the competition was very steep. She noted how unequal the allocation of research funds in Denmark was. For instance the National Research Council for the Humanities allocated DKK 4.95 million to women and DKK 44.9 million to men during the period 1998–2002. She believes that there is more equality in the competition for ordinary funds than for specific programmes. Christensen and Fox Maule

(2004) believe that the FREJA funds helped the universities to keep many of the younger female project researchers, and these researchers act as role models for potential researchers. FREJA is thus seen as a great success. However, only a few people received grants from FREJA and its effects remained limited from the general perspective.

Rogg (2004) observed that at the University of Oslo the proportion of female professors increased by 50% as a result of an equality initiative launched in 1987. This successful equality measure was not implemented without a struggle, because the female scientists were perceived as “the other” by the use of double standards of justice, and by the apparent devaluation of female scientists' competence. Arguments both in favour of and against the equality measure showed that, in practice, the university departments sometimes favour their own practical needs, setting principles of meritocracy aside. Nielsen (2004) was also interested in the case of the University of Oslo, which employs about 20 new professors each year. In 2002, about one third of these were women; the following year, the proportion decreased by less than 10%. In mid 2004, only one of seven new professors was a woman. These fluctuations might be coincidental but what was not a coincidence was the record of new women professors in 2002, the final year when scientific positions specially designated for women were filled as an equality measure based on the new University Law of 1997. Without those positions, the University of Oslo would have had only half as many new female professors in 2002, Nielsen claims. The discontinuation of this recruitment measure has also had positive effects, however, as the work towards gender balance has found new directions.

Angervall's (2005) comparative case study of gender equality work in Sweden shows that a case university tended to be more open to conflicts than a case private company was. The company studied is more likely to emphasize the importance of increasing women's social skills in order to improve gender equality. Both organizations use a hierarchical structure to organize their work. Both organizations emphasize consensus, individuality, neutral knowledge and neutral work and gender differences. The results illustrate how the strategies improving gender equality are steered and determined by specific organizational concepts and activities. Gender equality work is often presented as important, but is at the same time regarded as unnecessary and extraneous. Thus, gender equality work is complex and inconsistent and performed for a variety of reasons and goals, even if the general ambition seems to be to make the organizations more successful.

Jordansson (2005) notes that academia strives to maintain autonomy in the political field; it is not opposed to gender equality per se, but there is a fear of the loss of self-determination. Political interventions based on recommendations fit in well with academic ideals, whereas directives that are understood as compulsory do not. The Tham professorships in the mid-nineties are an example of the latter. The advertising of the posts was combined with the possibility of using affirmative action, which was seen as a threat to meritocracy. This article argues critically that the original intentions of Tham professorships were watering down and that the initiative was partly merely symbolic. The success rate of the intervention was dependent on co-operation and the alliance between politicians and gender researchers, which in itself is challenging. Mählick's (2006) investigation of the research assistants of Tham shows that the majority of them felt a lack of support from the departments and the need for external financing put them in a position of dependence, which hindered their choices of research subject. One third of them have left their original department.

Högskoleverket (2007) evaluated the gender science issues at Swedish universities. The group concluded that quality standards are being met by all gender research units. The subject is well represented in courses. The content of the courses shows a clear progression and the connection to the present research situation is good. There are, however, some problems. The educational environments are too small to conduct satisfying first cycle programmes as well as research education. The teachers employed are highly qualified, but there are so few of them that lessons without a teacher are not rare. The distorted gender distribution among both teachers and students was apparent. The students in first cycle programmes were mainly female and in research education as well, only women participated.

In the field of technical studies Lohikoski et al. (2007) state that it is important to realize the consequences of career guidance when pupils are selecting their future professional educational careers. One model is to have the students participate in the planning of contents and teaching approach. It is important to collect students' experiences of equality and give them basic knowledge to understand equality issues. In addition, it is important to have students' representatives in the equality work groups and organs. Another area is the mapping of equality situations of individual educational institutions and the use of this information in for

vocational guidance. Finally, it is important to build a future vision and plan for equality. The final sections of the report present equality projects and initiatives undertaken in Finnish educational institutions.

#### 2.7.4 Gaps

A general observation is that in Sweden studies on policies towards gender and science have a longer traditions and greater continuity. In other countries the studies are undertaken more or less incidentally, perhaps as hobby of an individual enthusiastic or a part of a recent temporary funding boom in the research area.

The analysis of policy measures in gender and science is exiguous, incidental and not systematic, except in Sweden. Most of the studies are conceptual and state-of-the-art and do not go into deeper and more detailed analyses. Empirical analyses are based on basic statistics and targeted and more sophisticated empirical studies are not used in this area.

This means that there are no institutional observatories, indicator lines, time series or targeted empirical policy options' (benchmarking) research in analysing gender and science. Furthermore, the rich tradition of social evaluation studies in Nordic countries is barely present. There are often just single policy reports based on brainstorming brain working and state-of-the-art analyses. Cross-sectional and longitudinal studies across various sectors and disciplines are missing. Moreover, evaluation of the results of equal opportunity policies should be carried out by independent agencies and not by an insider, as is usually the case.

The focus of policy development is academia and especially the academic careers of individual researchers. The papers indicate that there are structural hindrances to women's careers, but these political claims are not usually based on empirical research – only on the expressions of committee "brainstorming sessions". The reasons behind hostile views towards the gender equality agenda need to be examined and dealt with more thoroughly. There are no ideas for large structural policy changes, and consequently the idea of gender mainstreaming is not supported by concrete policy measures.

In Norway (and to a lesser degree in Sweden, Denmark and Finland), many initiatives over the last decades have aimed at recruiting or keeping women in the most male-dominated disciplines, and many of these initiatives have been studied. Most of the initiatives gave temporary positive results, while, in particular in technology, a recent decrease in female students indicates a lack of long-term effects. To learn more about how gender equality measures work we should have both ethnographic action research and qualitative longitudinal studies.

### 3. Conclusions

If we want to highlight the particular characteristics of Nordic countries in the field of gender and science, we find that one such characteristic is the public higher education system and the institutionalization of gender studies in it. The development of gender studies is closely connected with the strong development of the welfare state across the Nordic countries during the 1970s and 1980s. The connection between state and Nordic equality policies is supported (besides the other scientific disciplines) by gender studies, which 1) creates background concepts and suggestions for policies; 2) evaluates and assesses policy outcomes; 3) challenges prevailing practices and encourages the work force to enter professions associated with the opposite sex to a greater extent.

Despite its short history, gender studies has undergone several metamorphoses. Its concepts, methods and research subjects are still a matter of discussion. Moreover, it is impossible to give a single definition of its content that would be valid for all. It was the international feminist criticism of gender inequality in the 1970s that provided the impetus for gender studies in the Nordic countries. In academia, the feminist critique was initially a critical response to the lack of relevant epistemological knowledge and disciplines orientated towards equality questions. Women's studies, as the subject was called in its first phase, started to complement the knowledge gap of various disciplines. It had impetus especially in the social sciences as well as in medical studies. Moreover, subject areas such as history and ICT were affected by the feminist critique.

The knowledge obtained from interdisciplinary gender studies has also been used to improve understandings of the problems of other disciplines. Despite the dynamic development of interdisciplinary research, gender studies are still mainly carried out within traditional disciplines and during the last decades have significantly helped to develop and broaden a subject-specific relational knowledge and theory in some of them. The development of women's/gender studies was considered necessary to create knowledge about women's lives and conditions and to ensure that science was not biased and ignorant about the situation of women, which would lead to further injustices.

However, it proved difficult to mainstream the results of women's studies, which later became gender studies. Gender studies challenged and changed the overall disciplinary structure and during this process, disciplinary criticism grew stronger. The new insights were used to scrutinize academic traditions. Attention was drawn to the discrimination of women researchers and women pioneers in various disciplines. Complementary research is almost always a necessary first step towards developing gender studies within a new field, and the criticism of gender blindness in individual disciplines is still an important task. However, the issues raised by the feminist tradition are imposed on structures of science and educational policy and the principle of gender mainstreaming is foregrounded by scientific research. But sometimes in the world of market liberalism it appears that equality policies are ineffective and just a rhetorical practice of politicians and administrators. Gender mainstreaming is then used by the political and administrative élites as a tool to make whatever they may or may not do acceptable.

One of the most frequently studied topics in the Nordic countries is horizontal and vertical segregation. It is an important topic, as science in the Nordic countries is still gender segregated, despite the general political equality orientation and women's relative strong position in political life. The main research question asked is whether women are under-/over-represented in different scientific fields and at different institutional levels/sectors. Moreover, research seeks answers to the question of whether women are under-/over-represented at the top/bottom of the academic hierarchy. In the field of *internal horizontal segregation*, the focus is on the extent to which women are under-/over-represented within a particular male-dominated profession or discipline (e.g. medical profession, technology sciences, computer science.) and whether they choose different specialties from men? Finally, the role of social background in explaining horizontal and vertical segregation is studied. Research shows that women are still overrepresented in the humanities, the arts and social sciences, while men dominate in natural sciences and engineering. Women are still less likely than men to obtain permanent academic posts, although women are now in the majority among those in tertiary education. Few women have advanced to a professorship and they are seldom appointed to committees associated with scientific power and prestige. Women appear to prefer research careers in the private sector to academia and to become teachers in upper secondary schools. The main reasons for these developments are the strict disciplinary borders and job hierarchies based on individual performance.

In the field of stereotypes and identity, in which the construction and background factors of gender segregation are studied, the main questions were whether different social and cognitive factors explain why boy's and girl's choose different scientific fields or subject areas. The main political motivation behind these studies was to get more girls to study engineering, ICT and the hard natural sciences. Another popular topic was whether women/men identify themselves with their male-dominated /female-dominated scientific field or profession or whether they regard themselves as being a social minority. Finally, research focused on the extent to which institutional practices reproduce stereotypes. Studies in the sub-topic of the social construction of science created the epistemological foundation for women's and gender studies. These conceptual and theoretical studies considered in particular how science could be constructed in a more gender-equal way. There has been continuous theoretical and epistemological development in women, men and gender research and later on in queer / sexual body studies. Finally, an important question addressed is how to mainstream the gender perspective into science and research in general. The gender mainstreaming of science is understood as a critical analysis of the gender bias in scientific knowledge and as a new practical and theoretical approach for conducting research policies.

In the studies of science as a labor activity, the results show that in academia motherhood and family responsibilities put women's career advancement at risk and put a strain on professional women. There is evidence that women have to pay a higher price for a career than men or are forced to choose between career and personal life. The work culture in academia is male-orientated and women have in most cases had to conform to it in order to compete with men. Women's choices concerning productivity, specialty and working hours are more likely to be influenced by the needs of the family than those of men. Sexism and hidden discrimination continue to be a part of daily life in academia, but academic women continue to challenge this in various ways.

In studies of scientific excellence, the main research question was what explains gender differences in scientific excellence. Another important question was to what extent the personal character of a female researcher matches the ideal of a researcher. Are the criteria for and the measurements of scientific excellence gender-biased? Male dominated academic fields, specialties' and research fields/designs are often considered to be of higher status. Women in academia were found to be less scientifically productive and less qualified than men due to slower career advancement and lack of opportunities to engage in research collaboration (not in Denmark, however). A study in Iceland of the university evaluation committees found use of gender-based language, a higher valuing of continuous research activities, more detailed and less critical discussions of the works of male candidates and more positive opinions of the male candidates who had done gender research compared to women candidates.

In the field of gender policies, it was found that there is a fear of the loss of self-determination in academia. Hence, measures promoting gender equality have met resistance and they have not, therefore, always produced the expected results. Attempts have been made to reduce gender segregation across disciplines and to increase the number of women professors and researchers. Studies of initiatives aimed at recruiting or keeping women in the most male-dominated disciplines found temporary positive results. Evaluation of equality measures has found that they are not value-neutral. Strategies to include or retain women contribute to constructing particular perceptions of gender. In spite of good intentions, state feminist strategies are often built on dualistic and rather stereotypical notions of gender and are poorly equipped to make long-lasting changes in science.

Sweden is the most advanced country in the gender and science field due to its extended and continuous policies of science and research. This has led to more extensive and wide-scale research funding and publishing. In addition to large-scale public policies, there have been more resources than in the other Nordic countries to promote gender equality in science. Equality policy programmes and their evaluation studies in particular are more extensive. This has also maintained the scientific infrastructure and continuity. Through the policy programmes the disciplinary scale of the gender aspect in science is wider and more firmly rooted than in other countries in which gender studies are more typically dealt within the social sciences.

In Iceland, few studies focus exclusively on gender and science. Within academia, the work incentive system and equal rights matters have been evaluated, but studies on gender and science in the private labour market are absent. Studies focusing on horizontal and vertical segregation are mostly limited to the presentation of information on the under-/over-representation of men and women across disciplines and within the academic hierarchy. There has been a growing interest in methodological thinking about how educational and job choices are socially constructed. Research has found that psychological tests used to

direct individuals into certain educational and job tracks reinforce horizontal and vertical segregation. Those women who enter male-dominated professions do not appear to be able to make their mark on the work culture and adapt to the prevailing work culture instead. Men in female-dominated professions claim that they are looked upon as being abnormal. However, they are encouraged by women in their profession to make the work culture more masculine. Finally, there is a need for more focused research across all disciplines in Iceland on the various topics related to gender and science.

In Denmark, the social construction of identity and the social construction of science are the dominant lines of research. Science is deconstructed as a social field, whereby structures and patterns that favour men and subordinate women are disclosed. Gender identity is formed at an early age; therefore the material includes a significant number of studies on education with an emphasis on gender differences among boys and girls. Gender segregation is related to the social construction of science and gender identity. Gender segregation has been the focus of campaigns and positive action initiatives by the Ministry for Research, in terms of funding programmes and special professorships, and for this reason this topic seems to be the one that has been most thoroughly investigated.

In Norway, horizontal gender segregation has mostly been studied in relation to a few of the disciplines of natural sciences (mainly physics and mathematics) and computing. The focus on women in computing has been important since the early 1980s and has even dominated this research since the late 1990s, partly due to large research projects from the Norwegian Research Council and the EU. Horizontal segregation is not only between disciplines but also within disciplines; this has mostly been studied in relation to medical specialist training, thus leaving discipline-internal horizontal segregation an under-researched area in most of the other disciplines. Horizontal and vertical segregation are often studied together in research projects, although the mechanisms that cause women and men to choose different disciplines might not be the same as those that produce male dominance at the top of the academic hierarchy. In the studies on women in computer related contexts, it has been pointed out that although we need to understand the mechanisms of exclusion, simply changing them will not guarantee inclusion. In the field of medicine, the problem is a lack of focus on women from the perspective of feminist critique. The consequences might be, for example, biased treatment, ignorance in clinical practices or even a threat to the patient's life.

In Finland (as in the other countries), most of the higher research is done at the public universities, which are the only institutions where gender studies is engaged in. The research areas of gender studies have been narrow, aiming first to develop an epistemological background and concept for women's studies and then examining the lack of women in engineering, ICT and technology. In other public and private research institutes and R&D activities, the gender focus is lacking. Moreover, biomedicine and life sciences are not studied – at least not according to the database (GSD) – from the gender perspective. The emphasis on women's subjective experiences has led to less quantitative research than in many other countries and to a failure to observe the social interactionism practised and constructed in the gender systems. This can be seen in the conceptual separation of women's and men's studies and in the lack of studies of men's and women's interaction/relations. Finally, it appears to be difficult to affect the prevailing male dominated practices of science in Finland from inside the social sciences.

The focus of the gender and science studies in the Nordic countries is almost exclusively on academia at large and not on particular institutions in the private and public sectors. The private and public science institutions need to become the focus of research to uncover the current status of gender and science. Also, forces underlying gendered outcomes in terms of educational choices and career advancement are seldom examined.

Hence, more empirical studies are needed. Only a few longitudinal studies or studies using sophisticated quantitative methods to identify trends over time or the background factors of segregated outcomes have been undertaken. Moreover, few studies have produced new empirical material using quantitative longitudinal studies of academic careers, and only a handful of qualitative studies have made deeper analyses of social interaction, which could be useful in the future. A collection and a comparison of a number of different research projects might also provide a more overarching view and knowledge about how gender inclusion/exclusion mechanisms work at different levels and in different contexts. Despite longstanding tradition of social impact evaluation studies across the Nordic countries, there are few examples in the field of gender and science. This means that policy initiatives and positive measures are not properly and systematically assessed in many cases. Also, chronological studies with time series analyses are lacking from the research.

The majority of the authors of the GSD material are women and only a few men are represented. It is worth noting that gender divides exist in terms of different interpretations of the same data, which results in intensive debates about the true state of the gender equality in science and research. Significantly, male authors hold that women in science are better off than they themselves think, while female authors emphasize the presence of inequalities.

A critic and a pessimist might say that the conceptual efforts of women's and gender studies will not lead to long-lasting structural changes in mainstream science (with the exception, perhaps, of Sweden), if the current market and competition-orientated trend in Nordic higher education continues. The gender mainstreaming policies in academia and the state administration are in danger of becoming mere political rhetoric and oratory instead of effective and equal science policies. If one wants to continue structural change, more positive and more "gender mainstreamed" measures are required, and these need to be supported, evaluated, implemented and managed.

## 4. Selected literature

Aas, G. H. 1999, *Kvinneforskningspolitiske (pr)øvelser*, Luleå Tekniska Universitet, Luleå.

Aasebø, T. S. 2002, 'Kjønn - en saga blott?', *Norsk pedagogisk tidsskrift*, vol. 87, no. 2-3, pp. 162-173.

Academy of Finland (2002), *Women's Studies and Gender Research in Finland. Evaluation report. Publications of the Academy of Finland 8/02.*

<http://www.aka.fi/Tiedostot/Tiedostot/Julkaisut/Women's%20Studies%20and%20Gender%20Research%20in%20Finland.pdf>

Ahlgren, C. 2004, 'Hur kan vi utveckla modeller för att analysera genus och biologi samtidigt?' in *Medicinsk genusforskning - teori och begreppsbyggnad*, Vetenskapsrådet och ORD&FORM AB, Uppsala, pp. 36-42.

Ahlqvist, I. 1999, 'Demeterin matka. Radikaalin sukupuolieron näkökulma tiedon mimesikseen', *Naistutkimus*, vol. 3/1999, pp. 18-33.

Almegård, A. 1995, 'Om kvinnor får samma resurser som män forskar de lika mycket - Medicinsk kvinnoforskning och forskning om kvinnors hälsa' in *Viljan att veta och viljan att förstå. Kön, makt och den kvinnovetenskapliga utmaningen i högre utbildning. SOU 1995:110. Slutbetänkande av Utredningen om insatser för kvinno- och jämställdhetsforskning. Stockholm 1995, Ministry of Education and Research. Swedish statutes in translation SFS 1995:110., Stockholm, pp. 85-103.*

Alnebratt, K. 2007, *Genusprofessorerna – En rapport om en regeringsåtgärd och vad det blev av den*, Swedish Secretariat for Gender Research, Göteborg.

Ammitzbøll, L. 1992, 'Rip, Rap og Rup på universitetet', *Magisterbladet*, vol. 17, pp. 6-7.

Andenæs, A., Johannessen, B. F. & Ødegård, T. 1992, 'Kjønn som forsvant? Om betydningen av kjønn i psykologien' in *Forståelser av kjønn i samfunnsvitenskapenes fag og kvinneforskning*, eds. A. Taksdal & K. Widerberg, Ad Notam Gyldendal AS, Oslo, pp. 51-88.

Andersen, A. C. 2004, 'Gentagelse fremmer forståelsen', *Kvinden & Samfundet*, vol. 1, pp. 17-19.

Andersen, H. 1997, *Forskere i Danmark – videnskabsyn, vurderinger og aktiviteter*, Sociologisk Institut, University of Copenhagen, Copenhagen.

Andersen, H. 1998, *Køn og karriereforhold i dansk forskning - særligt i samfundsvidenskaberne. Resultater fra en interviewundersøgelse*. Sociologisk Institut, University of Copenhagen, Copenhagen, vol. 10/1998.

Andersson, A. 2007, "Vi blev antagligen för många": könskränkande behandling i akademisk miljö, Uppsala University, Department of Business Studies, Uppsala.

Andersson, G. (ed.) 2000, *Bedrägliga begrepp. Kön och genus i humanistisk forskning*, Uppsala Universitet, Jämställdhetskommittén, Uppsala.

Angervall, P. 2005, *Jämställdhetens pedagogik: dilemman och paradoxer i arbetet med jämställdhet på ett företag och ett universitet*, Göteborg : Acta Universitatis Gothoburgensis, Göteborg.

Annfelt, T. 1994, 'Kirurg eller allmennpraktiker? Betydningen av den medisinske diskurs for studenters karriereplaner', *Nytt om kvinneforskning*, vol. 18, no. 3, pp. 41-48.

Annfelt, T. 1999, Kjønn i utdanning. Hegemoniske posisjoner og forhandlinger om yrkesidentitet i medisin- og faglærerutdanning, Senter for kvinneforskning, NTNU, Trondheim.

Anttonen, A. 1988, 'Hyvinvointivaltion feministinen kritiikki - lähtökohtia uusille sosiaalipolitiikan tulkinnoille' in Naistutkimuksen ajankohtaisia ongelmia, ed. L. Simonen, Yhteiskuntatieteiden tutkimuslaitos Sarja C 30/1988. Tampereen yliopisto, Tampere, pp. 39-64.

Anttonen, A. 1989, 'Hyvinvointivaltion feministinen ymmärtäminen', Sosiaalipolitiikka, vol. 1989, pp. 23-36.

Anttonen, A. 1997, Feminismi ja sosiaalipolitiikka, Tampere University Press, Tampere.

Anttonen, A., Lempiäinen, K. & Liljeström, M. (eds.) 2000, Feministejä - Aikamme ajattelijoita, Vastapaino, Tampere.

Árnadóttir, J. H. 2004, 'Hvað tekur við?', Vélabrögð, vol. 25, pp. 4-6.

Arwill-Nordbladh, E. 2001, Genusforskning inom arkeologin, Swedish National Agency for Higher Education, Stockholm.

Åsberg, C. 1998, 'Debatten om begreppen. "genus" i Kvinnovetenskaplig tidskrift 1980-1998', Kvinnovetenskaplig tidskrift, vol. 2, pp. 29-41.

Balling Rasmussen, J. 2005, 'Piger og drenge i PISA', Undervisningsministeriets Tidsskrift Uddannelse, vol. 2, pp. 3-17.

Benckert, S. 1997, 'Är fysiken könlös? Reflektioner kring ett universitetsämne' in Makt & kön. Tretton bidrag till feministisk kamp, Brutus östlings Bokförlag Symposium, Stockholm, pp. 53-70.

Benckert, S. & Staberg, E. 1990, Women and scientists, Jönköping, Contributions GASAT, Jönköping, Sweden 1990, pp. 231-249.

Benckert, S. & Staberg, E. 2000, Val, villkor, värderingar: samtal med kvinnliga fysiker och kemister, Kvinnovetenskapligt forum, Umeå Universitet, Umeå, vol. 9.

Benckert, S. & Staberg, E. 2001, 'Women in science: can they be disturbing elements?', NORA - Nordic Journal of Feminist and Gender Research, vol. 9, no. 3, pp. 162-171.

Bendix Petersen, E. 1999, Køn i den akademiske organisation 6: Køn, virksomhed & kompetence, Institut for Statskundskab, University of Copenhagen, Copenhagen.

Benterud, T. 1998, 'Om maktutredningene i Norge, Danmark og Sverige - og om kvinneforskeres kamp for faglig innflytelse', Kvinneforskning, vol. 22, no. 3-4, pp. 10-23.

Berg, A. 1998, 'Begeistring og begjær: Vi stammer vel fra apene?' in Betatt av viten. Bruksanvisninger til Donna Haraway, eds. K. Asdal, A. Berg, B. Brenna, I. Moser & L. M. Rustad, Spartacus Forlag, Oslo, pp. 80-114.

Berg, B. 2006, Genuspraktika för lärare, Lärarförbundet, Stockholm, vol. 2006/10.

Berg, L. & Aamodt, P. O. 1987, 'Kvinnelige og mannlige studenters tidsbruk', Nytt om kvinneforskning, vol. 11, no. 5, pp. 13-16.

- Berge, B. 1997, 'Styra eller styras. Att skapa kön i klassrummet' in *Makt och kön. Tretton bidrag till feministisk kunskap*, Brutus Östlings Bokförlag Symposium, Eslöv, pp. 15-32.
- Berggren, C. 2006, *Entering higher education: gender and class perspectives*, Göteborgs studies in educational science, Göteborg.
- Bergsdóttir, G. S. 2006, *Konur á tölvuöld. Eigindleg rannsókn um kventölvunarfræðinga*.
- Bergström, H. 2004, 'Tolkad, konstruerad och/eller observerad. Kön och genus när kroppen inte räcker till' in *Medicinsk genusforskning - teori och begreppsbyggnad*, Vetenskapsrådet och ORD&FORM AB, Uppsala, pp. 43-49.
- Bermann, T., Holter, H., Sørensen, B. Å. & Aas, G. H. 1988, *På kvinners vis - med kvinners råd. Nye perspektiver på forskningspolitikken*, NAVFs sekretariat for kvinneforskning, Oslo.
- Berner, B. (ed.) 1997, *Gendered Practices. Feminist Studies of Technology and Society*, Almqvist & Wiksell International, Linköping.
- Berner, B. (ed.) 2003a, *Vem tillhör tekniken? Kunskap och kön i teknikens värld*, Arkiv förlag, Kungälv.
- Berner, B. 2003b, 'Introduktion: Vad har teknik med genus att göra?' in *Vem tillhör tekniken? Kunskap och kön i teknikens värld*, Arkiv förlag, Kungälv, pp. 15-21.
- Berner, B. 2004, *Ifrågasättanden. Forskning om genus, teknik och naturvetenskap*, Tema Teknik och social förändring, Linköpings Universitet, Linköping.
- Beyer, K. 1995, 'A Gender Perspective on Mathematics and Physics Education: Similarities and Differences' in *Gender and Mathematics Education*, eds. B. Grevholm & G. Hanna), Lund University Press, Lund, pp. 45-64.
- Bjarnadóttir, V. H. & Hallgrímsdóttir, G. (eds.) 1989, *Konur í tækni og iðngreinum*, BRYT, Akureyri.
- Bjerrum Nielsen, H. 2003, 'Samtaler om ligestilling – indenfor, udenfor, udenom, og ind i discussionen', *Kvinder, køn & forskning*, vol. 2, pp. 10-17.
- Björkman, C. 2005, *Crossing boundaries, focusing foundations, trying translations: feminist technoscience strategies in computer science*, Blekinge tekniska högskola. Sektionen för teknokultur, humaniora och samhällsbyggnad, Karlskrona.
- Björnsson, M. 2005, *Kön och skolframgång. Tolkningar och perspektiv*, Department of Education, Stockholm.
- Bloch, C. 2002, *Køn i den akademiske organisation 12: Håndtering af følelser i academia*, Institut for Statskundskab, University of Copenhagen, Copenhagen.
- Bloch, C. 2003, 'Følelsernes skjulte spil i academia' in *Akademisk tilblivelse – Academia og dens kønnede befolkning*, eds. L. Højgaard & D. M. Søndergaard, Akademisk Forlag, Copenhagen, pp. 121-157.
- Bloch, C. 2007, *Passion og Paranoia - Følelser og følelseskultur i Academia*, Syddansk Universitetsforlag, Odense.

Blom, I. 1993, 'Fra kvinnehistorie til kjønns historie. Utfordringer for historiefaget i 90-årene' in Viten, vilje, vilkår: Forskningspolitisk konferanse om kvinneforskning, Norges forskningsråd, Oslo, pp. 135-141.

Blom, I. 1994, Det er forskjell på folk - nå som før. Om kjønn og andre former for sosial differensiering, Universitetsforlaget, Oslo.

Blom, I. 2005, "... uden dog at overskride sin naturlige Begrænsning" - kvinder i Akademia 1882-1932' in Minervas døtre - organisering av kvinnelige akademikere 1882-2005, ed. L. Sangolt, Sigma Forlag, Bergen, pp. 80-101.

Bojer, H. 1997, 'Kvinneforskning og sosialøkonomi', Kvinneforskning, vol. 21, no. 3-4, pp. 120-123.

Bonde, J. 1991, 'Derfor økonomi: "Det har altid været en selvfølge, at jeg skulle have en uddannelse..."' in Myter strukturer og selvforståelser - Undersøgelser af kønnets betydning i uddannelse og arbejde, eds. K. Grøn bæk Hansen et al, Aalborg Universitetsforlag, Aalborg, pp. 87-103.

Bonde stam, F. 1999, Färre tjänster, fler kvinnor? En undersökning av Uppsala universitets försöksverksamhet med positiv särbehandling, Uppsala University, Uppsala.

Bonde stam, F. 2004, En önskan att skriva abjektet: analyser av akademisk jämställdhet, Stehag, Gondolin, Uppsala.

Boschini, A. D., Jonung, C. & Persson, I. 2005, Genusperspektiv på nationalekonomi, Swedish National Agency for Higher Education, Kalmar.

Brandt, E., Olsen, T. B. & Vabø, A. 2002, Kjønn og forskning i Norge, NIFU STEP, Oslo.

Bratteteig, T. & Verne, G. 1997, 'Feministisk eller bare kritisk: En diskusjon av fagkritikk innen informatikk', Kvinneforskning, vol. 21, no. 2, pp. 11-24.

Bron-Wojciechowska, A. 1995, Att forskarutbilda sig vid Uppsala universitet, Uppsala Universitet, Reprocentralen HSC, Uppsala.

Bruhns, S. 1997, 'Hvad blev der af produktivitetsgåden: kvindelige og mandlige forskeres produktivitet', Biblioteksarbejde, vol. 49, pp. 51-54.

Bruun, G. M., Kragelund, B. B. & Oddershede, L. B. 2003, Universitetsstuderendes tilgang til eksperimentelt udstyr - kønslige og faglige aspekter, Center for Naturfagenes Didaktik, University of Copenhagen, Copenhagen.

Bruun, K., Eskola, K. & Suolinna, K. 1982, 'Väitöksestä juhla kirjaan. Naiset tieteen miesseuroissa', Sosiologia, vol. 2/1982, pp. 89-101.

Carlsson, I. & Tham, C. 1995, Proposition 1994/95:164 Jämställdhet mellan kvinnor och män inom utbildningsområdet, The Swedish Government, Proposition 1994/95:164. Downloaded on 12/01/2009, available at: [http://www.riksdagen.se/Webbnav/index.aspx?nid=37&dok\\_id=GI03164&rm=1994/95&bet=164](http://www.riksdagen.se/Webbnav/index.aspx?nid=37&dok_id=GI03164&rm=1994/95&bet=164).

Carstensen, G. 2005, Sexuella trakasserier finns nog i en annan värld: Konstruktioner av ett (o)giltigt problem, Gondolin, Eslöv.

CHEPS 2005, Issues in higher education policy, Western countries. An update on higher education policy issues in 2004 in 11, CHEPS – International Higher Education Monitor, University of Twente.

Christensen, T. & Fox Maule, C. 2004, 'Mens vi venter på ligestilling', *Aktuel Naturvidenskab*, vol. 1, pp. 28-29.

Colding, H. & Henningsen, I. 1999, 'Lægevidenskabelig forskning og køn - En analyse af de teoretiske institutter ved Københavns Universitet', *Ugeskrift for læger*, vol. 43, pp. 5920-5924.

Corneliussen, H. 2003a, *Diskursens makt – individets frihet: Kjønnede posisjoner i diskursen om data*, University of Bergen, Bergen.

Corneliussen, H. 2003b, 'Male positioning strategies in relation to computing' in *He, She and IT Revisited. New Perspectives on Gender in the Information Society*, ed. M. Lie, Gyldendal Akademisk, Oslo, pp. 103-134.

Corneliussen, H. 2003c, 'Konstruksjoner av kjønn ved høyere IKT-utdanning i Norge', *Kvinneforskning*, vol. 27, no. 4, pp. 31-50.

Dahlerup, D. 1993, 'Den lige forskning', *CekvinaNYT*, vol. 3, pp. 9-13.

Dale, K. 1992, 'Forståelser av kjønn i økonomi' in *Forståelser av kjønn i samfunnsvitenskapenes fag og kvinneforskning*, eds. A. Taksdal & K. Widerberg, Ad Notam Gyldendal AS, Oslo, pp. 247-274.

Danmarks Evalueringsinstitut 2005, *Køn, karakterer og karriere. Drenges og pigers præstationer i uddannelse*, Danmarks Evalueringsinstitut.

de Coninck-Smith, N. 2000, 'Forskningsrådene og ligestillingen', *Kvinder, køn & forskning*, vol. 2, pp. 76-77.

de Coninck-Smith, N. 2003, 'Kvinder, ledelse og universitetsreform', *Kvinder, køn & forskning*, vol. 2, pp. 44-47.

Drotner, K. & Mouritsen, O. G. 1999, "Superprofessorater" til kvinder vil højne kvaliteten, *KVINFO*. Downloaded on 11/09/2008, available at: <http://www.kvinfo.dk/side/559/article/557/>.

Dryler, H. 1998, *Educational choice in Sweden: studies on the importance of gender and social context*, Swedish Institute for Social Research, Stockholm.

Eduards, M., Elgqvist-Saltzman, I., Lundgren, E., Sjöblad, C., Sundin, E. & Wikander, U. 1992, *Rethinking change. Current Swedish feminist research*, Swedish Science Press, Uppsala.

Eeg-Henriksen, F. & Widerberg, K. 1995, 'A house of one's own - sentrene for kvinneforskning' in *Alma Maters Døtre. Et århundre med kvinner i akademisk utdanning*, eds. S. S. Lie & M. B. Rørslett, Pax Forlag A/S, Oslo, pp. 139-151.

Eeg-Henriksen, F. 1997, 'Med nordisk blick på organisatoriske utfordringer for kvinneforskningen i Norge', *Kvinneforskning*, vol. 21, no. 3-4, pp. 124-130.

Egeland, C. 1999, 'Problemet som ikke (vil) finnes', *Kvinneforskning*, vol. 23, no. 1, pp. 80-88.

Egeland, C. 2000, "Men det har ikke noget med kønnet at gøre" *Køn, kønsbarrierer og Akademia - konstruktioner af et ugyldigt problem*, dissertation, University of Southern Denmark.

Egeland, C. 2001, 'Kønsforskellens monstrøsitet: kønsbarrierer i Akademia – et ugyldigt problem', *Kvinder, køn & forskning*, vol. 4, pp. 38-49.

Egeland, C. 2003, 'Kraften i det underforståtte - noen overveielser om feministisk forskning', *Kvinneforskning*, vol. 27, no. 4, pp. 5-15.

Einarsdóttir, S. 2005, 'Kynjamunur á starfsáhuga - raunverulegur eða skekkja í áhugakönnunum?' in *Kynjamyndir í skólastarfi*, Rannsóknarstofnun Kennaraháskóla Íslands, Reykjavík, pp. 103-119.

Einarsdóttir, T. 1997, *Läkaryrket i förändring: en studie av den medicinska professionens heterogenisering och könsdifferentiering*, Göteborgs Universitet, Sociologiska Institutionen, Göteborg.

Einarsdóttir, Þ. & Magnúsdóttir, B. R. 2005a, 'Karlar í útrýmingarhættu? Um stöðu kvenna og karla í framhaldsskólum og háskólum' in *Kynjamyndir í skólastarfi*, Rannsóknarstofnun Kennaraháskóla Íslands, Reykjavík, pp. 199-219.

Einarsdóttir, Þ. & Magnúsdóttir, B. R. 2005b, 'Er grunnskólinn kvenlæg stofnun?' in *Kynjamyndir í Skólastarfi*, Rannsóknarstofnun Kennaraháskóla Íslands, Reykjavík, pp. 151-172.

Einarsdóttir, Þ. 2000, 'Er menntun lykillinn að jafnrétti? Staða kvenna í háskólasamfélaginu' in *Bryddingar. Um samfélagið sem mannanna verk.*, Félagsvísindastofnun Háskóla Íslands. Háskólaútgáfan., Reykjavík, pp. 11-23.

Einarsdóttir, Þ. 2004, *Hvatakerfi í háskólum: Fjármögnun rannsókna*. Downloaded on 07/10/2008, available at: <http://www.hi.is/professorar/thorgerdur-einarsdottir.html>.

Einarsdóttir, Þ. 1999, *Kynjamunur í vinnumatskerfi háskólamanna*, University of Iceland. Downloaded on 07/10/2008, available at: <http://www.hi.is/page/vinnumatfrettabref>.

Ek, A. 2007, "'Varför måste Butler vara så jävla akademisk?' En diskussion om feministisk kunskapsteori och akademiska undervisningsrum', *Tidskrift för genusvetenskap*, vol. 4, pp. 67-93.

Ek, R. 2001, *Den kvantitativa förekomsten av genusrelaterad litteratur på kurser vid institutionen för kulturgeografi och ekonomisk geografi*, Lund University, Center for Gender Studies, Lund, *Genusperspektiv i undervisning och lärande*, pp. 23-31.

Elkjær, B. 1991, 'Piger og informatik - et reelt problem eller et konstrueret problem?' in *Myter strukturer og selvforståelser - Undersøgelser af kønnets betydning i uddannelse og arbejde*, eds. K. Grønbæk Hansen et al, Aalborg Universitetsforlag, Aalborg, pp. 137-158.

Elovaara, P. 2004, *Angels in unstable sociomaterial relations: stories of information technology*, Division of Technoscience Studies, Blekinge Institute of Technology, Karlskrona.

Elverdam, B. & Hertzberg Johnsen, B. 1990, 'Kvindeforskningsspektiver' in *KvinnFolk. Kvinnor i tradition och kultur*, Etnologiska Institutionen, Uppsala Universitet, Uppsala, pp. 11-27.

Ericsson, C. (ed.) 1993, *Genus i historisk forskning*, Studentlitteratur, Lund.

Eriksson, A. 1995, *The Meaning of Gender in Theology. Problems and Possibilities*, Uppsala Universitet, Teologiska fakulteten, Uppsala.

Eriksson, K. 2003, *Manligt läkarskap, kvinnliga läkare och normala kvinnor: köns- och läkarskapande symbolik, metaforik och praktik*, Stehag, Gondolin, Uppsala.

Eriksson-Zetterquist, U. & Svensson, E. 2001, 'Genus i utbildningen - tre exempel', *Kvinnovetenskaplig tidskrift*, vol. 1, pp. 97-101.

European Commission, 2005, Commission Staff Working Document: Women and Science: Excellence and Innovation – Gender Equality in Science. Commission of the European Communities, 11.3.2005 SEC (2005) 370, Brussels.

European Commission, 2008, The Gender Challenge in Research Funding. Assessing the European National Scenes, Office for Official Publications of the European Communities, Luxembourg.

Expert group on men's studies 1987, Discussions on men's studies, Ministry of Social Affairs and Health Finland, Equality Publications, Series E: Abstracts, vol. 1/1987.

Fanngeirsdóttir, K. 2003, Konur og tölvunarfræði. Downloaded on 26/08/2008, available at: <http://www.ru.is/kennarar/asrun/Efni/Skyrslakonur.pdf>

Fiig, C. 1999, ForskelLIGHED i forskning? - Ligestillingsrådets status og strategipapir over ligestilling i dansk forskning, Ligestillingsrådet, Copenhagen.

Fjelkestam, K. 2005, 'Med karta och kompass: Kvt i den teoretiska terrängen', *Kvinnovetenskaplig tidskrift*, vol. 4, pp. 66-73.

Forsberg, G. & Grenholm, C. (eds.) 2005, ... och likväl rör det sig. Genusrelationer i förändring, Karlstad University Press, Karlstad.

Forsberg, U. 1998, Jämställdhetspedagogik - en sammanställning av aktionsforskningsprojekt, Liber Distribution, Västervik.

Forskargruppen för genusvetenskapliga studier (ed.) 2001, Genusrelationer i rörelse. Ett forskningsprogram för Genusvetenskap vid Karlstads universitet 2001-2005, Karlstads Universitet, Karlstad.

Franck, O. (ed.) 2007, Genusperspektiv i skolan – om kön, kärlek och makt, Studentlitteratur, Polen.

Fridner, A. 2004, Karriärvägar och karriärmönster bland disputerande läkare och medicinare, *Acta Universitatis Upsaliensis*, Uppsala.

Frimodt-Møller, I. & Ingerslev, G. H. 1993, 'Nye piger i gymnasiet' in *Køn i forandring*, Forlaget Hyldebjerg, Copenhagen, pp. 155-175.

Fürst, E. 1988, Kvinner i Akademia - inntrengere i en mannskultur?, NAVFs sekretariat for kvinneforskning, Oslo.

Gansmo, H. J., Lagesen, V. A. & Sørensen, K. H. 2003, 'Forget the hacker? A critical re-appraisal of Norwegian studies of gender and ICT' in *He, She and IT Revisited. New Perspectives on Gender in the Information Society*, ed. M. Lie, Gyldendal Akademisk, Oslo, pp. 34-68.

Gender in Research 2003, Gender in research – research in gender. The Co-ordination for Gender Studies in Denmark, Copenhagen, Downloaded on 01/09/2009, available at <http://koensforskning.soc.ku.dk/publikationer/forskning/forskningengelsk.pdf>

Georgsdóttir, I. 2001, 'Enn eru steinar í götu kvenna', *Læknablaðið*, vol. 87, no. 3, pp. 235-237.

- Gjerberg, E. & Hofoss, D. 1995, 'Har kjønn betydning for om legen blir spesialist? En analyse av spesialisierungsgrad blant kvinnelige og mannlige leger', *Tidsskrift for Den norske lægeforening*, vol. 115, no. 10, pp. 1253-1257.
- Gjerberg, E. 2002, *Kvinner i norsk medisin - mot full integrering. En studie av kjønnsdifferensieringen i legers spesialitetsvalg*, Work Research Institute, Oslo.
- Glynn, C., Heyenstrand, P., Jacobsson, C., Larsson, M., Lundberg, E. & Wadskog, D. 2006, *Vetenskapsrådet och jämställdheten*, Vetenskapsrådet, Bromma.
- Gomard, K. & Reisby, K. 2002, 'Fokus på faglig og social praksis i et kønsblindt Akademia', *Kontur (Tidsskrift for Kulturstudier)*, vol. 6, pp. 39-46.
- Gomard, K. & Reisby, K. 2001, *Kønsblik – på forskeruddannelser*, Danmarks Pædagogiske Universitet (Denmarks University of Education), Copenhagen.
- Gomard, K. 2000, 'In the Centre or At the Margins: Male and Female Ph.D. Students in Chemistry – A Study of Culture and Interaction in Meetings of Research Groups at a University in Denmark' in *Bridging Research Methodology and Research Aims*, eds. R. H. Evans, A. Møller Andersen & H. Sørensen, The Danish University of Education, Copenhagen, pp. 379-385.
- Gomard, K. 2002, 'Forhandling af forskerposition og køn på et humanistisk forskeruddannelseskursus' in *M/K - Mod og kvindehjerter*, Forlaget Modtryk, Århus, pp. 21-34.
- Gonäs, L., Rosenberg, K. & Bergman, A. 2005, *Osakliga löneskillnader mellan kvinnor och män. En studie vid Karlstads Universitet*, Karlstads University Studies, Karlstad.
- Goodman, S. E. 1995, *Gender, Technology and Knowledge*, Lunds Universitet, Sociologiska Institutionen, Lund.
- Goodman, S. E. 2007, *A Critical Reflection on Research on Gender, IT and Learning - intersections of pleasures and challenges of interdisciplinary research*, Learning Lund and Centre for Gender Studies, Lund.
- Grønbæk Hansen, K. 1993a, *Feminist Research – About or Within Natural Science*, Feminist Research Network - Gender-Nature-Culture, University of Odense, Odense, pp. 5-15.
- Grønbæk Hansen, K. 1993b, 'Kvalificering til maskulinitet og underordning - Det maskulines bastioner i erhvervsuddannelserne' in *Køn i forandring - Ny forskning om køn, socialisering og identitet*, eds. A. M. Nielsen et al, Forlaget Hyldebjætt, Copenhagen, pp. 213-224.
- Guðmundsson, H.K. 2008, *The gender challenge in research funding - assessing the European national scenes*. Iceland. Available at: [http://ec.europa.eu/research/science-society/document\\_library/pdf\\_06/iceland-research-funding\\_en.pdf](http://ec.europa.eu/research/science-society/document_library/pdf_06/iceland-research-funding_en.pdf)
- Gulbrandsen, E. 2001, *WOMEN AND SCIENCE: Review of the situation in Norway* Helsinki Group on women and science, European Union.
- Gunnarsson, E., Westberg, H., Andersson, S. & Balkmar, D. 2007, 'Learning by fighting?', *Jämställdhet och genusvetenskap i VINNOVAs organisation och verksamhetsområde*, Arbetsliv i omvandling, Växjö.
- Gunnes, H. & Hovdhaugen, E. 2008, *Karriereløp i akademia. Statistikkgrunnlag utarbeidet for Komité for integreringstiltak - Kvinner i forskning*, NIFU STEP, Oslo.

Haake, U. 2007, Mission (im)possible? Kvinnor om att vara akademiska ledare i forskningstunga miljöer. Available at: <http://www.idas.nu/filer/Ulrika.Haake.2007.Mission.impossible.pdf>

Haavind, H. 1984, Hva vil kvinnene på universitetet? Hvorfor kvinnene vil drive kvinneforskning og hvilke krav de stiller til forskningsvirksomheten og forskningsmiljøet, University of Oslo, Likestillingsutvalget, Oslo, Kvinner på Universitetet 100 år (Women at the University 100 years).

Haavind, H. 1986, 'Kvinneforskning og vitenskapelige paradigmer', Nytt om kvinneforskning, vol. 10, no. 1, pp. 4-10.

Hagemann, G. 1999, 'Kjønn i historien...' in Kritisk kunnskapspraksis. Bidrag til feministisk vitenskapsteori, eds. A. T. Lotherington & T. Markussen, Spartacus Forlag, Oslo, pp. 37-56.

Hagemann, G. 2003, Feminisme og historieskriving. Inntrykk fra en reise, Universitetsforlaget, Oslo.

Hakulinen, S. (ed.) 2007, Naisten tiedesäätö 1987-2007, Naisten tiedesäätö, Helsinki.

Halsaa, B. 1993, 'Norsk kvinneforskning på 90-tallet: En vurdering av status og retning' in Viten, vilje, vilkår: Forskningspolitisk konferanse om kvinneforskning, Norges forskningsråd, Oslo, pp. 58-64.

Halsaa, B. 2003, 'Feministisk forskning – feministisk politikk', Kvinneforskning, vol. 27, no. 1, pp. 5-25.

Hamberg, K. & Johansson, E. 1998, 'Läkare, kvinna och forskare - reflektioner kring tolkning av intervjuer', Socialmedicinsk tidskrift. Ett socialt och socialmedicinskt forum, vol. 1-2, pp. 28-31.

Hamberg, K. 2002, "'Vi är ju så olika - det går inte att komma ifrån" Om biologins tolkningsföreträdare i medicinen' in Genusvägar - en antologi om genusforskning, Liber ekonomi, Kristianstad, pp. 47-60.

Hamberg, K. 2004, 'Om förvirringen kring biologi, kön och genus i medicinen' in Medicinsk genusforskning - teori och begreppsbyggnad, Vetenskapsrådet och ORD&FORM AB, Uppsala, pp. 21-29.

Hammarström, A. 2004, Genusperspektiv på medicinen - två decenniers utveckling av medvetenheten om kön och genus inom medicinsk forskning och praktik, Swedish National Agency for Higher Education, Kalmar.

Hammarström, A. & Johansson, E. 2002, 'Genusvetenskapens utveckling inom medicinen' in Genusvägar - en antologi om genusforskning, Liber ekonomi, Kristianstad, pp. 27-46.

Hammarström, A., Hovelius, B. & Wijma, B. 2004, 'Medicinsk genusforskning – i går, i dag och i morgon' in Medicinsk genusforskning - teori och begreppsbyggnad, Vetenskapsrådet och ORD&FORM AB, Uppsala, pp. 9-17.

Hannula, M. 2006, Tytöt, pojat ja matematiikka, Tinataan-project. Downloaded on 17/06/2009, available at: <http://tina.tkk.fi/tietopankki/hannula.pdf>

Hannula, M., Kupari, P., Pehkonen, L., Räsänen, P. & Soro, R. 2004, 'Matematiikka ja sukupuoli' in Matematiikka - näkökulmia opettamiseen ja oppimiseen, eds. P. Räsänen, P. Kupari, T. Ahonen and P. Malinen, Niilo Mäki Instituutti, Jyväskylä, pp. 170-197.

Hansen, F. 1998, 'En usikker levevej for kvinder', Ingeniøren, vol. 7, pp. 7.

Hansen, J. M. 1999, 'Naturvidenskab og de "kvindelige" værdier', Aktuel Naturvidenskab, vol. 1, pp. 42-44.

- Hasse, C. 1998a, 'Learning to Pattern Physicist Virtues: Male and Female Dissimilarities' in Justification and Enrolment Problems in Education Involving Mathematics or Physics, eds. J. Højgaard Jensen & M. Niss), Roskilde University Press, Roskilde, pp. 106-122.
- Hasse, C. 1998b, *Køn I den akademiske organisation 4: Kulturelle forestillinger og køn på tærsklen til videnskabens samfund. Portræt af en gruppe fysikstuderende - med antropolog*, Institut for Statskundskab, University of Copenhagen, Copenhagen.
- Hasse, C. 2003, 'Kropstegns betydning i uddannelseskulturer' in *Akademisk tilblivelse – Academia og dens kønnede befolkning*, eds. L. Højgaard & D. M. Søndergaard, Akademisk Forlag, Copenhagen, pp. 159-187.
- Hasse, C. 2007, 'Cultural Models of Gender in Science - Women in Physics through the Cultural-Psychological Magnifying Glass' in *University Science and Mathematics Education - Challenges and Possibilities*, eds. P. Valero & O. Skovsmose, DCN Press (In press), Copenhagen.
- Haukaa, R. & Holter, Ø. G. (eds.) 1990, *Mannlighet og forståelse. Rapport fra en konferanse om menn og forskning*, NORAS, Oslo.
- Haupt, A. 1990, *Visions and revision – Women's studies in technology*, Jönköping, Contributions GASAT, Jönköping, Sweden 1990, pp. 276-289.
- Hearn, J., Lattu, E. & Tallberg, T. 2003, 'Minne mies menossa? Miehiä koskevan tutkimuksen kehitys suomessa', *Naistutkimus*, vol. 1/2003, pp. 18-29.
- Hedlin, M. 2004, *Lilla genushäftet Om genus och skolans jämställdhetsmål*, Kalmar University, Kalmar.
- Heikkinen, K. 2003, 'Sukupuolen näkökulma perinteentutkimuksessa' in *Mikä ero? Kaksikymmentä kirjoitusta yhteiskunnasta, kulttuurista ja sukupuolesta*, eds. R. Turunen and M. Roivas, Suomalaisen Kirjallisuuden Seura, Helsinki, pp. 139-155.
- Helsinki Group Sweden, 2001, *Women and Science: Review of the situation in Sweden*, European Union.
- Henningsen, I. & Colding, H. 1999, 'Lægevidenskabelig prestige og køn - med de klinisk videnskabeligt ansatte i København som eksempel', *Ugeskrift for læger*, vol. 43, pp. 5924-5927.
- Henningsen, I. & Højgaard, L. 2002, *Køn i den akademiske organisation 9: "The Leaking Pipeline" – øjeblikbilleder af kønnede in- og eksklusionsprocesser i akademien*, Institut for Statskundskab, University of Copenhagen, Copenhagen.
- Henningsen, I. & Sjørup, K. 1997, 'Køn, kvalifikationer og rekruttering i videregående uddannelser' in *Brydninger – Perspektiver på det kønsopdelte arbejdsmarked*, eds. R. Emerek, V. Kold, S. Ipsen & H. Holt, Arbejdsmarkedsstyrelsen, Copenhagen, pp. 28-41.
- Henningsen, I. 1993, *Observations and Conjectures on Women and the Sciences*, Feminist Research Network Gender-Nature-Culture, Odense, pp. 17-26.
- Henningsen, I. 1998, *Køn i den akademiske organisation 2: Lægevidenskab og køn*, Institut for Statskundskab, University of Copenhagen, Copenhagen.
- Henningsen, I. 2002, *Køn i den akademiske organisation 13: 30 års march på stedet? Kønsprofilen blandt de videnskabeligt ansatte på Københavns Universitet 1970-2001*, Institut for Statskundskab, University of Copenhagen, Copenhagen.

Henningsen, I. 2003, 'Modseleksjon eller efterslæb' in *Akademisk tilblivelse – Akademia og dens kønnede befolkning*, eds. L. Højgaard & D. M. Søndergaard, Akademisk Forlag, Copenhagen, pp. 25-60.

Henningsen, I. 2004, 'Underrekruttering af kvinder på danske universiteter', *Kvinden & Samfundet*, vol. 1, pp. 20-21.

Henningsen, I., Gundelach, P. & Juselius, K. 1999, *Køn og bevillinger - En undersøgelse af sammenhængen mellem køn og bevillingspraksis i Statens Samfundsvidenskabelige Forskningsråd i perioden december 1997 - maj 1998*, Statens Samfundsvidenskabelige Forskningsråd, Copenhagen.

Henningsen, I., Højgaard, L., Nexø Jensen, H. & Søndergaard, D. M. 1998, *Køn i den akademiske organisation 5: Reduktionisme og kønsfordeling i forskerverdenen*, Institut for Statskundskab, University of Copenhagen, Copenhagen.

Hilden, J. 1997, *Hvorfor forsker? - karrierevej eller blindgyde?*, Forskningsministeriet (Ministry for Research), Copenhagen.

Hoffmeyer, J. 1996, 'Umælende tale', *Kvinder, køn & forskning*, vol. 2, no-, pp. 96-97.

Holmberg, T. 2005, 'Vetenskapskrig och det goda samtalets retorik - biologer talar om "tokfeminism"', *Kvinnovetenskaplig tidskrift*, vol. 4, pp. 7-22.

Holst, C. 2001a, *Sosiologi, politikk og kvinnelighet. Norsk kvinne- og kjønnsosiologi etter 1970. Generasjoner, identiteter og diskurser*, SVT Press, Bergen.

Holst, L. 2001b, *At turde sig matematik-gen*, KVINFO. Downloaded on 11/09/2008, available at: <http://www.kvinfo.dk/side/559/article/360/>.

Holter, H. 1989, 'Teoriutvikling i norsk samfunnsvitenskapelig kvinneforskning. Muligheter og ambisjoner', *Nytt om kvinneforskning*, vol. 13, no. 1, pp. 22-27.

Hottola, P. 2006, 'Sukupuoli maantieteen ja matkailun tutkimuksessa', *Terra*, vol. 118, no. 3-4 2006, pp. 229-237.

Hovdhaugen, E., Kyvik, S. & Olsen, T. B. 2004, *Kvinner og menn - like muligheter? Om kvinners og menns karriereveier i akademia*, NIFU STEP, Oslo.

Husu, L. 2001, *Sexism, Support and Survival in Academia. Academic Women and Hidden Discrimination in Finland*, *Social Psychological Studies* 6. Department of Social Psychology, University of Helsinki, Helsinki.

Husu, L. & Rolin, K. (eds.) 2005, *Tiede, tieto ja sukupuoli*, Gaudeamus, Helsinki.

Husu, L. 2002, 'Yliopistot ja sukupuolten välinen tasa-arvo' in *Tasa-arvopoliitikan haasteet*, eds. A. M. Holli, T. Saarikoski & E. Sana, WSOY. *Tasa-arvoasian neuvottelukunta*. Sosiaali- ja terveystieteiden tutkimuskeskus, Vantaa, pp. 146-164.

Håpnes, T. & Rasmussen, B. 1990, 'Har datafaget kjønn?', *Nytt om kvinneforskning*, vol. 14, no. 4, pp. 46-60.

Håpnes, T. 1996, 'Not in Their Machines. How Hackers Transform Computers into Subcultural Artefacts' in *Making Technology Our Own? Domesticating Technology in Everyday Life*, eds. M. Lie, & K. H. Sørensen, Scandinavian University Press, Oslo, pp. 121-150.

Härnsten, G. & Wingård, B. (eds.) 2007, Högskoleutbildning javisst, men med vem och för vad? Genusperspektiv i praktikinära forskning i högre utbildning, Växjö University Press, Göteborg.

Högskoleverket (ed.) 2007, Utvärdering av ämnet genusvetenskap vid svenska universitet, Högskoleverket. Downloaded on 09/02/2009, available at: <http://www.hsv.se/download/18.5b73fe55111705b51fd80002237/0717R.pdf>.

Högskoleverket 2008, Kvinnor och män i högskolan, Swedish National Agency for Higher Education, Stockholm, Report 2008:20 R.

Højgaard, L. 1995, Working Fathers Caught in the Web of the Symbolic Order of Gender, Institut for Statskundskab, University of Copenhagen, Copenhagen, vol. 1995/4.

Højgaard, L. 2003, 'Fællesskab og faglighed – diskurser om forskning og køn' in Akademisk tilblivelse – Akademia og dens kønnede befolkning, eds. L. Højgaard og D. M. Søndergaard, Akademisk Forlag, Copenhagen, pp. 203-233.

Ihalainen, R. 1987, Nainen metsänhoitajana, Folia Forestalia 698. Metsäntutkimuslaitos, Institutum Forestale Fenniae, Helsinki.

Ikonen, H. & Ojala, H. 2005, 'Yhteisyyden luomista ja eron kokemuksia - haastattelu, konteksti ja feministinen tietäminen', Naistutkimus, vol. 1/2005, pp. 17-29.

Immonen, V. 2003, 'Arkeologin vaatteenparsi, kentän logiikka ja feministinen tieteenkritiikki', Naistutkimus, vol. 4/2003, pp. 20-30.

Imsen, G. 1995, 'Kjønn og utdanning: Likt og ulikt' in Kjønn og samfunn i endring. Rapport fra avslutningskonferanse, Norges forskningsråd, Oslo, pp. 352-360.

Ipsen, S. 1995, Forskerrekruttering på naturvidenskab, Københavns Universitet, Centre for Alternative Social Analysis (CASA), Copenhagen.

Jacobsson, A. 2000, Motivation och inlärning ur genusperspektiv: en studie av gymnasieelever på teoretiska linjer/program, Acta Universitatis Gothoburgensis, Göteborg.

Jacobsson, C., Glynn, C. & Lundberg, E. 2005, Equality between men and women in Swedish research funding? – An analysis of the Swedish research council's first years (2003—2005), Vetenskapsrådet. Downloaded on 29/01/2009, available at: <http://www.vr.se/download/18.29d0c9e3115d713077b80003077/Engelsk+presentation+rev+4+19+oct07bny.pdf>.

Jafnréttisnefnd Háskóla Íslands 2004, Staða og þróun jafnréttismála 1997-2002. Downloaded on 01/10/2008, available at: <http://www.ask.hi.is/Apps/WebObjects/HI.woa/swdocument/1004573/Sta%C3%B0a+og+%C3%BEr%C3%B3un+jafnr%C3%A9ttism%C3%A1la+1997-2002.pdf>.

Jafnréttisnefnd Háskóla Íslands 2007, Skipting umsókna og úthlutanir úr sjóðum: Rannsóknarsjóður Háskóla Íslands 2006 og 2007. Downloaded on 01/10/2008, available at: [www.ask.hi.is/solofile/1010675](http://www.ask.hi.is/solofile/1010675).

Jalmert, L. 1993, 'Likgiltighet största hindret för mansforskningen', Kvinnovetenskaplig tidskrift, vol. 1, pp. 57-64.

Jansson, C. 2008, *Maktfyllda möten i medicinska rum: debatt, kunskap och praktik i svensk förlossningsvård 1960-1985*, Sekel bokförlag, Lund.

Jerneck, A. 1998, *Genusperspektiv i ekonomisk historia*, Lund university, Center for Gender Studies, Lund, *Genusperspektiv i undervisning och lärande*, pp. 5-18.

Jespersen, C. 2002, 'Unge valg af fag', *AKF Nyt*, vol. 2, pp. 41-46.

Jespersen, C. 2006, *Det naturlige valg? - En analyse af unges valg af tekniske og naturvidenskabelige fag og uddannelser*, The Danish University of Education, Copenhagen.

Jiehua, H. 2009, *Managerial Careers in the IT Industry: Women in China and in Finland*, *Acta Universitatis Lappeenrantaensis 344*, Lappeenranta University of Technology, Lappeenranta.

Johansson, A. 2006, 'Supporting Research of the Highest Quality' in *Reaching for scientific excellence in gender research*, Vetenskapsrådet, Bromma, pp. 20-23.

Johnsson, L. 1997, 'Vem forskar och undervisar på högskolan? Ett könsperspektiv', *Pedagogisk forskning i Sverige*, vol. 2, pp. 81-94.

Jokinen, A. 1999, 'Suomalainen miestutkimus ja -liike: muutoksen mahdollisuus?' in *Mies ja muutos. Kriittisen miestutkimuksen teemoja*, ed. A. Jokinen, Tampere University Press, Tampere, pp. 15-51.

Jokinen, E. 1989, 'Muistelutyö', *Sosiaalipolitiikka*, vol. 1989, pp. 93-102.

Jordansson, B. 1999, *Jämställdhetspolitikens villkor. Politiska intentioners möten med den akademiska världen: exemplet "Thamprofessorerna"*, Swedish Secretariat for Gender Research, Göteborg.

Jordansson, B. 2005, 'Jämställdhet och genus på akademins villkor: Två exempel på det vetenskapliga fältets agerande i samband med politiska satsningar', *Kvinnovetenskaplig tidskrift*, vol. 4, pp. 23-41.

Julkunen, R. 1984, 'Nainen suomalaisessa työn sosiologiassa', *Sosiologia*, vol. 2/1984, pp. 146-162.

Julkunen, R. 2004, *Hullua rakkautta ja sopimustohtoreita*, *SoPhi 96*, Jyväskylän yliopisto, Jyväskylä.

Jungersen, D. 1997, 'Fri os for øremærkning', *Ugeskrift for læger*, vol. 37, pp. 5554-5556.

Juvonen, T. 2006a, 'Kohti pervopedagogiikkaa. Lesbo- ja queer-tutkimuksen haaste yliopistopedagogiikalle', *Naistutkimus*, vol. 4/2006, pp. 4-16.

Juvonen, T. 2006b, 'Seksuaalisen ruumiin jäljillä' in *Seksuaalinen ruumis. Kulttuuritieteelliset lähestymistavat*, eds. T. Kinnunen & A. Puuronen, Gaudeamus, Helsinki, pp. 71-90.

Jyränki, J. 2005, 'Kummia naisia, outoja oikeuksia. Oikeustiedettä queer-teorian ja naisoikeuden leikkauspisteissä', *Oikeus*, vol. 34/2005, no. 2, pp. 157-177.

Kærgård, N. 1990, 'Kvinderne og Det Statsvidenskabelige Studium', *Nationaløkonomisk Tidsskrift*, vol. 128/1990, no. 3, pp. 359-374.

Kainulainen, P. 2005, *Maan viisus. Ivone Gebaran ekofeministinen käsitys tietämisestä ja teologiasta*, Joensuun yliopiston teologisia julkaisuja N:o 13, Joensuu.

Kantola, J. & Valenius, J. (eds.) 2007, Toinen maailmanpolitiikka. 10 käsitettä feministiseen kansainvälisten suhteiden tutkimukseen, Vastapaino, Tampere.

Katainen, E., Kinnunen, T., Packalen, E. & Tuomaala, S. 2005, 'Naiset historiankirjoittajina. Akateeminen marginaali ja tiedon tuottaminen' in Oma pöytä. Naiset historiankirjoittajina Suomessa, eds. E. Katainen, T. Kinnunen, E. Packalen & S. Tuomaala, Suomalaisen Kirjallisuuden Seura, Helsinki, pp. 11-49.

Keränen, M. 1989, 'Miehet politiikkatieteen subjekteina' in Naisen tieto, ed. S. Heinämaa, Art House, Helsinki, pp. 163-182.

Kivikkokangas-Sandgren, R. 1986, 'History of geography in Finland in 1890-1930 - a female perspective' in Nainen - alue - yhteiskunta. Naisnäkökulmia yhteiskuntamaantieteessä eri Pohjoismaissa, eds. R. Ojalehto, L. Piispa & S. Virkkala, Tampereen yliopisto, aluetieteen laitos. Tiedonantoja 31/1986, Tampere, pp. 61-70.

Kivikkokangas-Sandgren, R. 1987, 'Naistutkimuksen lähtökohtia ja ongelmanasetteluja maantieteen tutkimuksessa' in Tulen kesyttäjät. Suomalaista naistutkimusta, ed. Helsingin Akateemiset Naiset, WSOY, Porvoo ja Juva, pp. 53-67.

Kleberg, M. 2006, Genusperspektiv på medie- och kommunikationsvetenskap, Swedish National Agency for Higher Education, Kalmar.

Knudsen, S. V. 2000, 'Hvad gør de med faglighed og køn? - interview med studerende på et humanistisk studium', Kvinder, køn & forskning, vol. 1, pp. 25-39.

Knudsen, S. V. 2004, 'Gender paradoxes and power - theoretical reflections with empirical awareness', NORA Nordic Journal of Women's Studies, vol. 12, no. 2, pp. 102-112.

Knudsen, S. V., Reisby, K. & Sørensen, H. 2001, Kønsblik – på bacheloruddannelser, Danmarks Pædagogiske Universitet (The Danish University of Education), Copenhagen.

Koeller, A. B. 2001, Frejas flyvende forskning, KVINFO. Downloaded on 11/09/2008, available at: <http://www.kvinfo.dk/side/559/article/304/>.

Koivunen, A. & Liljeström, M. (eds.) 1996, Avainsanat. 10 askelta feministiseen tutkimukseen, Vastapaino, Tampere.

Kolmos, A. 1989, Kvindesynsvinkler i de teknisk-naturvidesnakbelige uddannelser, Institut for Samfundsudvikling og Planlægning, University of Aalborg, Aalborg, vol. 34.

Kolmos, A. 1995, Mellem ambition og tradition - yngre ingeniørers karrierestrategier, Ingeniørforeningen i Danmark, Copenhagen.

Kolmos, A. 1996, 'Køn og karrierestrategier blandt yngre ingeniører', Kvinder køn & forskning, vol. 3, pp. 6-17.

Korvajärvi, P. (ed.) 1993, Tieteen huolet, arjen ihmeet, Vastapaino, Tampere.

Koski, L. 2003, 'Naisten paikat "miesten maailmassa". Näkökulmia sosiologiseen naistutkimukseen' in Mikä ero? Kaksikymmentä kirjoitusta yhteiskunnasta, kulttuurista ja sukupuolesta, eds. R. Turunen and M. Roivas, Suomen Kirjallisuuden Seura, Helsinki, pp. 273-293.

Koski, L. & Tedre, S. 2003, 'Sukupuolipiiloja ja -huolia. Naisten muistoja yliopistouralta', *Naistutkimus*, vol. 3/2003, pp. 19-32.

Krafft, C. 2007, *Mer lika än olika - kvinnliga och manliga akademiker om organisationsvärderingar och karriär*, Sveriges Akademikers Centralorganisation, Stockholm.

Kristinsson, Þ. 2003, *Kynlegir kvistir: Karlar í hjúkrun, Óbirt MA-ritgerð*, Háskóli Íslands.

Krogh Andersen, K. & Fox Maule, C. 2006, 'Fysik er også for piger', *MONA*, vol. 2, pp. 86-89.

Kruse, A. 1996, *Pigepædagogik og drengpædagogik*, Cekvina (Center for kvinde- og kønsforskning i Aarhus), Aarhus, vol. 24.

Kupari, P. 1986, 'Tytöt, pojat ja matikkapää: Sukupuoli ja matematiikka' in *Naiset, tekniikka ja luonnontieteet*, ed. H. Varsa, *Tasa-arvoasian neuvottelukunnan monisteita* vol. 8/1986, Helsinki, pp. 81-91.

Kurki, H., Kuusi, H. & Vänskä, H. 2001, *WOMEN AND SCIENCE: Review of the situation in Finland*, European Union. Downloaded on 16/06/2009, available at:  
[ftp://ftp.cordis.europa.eu/pub/improving/docs/women\\_national\\_report\\_finland.pdf](ftp://ftp.cordis.europa.eu/pub/improving/docs/women_national_report_finland.pdf)

Kuronen, M., Granfelt, R., Nyqvist, L. & Petrelius, P. 2004, 'Sukupuolistunut ja sukupuoleton sosiaalityö' in *Sukupuoli ja sosiaalityö*, eds. M. Kuronen, R. Granfelt, L. Nyqvist & P. Petrelius, PS-kustannus, Jyväskylä, pp. 5-18.

Kvande, E. 1984, *Kvinner og høyere teknisk utdanning. Integrert eller utdefinert? Om kvinnelige NTH-studenters studiesituasjon og framtidsplaner*, IFIM, SINTEF, Trondheim.

Kyvik, S. 1988, *Vitenskapelig publisering blant kvinnelige og mannlige universitetsforskere*, NAVFs utredningsinstitutt, Oslo.

Kyvik, S. 1991, *Productivity in Academia. Scientific Publishing at Norwegian Universities*, Universitetsforlaget, Oslo.

Kyvik, S. & Teigen, M. 1996, 'Child Care, Research Collaboration, and Gender Differences in Scientific Productivity', *Science, Technology, & Human Values*, vol. 21, no. 1, pp. 54-71.

Lagesen, V. A. 2003, 'Advertising computer science to women (or was it the other way around?)' in *He, She and IT Revisited. New Perspectives on Gender in the Information Society*, ed. M. Lie, Gyldendal Akademisk, Oslo, pp. 69-102.

Langberg, K. 2006, *Gender-gap and Pipeline-metaphor in the Public Research Sector. Main case: Universities in Denmark*, The Danish Centre for Studies in Research and Research Policy (CFA), Århus: University of Århus., vol. 2006/1.

Langberg, K. & Vestergaard, E. 2006, *Kvinder i forskning - kønne forskere*, CFA - Dansk Center for Forskningsanalyse. Downloaded on 30/10/2008, available at:  
<http://www.cfa.au.dk/Tema/Kvinder%20i%20forskning.htm>.

Larsen, C. J. & Widerberg, K. 2007, 'How interdisciplinary is interdisciplinary gender research? An investigation of the research programme gender in transition', *Tidsskrift for kjønnsforskning*, vol. 31, no. 1, pp. 75-86.

- Larsen, E. 2006, 'Kjønnskonservatismens reproduksjon', *Nytt Norsk Tidsskrift*, vol. 23, no. 3, pp. 200-212.
- Lauritsen, H. 1999, 'Pigerne springer over', *Folkeskolen*, vol. 18, pp. 30-31.
- Lauritsen, H. 2004, 'Piger er til sundhed, drenge til teknik', *Folkeskolen*, vol. 39, pp. 6-7.
- Le Feuvre, N. 2009, 'Exploring women's academic careers in cross-national perspective. Lessons for equal opportunity policies', *Equal Opportunities International*, vol. 28, no.1, pp. 9-23.
- Lehtinen, U. 2004, 'Behöver genusmedicinare ett delvis annat kroppsbegrepp än andra genusvetare?' in *Medicinsk genusforskning - teori och begreppsbildning*, Vetenskapsrådet och ORD&FORM AB, Uppsala, pp. 53-61.
- Leira, A. 1992, 'Hankjønn, hunkjønn, intetkjønn - ? Forståelser av kjønn i norsk kvinnesosiologi' in *Forståelser av kjønn i samfunnsvitenskapenes fag og kvinneforskning*, eds. A. Taksdal, & K. Widerberg, Ad Notam Gyldendal AS, Oslo, pp. 171-200.
- Lempiäinen, K. 2003, *Sosiologian sukupuoli*, Vastapaino, Tampere.
- Lie, Gjerberg, E. 2002, 'Gender similarities in doctors' preferences: and gender differences in final specialisation', *Social science & medicine*, vol. 54, no. 4, pp. 591-605.
- Lie, S. & Sjøberg, S. 1984, "Myke" jenter i "harde" fag?, Universitetsforlaget, Oslo.
- Lie, S. S. & Rørslett, M. B. (eds) 1995, *Alma Maters Døtre. Et århundre med kvinner i akademisk utdanning*, Pax Forlag A/S, Oslo. P23
- Liinason, M. & Holm, U. M. 2006, 'Women's Gender Studies and Interdisciplinarity', *NORA - Nordic Journal of Feminist and Gender Research*, vol. 2, no. 14, pp. 115-130.
- Liljeström, M. (ed.) 2004, *Feministinen tietäminen. Keskustelua metodologiasta*, Vastapaino, Tampere.
- Lilleaas, U. 2004, 'Forholdet mellom etikk og politikk i feministisk forskning sett i lys av egne forskererfaringer', *Kvinneforskning*, vol. 28, no. 2, pp. 53-67.
- Lindenskov, L. 2005, 'Er matematikken køn i PISA?', *Undervisningsministeriets Tidsskrift Uddannelse*, vol. 2 Piger og drenge, pp. 18-28.
- Lindø, A. V. & Sigurdardottir, A. 2004, 'Mænds sprog og kvinders pludren', *Kvinden & Samfundet*, vol. 1, pp. 22-24.
- Lohikoski, P., Putila, P., Sassi, E. & Viitamaa-Tervonen, O. (eds.) 2007, *Tasa-arvoa oppilaitoksiin - Toimintamalleja tasa-arvosuunnittelun tueksi*, Tinataan-project. Downloaded on 16/06/2009, available at: [http://tina.tkk.fi/tietopankki/Uusi\\_opas.pdf](http://tina.tkk.fi/tietopankki/Uusi_opas.pdf)
- Lorentzen, J. 2004, 'Mannsforskning, feminisme og likestilling', *Kvinneforskning*, vol. 28, no. 3, pp. 93-103.
- Lotherington, A. T. & Markussen, T. (eds.) 1999, *Kritisk kunnskapspraksis. Bidrag til feministisk vitenskapsteori*, Spartacus Forlag, Oslo.
- Lund, H. H. 2005, 'Piger og fysik - en umulig kombination?', *Uddannelse*, vol. 2, pp. 51-56.

Lundqvist, Å. & Mulinari, D. (eds.) 1997, Sociologisk kvinnoforskning, Studentlitteratur, Lund.

Luomalahti, M. 2005, Naisopiskelijoiden teknologiasuuntautuminen luokanopettajakoulutuksessa, Acta Universitatis Tamperensis 1065, Tampere University Press, Tampere.

Luukkonen-Gronow, T. 1983, 'Naistutkijat, perhe ja työ', Sosiologia, vol. 1/1983, pp. 23-32.

Lykke, N. 2003, 'Interseksjonalitet – ett användbart begrepp för genusforskningen', Kvinnovetenskaplig tidskrift, vol. 1, pp. 47-56.

Lykke, N. 2006, 'Gender Research and Excellence. Some Recommendations and Future Perspectives' in Reaching for scientific excellence in gender research, Vetenskapsrådet, Bromma, pp. 64-74.

Lytje, I. 1985, Om maskuline metoder i datalogi.

Lützen, D. & Larsen, T. 2005, 'Last man standing'. Rapport fra projekt "Køn i forskning" på Aarhus Universitet, Lützen Management, Aarhus.

Lähdetie, J. 1986, 'Naisnäkökulma biolääketieteelliseen tutkimukseen' in Naiset, tekniikka ja luonnontieteet, ed. H. Varsa, Tasa-arvoasian neuvottelukunnan monisteita 8/1986, Helsinki, pp. 51-65.

Løgstrup, B. 1994, 'Kvinder i forskerstillinger', Uddannelse, vol. 4, pp. 169-172.

Løvlien, M. 2001, 'Blir kvinners hjerter tatt på alvor?', Vård i Norden, vol. 21, no. 1, pp. 15-19.

Mählck, P. 2003, Mapping gender in academic workplaces: ways of reproducing gender inequality within the discourse of equality, Umeå Universitet, Sociologiska Institutionen, Umeå.

Mählck, P. 2006, 'Thams forskarassistenttjänster. En forskningspolitisk jämställdhetsåtgärning inom akademien' in Vad händer sen? Långsiktiga effekter av jämställdhetsåtgärningar under 1980- och 90-talen, VINNOVA- Verket fir Innovationssystem, Stockholm, pp. 201-220.

Mäkelä, A., Puustinen, L. & Ruoho, I. (eds.) 2006, Sukupuolishow. Johdatus feministiseen mediatutkimukseen, Gaudeamus, Helsinki.

Malterud, K. 1996, 'Den medisinske diagnose - feministiske perspektiver', Nytt om kvinneforskning, vol. 1, no. 1, pp. 13-20.

Malterud, K. 1997, 'Medisinsk kvinneforskning - pragmatisk endringsarbeid, nyskapende kunnskapsutvikling - eller begge deler?', Kvinneforskning, vol. 21, no. 3-4, pp. 81-87.

Mankinen, T. 1995, Akateemista nuorallatanssia. Sukupuolinen ahdistelu ja häirintä Helsingin yliopistossa, Helsingin yliopisto. Tasa-arvotoimikunta, Helsinki.

Mårdsjö, K. 1998, Människa teknik samhälle i högre teknisk utbildning, Institutionen för systemteknik, Linköpings Universitet, Linköping, Människa teknik samhälle i högre teknisk utbildning, vol. Rapport nr LiTH-ISYR-2062.

Markusson Winkvist, H. 2003, Som isolerade öar: de lagerkransade kvinnorna och akademien under 1900-talets första hälft, B. Österlings bokförlag Symposium, Eslöv.

Mathisen, W. C. 1998, 'Hvor annerledes? Om kvinneforskningens forskningspolitiske diskurs', *Kvinneforskning*, vol. 22, no. 1, pp. 11-25.

Melby, K. 1996, 'Norsk kvinnehistorie 1975-1995; Kjønnets endrede vitenskapelige status', *Historisk Tidsskrift*, vol. 75, no. 1-2, pp. 185-214.

Melby, K. 2007, *Kjønnsbalanse i akademia - gyldne muligheter. Sluttrapport fra Komité for integreringstiltak - kvinner i forskning 2004-2006*, Komité for integreringstiltak - Kvinner i forskning, Oslo.

Melhuus, M., Rudie, I. & Solheim, J. 1992, 'Antropologien og kjønnen' in *Forståelser av kjønn i samfunnsvitenskapenes fag og kvinneforskning*, eds. A. Taksdal, & K. Widerberg, Ad Notam Gyldendal AS, Oslo, pp. 9-50.

Mellström, U. 1995, *Engineering lives: technology, time and space in a male-centred world*, Linköping Universitet, Tema teknik och social förändring, Linköping.

Menntamálaráðuneytið 2002, *Konur í vísindum á Íslandi*, Menntamálaráðuneytið. Downloaded on 22/08/2008, available at: <http://bella.stjr.is/utgafur/konurivisindum.pdf>.

Meta-analysis 2008, *Meta-analysis of gender and science research*, Final structure, Deliverable 12, Fúndacio CIREM.

Meulders, D. & Caprile, M. (eds.), Plasman, R., Cincera, M., Lemiere, S., Danis, S., O'Dorchai, S., Tojerow, I., Jepsen, M., Gangji, A., Moreno, D. & Kruger, K. 2003, *Women in industrial research. Analysis of statistical data and good practices of companies*, Office for Official Publications of the European Communities, Luxembourg.

Møller Jensen, E. 2005, 'Fra klasserum til kanon - skolens køn fra 1970'erne til i dag', *Undervisningsministeriets Tidsskrift Uddannelse*, vol. 2 Piger og drenge, pp. 57-62.

Myklebust, L. M. 1996, 'Feministisk kritikk av kunsthistorien', *Kvinneforskning*, vol. 20, no. 3, pp. 20-27.

Naistutkimustyöryhmä 1990, *Naistutkimuksen ja sen opetuksen järjestyminen Tampereen yliopistossa, Naistutkimusta ja sen opetusta pohtineen työryhmän muistio. Naistutkimusyksikkö työraportteja 1/1990*. Tampereen yliopisto., Tampere.

NAS [National Academy of Sciences] (2006), *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering*, The National Academies Press, Washington, DC.

Naskali, P. 1993, 'Kasvatus, tieto, subjekti. Kasvatustieteen kysymysten tarkastelua naisnäkökulmasta' in *Moninaista - kasvatustiedettä naisnäkökulmasta*, ed. P. Naskali, Lapin yliopiston kasvatustieteellisiä julkaisuja C. Katsauksia ja puheenvuoroja 4, Rovaniemi, pp. 124-141.

Nationella sekretariatet för genusforskning (ed.) 2004, *Nationellt seminarium om mansforskning*, Nationella sekretariatet för genusforskning, Göteborg.

NAVF's Secretariat for Women's Research (ed.), Emblem, R. 1991, *Hva karakteriserer konfliktene som oppstår rundt og i den medisinske kvinneforskning?*, NAVF's secretariat for women research, Oslo, pp. 90-96.

Nenola, A. 1999, 'Women's studies in Finland. Recognising the problems of belief in equality' in *Women in Finland*, Otava, Helsinki, pp. 159-169.

Nexø Jensen, H. 1997, *Køn I den akademiske organisation 1: Det forskningspolitiske system*, Institut for Statskundskab, University of Copenhagen, Rosenborggade 15, 1130 København K.

Nexø Jensen, H. 2002, *Køn i den akademiske organisation 10: Karrierespor blandt danske Ph.D. studerende*, Institut for Statskundskab, University of Copenhagen, Copenhagen.

Nexø Jensen, H. 2003a, 'Danske ph.d.-studerendes karrierespor – vejen ad hvilken' in *Akademisk tilblivelse – Akademia og dens kønnede befolkning*, eds. L. Højgaard & D. M. Søndergaard, Akademisk Forlag, Copenhagen, pp. 101-120.

Nexø Jensen, H. 2003b, 'Ressourcestrømme i det forskningspolitiske system' in *Academisk tilblivelse – Akademia og dens kønnede befolkning*, eds. L. Højgaard og D. M. Søndergaard, Akademisk Forlag, Copenhagen, pp. 189-201.

Nielsen, H. B. 2004, 'UiO som kjønnsbalansert universitet?', *Kirke og Kultur*, vol. 109, no. 3, pp. 313-339.

Nielsen, J. & Roepstorff, L. 1985, *Køn og teknologi - piger og datamater*, *Kvinder og teknologisk udvikling*, pp. 66-88.

Nilsson, J., Ravald, E. & Ytterberg, Å. 2004, *Livet efter disputationen – en enkät undersökning om den postdoktorala karriären*, Karolinska Institutet, Stockholm.

Nisser, U. 2006, *Prefekt och kvinna. En rapport om akademiskt ledarskap ur kvinnors perspektiv*, Uppsala University, Uppsala.

Njølstad, I. & Løchen, M. 2003, 'Er kvinner underrepresentert i medisinske forskningsprosjekter?', *Tidsskrift for Den norske lægeforening*, vol. 123, no. 1, pp. 22-25.

Nordal, I. 1996, 'Kvinnebiologi ved et sekelskifte', *Nytt om kvinneforskning*, vol. 20, no. 1, pp. 4-12.

Nordli, H. 2003, *The Net is Not Enough. Searching for the female hacker*, Department of Interdisciplinary Studies of Culture, NTNU, Trondheim, Norway.

Nyberg, A. 1999, *Från kvinnor och innovation till genus och innovation*, NUTEK, Närings- och teknikutvecklingsverket, Stockholm, vol. R 1999:14.

Nydahl, E. 2007, *Utan en obstinat gen hade jag aldrig försökt. Intervjuer med 62 framgångsrika kvinnor inom universitet och högskola*.

Nygård, B. (ed.) 2002, *Forskning och kön – med genusperspektiv i diskutabel omvandling*, Forskningsrådet för arbetsliv och socialvetenskap, FAS. Downloaded on 09/02/2009, available at: <http://www.fas.se/upload/dokument/konferenser/konferensrapporter/forskningochkon.pdf>

Nyman, J. & Roivas, M. 2003, 'Kirjallisia sukupuoliä. Sukupuolen näkökulma kirjallisuudentutkimuksessa' in *Mikä ero. Kaksikymmentä kirjoitusta yhteiskunnasta, kulttuurista ja sukupuolesta*, eds. R. Turunen and M. Roivas, Suomalaisen Kirjallisuuden Seura, Helsinki, pp. 13-29.

Näätänen, M. 2000, *Matematiikka, NAISSET ja osaamisyhteiskunta*, WSOY, Porvoo.

Nätkin, R. 1989, 'Intressi, luokka ja sukupuoli: Naisten ja hyvinvointivaltion suhteen tarkastelua', *Sosiaalipolitiikka*, vol. 1989, pp. 37-48.

- Oftung, K. 1997, 'Mannsforskning', *Kvinneforskning*, vol. 21, no. 3-4, pp. 67-73.
- Oksala, J. & Werner, L. (eds.) 2005, *Feministinen filosofia*, Gaudeamus, Helsinki.
- Olsson, P. & Willman, T. (eds.) 2007, *Sukupuolen kohtaaminen etnologiassa*, Ethnos ry, Helsinki.
- Opetusministeriön työryhmä 1982, *Naisten tutkijanuran ongelmat ja esteet*. Opetusministeriön asettaman työryhmän mietintö, *Komiteamietintö*, Helsinki, vol. 1982, no. 33.
- Opetusministeriön työryhmä 1986, *Naisten tutkijanuran ongelmat ja esteet*. Seurantaryhmän mietintö, *Opetusministeriön työryhmien muistioita*, Helsinki, vol. 1986, no. 34.
- Opetusministeriön työryhmä 2004, *Tutkijanuratyöryhmän loppuraportti*, Opetusministeriön työryhmämuistioita ja selvityksiä 2006:13. Opetusministeriö, Helsinki.
- Ore, K. L. 1999, 'Den glemte religionsforskningen - med kjønn som viktig kategori og kvinner som viktige aktører', *Nytt om kvinneforskning*, vol. 23, no. 2, pp. 79-87.
- Paloheimo, A. & Stenman, J. 2006, *Gender, Communication and Comfort Level in Higher Level Computer Science Education – Case Study, Tinataan-project*. Downloaded on 16/06/2009, available at: [http://tina.tkk.fi/tietopankki/Paloheimo\\_Stenman.pdf](http://tina.tkk.fi/tietopankki/Paloheimo_Stenman.pdf)
- Pedersen, G. & Reisby, K. (eds.) 1991, *Ligeværd - mangfoldighed*, Danmarks Lærerhøjskole, Copenhagen.
- Peltonen, E. 1988, *Tiedostaminen naisliikkeen ja naistutkimuksen strategiana*, *Tasa-arvojulkaistuja*, Sarja D: *Naistutkimusraportteja 4/1988*. Sosiaali- ja Terveysministeriö, Helsinki.
- Pettersson, K. 2007, *Men and Male as the Norm? A Gender Perspective on Innovation Policies in Denmark, Finland and Sweden*, *Nordic Research Programme 2005-2008*, Stockholm, vol. Report: 4.
- Poulsen, C. 2005, *Prestige in academia: a glance at the gender distribution*, *Ibidem-Verlag*, cop, Hannover.
- Prometea, 2006, *Empowering Women Engineers in Industrial and Academic Research*, Deliverable No 8 and Deliverable No 9, Report on state of the art, existing quantitative data, identification of gaps, and methodological overview, Final version. PROMETEA HPSE-CT-2005-017660.
- Raehalme, O. 1996a, *Lahjakas nainen tohtoriopiskelijana*, *Acta Universitatis Tamperensis ser A vol. 509*, Tampereen yliopisto, Tampere.
- Raehalme, O. 1996b, *Lahjakas nainen*. *Naisten lahjakkuuden kehittymiseen liittyvien erityispiirteiden tarkastelu*, *En Theos*, Hämeenlinna.
- Rahkonen, A. & Alha, K. 2004, *Opintoportailla - tilastollinen tutkimus naisten ja miesten opintopoluista teknillisen tiedekunnan koulutusohjelmissa*, *Oulun yliopiston opetus- ja opiskelijapalveluiden julkaisuja*. Sarja A nro 24, Oulu.
- Rantalaiho, L. & Saarinen, A. (eds.) 1987, *Naistutkimuksen tieteidenvälisiä ongelmia*. *Seminaariraportti*, Tampereen yliopiston sosiologian ja sosiaalipsykologian laitoksen työraportteja sarja B 22/1987, Tampereen yliopisto, Tampere.
- Rantalaiho, L. (ed.) 1986, *Miesten tiede, naisten puuhut*, *Vastapaino*, Tampere.

Rantalaiho, L. 1988, 'Naistutkimuksen metodologiasta' in Akanvirtaan. Johdatus naistutkimukseen, eds. P. Setälä and H. Kurki, Yliopistopaino, Helsinki, pp. 28-54.

Rantalaiho, L. 1989, 'Lehtolapsia', *Sosiaalipolitiikka*, vol. 1989, pp. 167-173.

Rasmussen, L. & Wittrup, E. 1988, 'Pigeklasse – drengeklasse', *Folkeskolen*, vol. 23, pp. 1048-1049.

Rasmussen, P. & Rittenhofer, I. 2001, 'Forestillinger om køn og forskning', *Humaniora*, vol. 4, pp. 13-17.

Rees, T. (ed.), Lenain, M., Verlaeckt, K., Bollen, L., Reuss, M., Madsen, K. K., Ebeling, H., Hadulla-Kuhlmann, C., Hartung, B., Löther, A., Dafna, K., Maratou-Alipranti, L., Navas, E., Baron, M., Hermann, C., Allan, J., Delli Colli, F., Vallerga, S., Entringer, J., Mottier, I., Haidar, A., Mukherjee-Cosmidis, S., Amâncio, L., Costa Araújo, H., Gonçalves da Silva, L., Patrício, T., Pereira, S., Reis, A. L., Ribeiro, M., Santos, C., Valente Rosa, M. J., Kuusi, H., Kurki, H., Vänskä, H., Moberg, S., Peters, J., Simeonova, K., Keravnou-Papailiou, E., Sepou, K., Philippou, M., Frydova, H., Lekesova, I., Linkova, M., Raudma, T., Hrubos, I., Gunnarsdottir, H., Messer-Yaron, H., Kahanovich, S., Gertnere, D., Taljunaite, M., Sciriha, I., Benterud, T., Gulbrandsen, E., Pininska, J., Caloianu, M., Piscova, M. & Lah, T. 2002, *National Policies on Women and Science in Europe*, Office for Official Publications of the European Communities, Luxembourg.

Reisby, K. 2001a, *Kønsblik - resumé*, Danmarks Pædagogiske Universitet, Copenhagen.

Reisby, K. 2001b, 'Kønnet som barriere', *Humaniora*, vol. 4, pp. 4-12.

Reisby, K., Knudsen, S. V. & Sørensen, H. 1999, *Kønsblik – på forskerrekuttering i universitetsuddannelser*, Danmarks Lærerhøjskole (Denmarks School of Teaching), Copenhagen. P167.

Reuss, M., Madsen, K. K. 2000, *Women and Science: Review of the situation in Denmark*, Helsinki Group on women and science, European Union.

Rienecker, L. 1996, 'Kvindelige studerende er et barometer for forholdet mellem studie og sprog', *Kvinder, køn & forskning*, vol. 2, pp. 98-100.

Rittenhofer, I. 2000, 'Mainstreaming som differentieret ligefordelingspolitik', *Kvinder, køn & forskning*, vol. 2, pp. 62-69.

Rittenhofer, I. 2001, *Om kønsmagnetisme. Dansk forskningspolitik 1970-1990 i et kulturanalytisk perspektiv*, Centre for European Cultural Studies with Department of Gender Research, University of Aarhus, Aarhus, vol. 4.

Rogg, E. 1997, 'Kvinner i Akademia: en trussel mot vitenskapens autonomi og selvforståelse?', *Kvinneforskning*, vol. 21, no. 3-4, pp. 31-37.

Rogg, E. 1998, 'Forskningspolitikk - bare for eksperter? En ufullstendig rapport fra en møtetrekk om forskningspolitikk på Senter for kvinneforskning i Oslo', *Kvinneforskning*, vol. 22, no. 1, pp. 62-67.

Rogg, E. 2001, 'Passion and pain in academia', *NORA - Nordic Journal of Feminist and Gender Research*, vol. 9, no. 3, pp. 154-161.

Rogg, E. 2003, *Lyst, lidelse og legitimitet. Om kjønnsmakt og likestilling i Akademia, Makt- og demokratiutredning 1998-2003* and Unipub forlag, Oslo.

- Rogg, E. 2004, 'Kvinnelig professor - «den andre» i akademia? Det akademiske feltet møter likestillingen', *Sosiologisk tidsskrift*, vol. 12, no. 3, pp. 235-254.
- Rolin, K. 2000, 'Tasa-arvo, tiede ja epistemologia', *Naistutkimus*, vol. 1/2000, pp. 33-40.
- Ronkainen, S. 1999, *Ajan ja paikan merkitsemät. Subjektiviteetti, tieto ja toimijuus*, Gaudeamus, Helsinki.
- Rosenbeck, B. 2003a, 'Dansk kønsforskning: status, strategi og perspektiv', *Kvinder, køn & forskning*, vol. 2, pp. 49-50.
- Rosenbeck, B. 2003b, 'De sidste mandsbastioner', *Kvinder, køn & forskning*, vol. 3, pp. 69-72.
- Ruest-Archambault, E. (ed.), von Tunzelmann, N., Iammarino, S., Jagger, N., Miller, L., Kutlaca, D., Semencenko, D., Popvic-Pantic, S. & Mosurovic, M. 2008, *Benchmarking policy measures for gender equality in science*, Office for Official Publications of the European Communities, Luxembourg.
- Ruoho, I. 1990, "Naisnäkökulman" ongelmia. Yhdysvaltalaisista standpoint-teorioista ja postmodernista feminismistä, Centre for Women's Studies and Gender Relations. Publ. 2/1990 ser N. University of Tampere, Tampere.
- Rustad, L. M. 1999, 'Kunnskapspolitiske utfordringer i likhets- og forskjellsdebatten' in *Kritisk kunnskapspraksis. Bidrag til feministisk vitenskapsteori*, eds. A. T. Lotherington. & T. Markussen, Spartacus Forlag, Oslo, pp. 85-100.
- Rømer Christensen, H. 2000, 'Mainstreaming af kønsforskning - et debatoplæg', *Kvinder, køn & forskning*, vol. 2, pp. 27-34.
- Rönblom, M. & Eduards, M. 2008, *Genusperspektiv på statsvetenskap*, Swedish National Agency for Higher Education, Kalmar.
- Saarinen, A. 1992, *Feminist Research - an Intellectual Adventure?*, Centre for Women's Studies and Gender Relations vol. 4/1992. Research Institute for Social Sciences ser N, University of Tampere, Tampere.
- Saarinen, J. 2003, *Naistutkijat tiedemaailmassa. Kertomuksia tutkimusprosesseista*, Acta Universitatis Lapponiensis 57. Lapin yliopisto, Rovaniemi.
- Salinas, I. 1997, 'Ligebehandling er forskelsbehandling', *Magisterbladet*, vol. 8, pp. 26-27.
- Salminen-Karlsson, M. 1999, *Bringing women into computer engineering: curriculum reform processes at two institutes of technology*, Linköping university, Linköping.
- Salminen-Karlsson, M. 2003, 'Hur skapas den nya teknikens skapare? Ingenjörutbildningens mansdominans och de kvinnliga teknologernas villkor' in *Vem tillhör tekniken? Kunskap och kön i teknikens värld*, Arkiv förlag, Kungälv, pp. 145-173.
- Salminen-Karlsson, M. 2007, *Naiset insinööriopiskelijoina -mitä opetuksessa tulisi huomioida*, Tinataan-project. Downloaded on 17/06/2009, available at: [http://tina.tkk.fi/tietopankki/naiset\\_iopiskelijoina.pdf](http://tina.tkk.fi/tietopankki/naiset_iopiskelijoina.pdf)
- Salonen, M. 2000, 'Sukupuolittutkimuksen moneus', *Psykologia*, vol. 2/2000, pp. 151-162.
- Sangolt, L. (ed.) 2005, *Minervas døtre - organisering av kvinnelige akademikere 1882-2005*, Sigma Forlag, Bergen.

- Sassi, E. & Simpanen, P. 2006, Naisten osuus teknillistieteellisen alan ylemmässä koulutuksessa kasvanut vuosina 1995–2005, Tinataan-project. Downloaded on 17/06/2009, available at: <http://tina.tkk.fi/tietopankki/Naisten%20osuus%20teknillistieteellisen%20alan.pdf>
- Schei, B., Botten, G. & Sundby, J. (eds.) 1993, *Kvinnemedisin*, Ad Notam Gyldendal, Oslo.
- Schiøtz, A. 1993, "'Hvor vi har ventet paa hende!'" in *Kvinnemedisin*, eds. B. Schei, G. Botten, & J. Sundby, Ad Notam Gyldendal, Oslo, pp. 9-26.
- Schlichting, E., Nielsen, H. B., Fosså, S. D. & Aasland, O. G. 2007, 'Kvinneres karriereutvikling i klinisk akademisk medisin', *Tidsskrift for Den norske lægeforening*, vol. 127, no. 16, pp. 2109-2112.
- Sendrup, L. & Frimodt-Møller, I. 2001, *Kønsadskilt undervisning, gruppearbejde og lærersamarbejde - en anden pædagogisk historie*. Paritas Grafik.
- She Figures 2006, *Women and Science, Statistics and Indicators*, European Commission Directorate-General for Research, Science and Society. European Commission, Brussels.
- Silvennoinen, H. 1992, 'Akateeminen koulutushierarkia, sukupuoli ja sosiaalinen tausta', *Sosiologia*, vol. 4/1992, pp. 294-309.
- Simonen, L. 1989, 'Feministinen diskurssi sosiaalitutkimuksessa', *Sosiaalipolitiikka*, vol. 1989, pp. 49-64.
- Sinnes, A. 2006, 'Three Approaches to Gender Equity in Science Education', *NorDiNa*, vol. 2, no. 3, pp. 72-83.
- Sjørup, K. 2001, 'Magt og mainstreaming i forskningsverdenen' in *Midt i Strømmen*, ed. H. Skjerbæk, Jurist- og Økonomiforbundets Forlag, Copenhagen, pp. 125-134.
- Sjørup, K. & Schmitz, C. (eds.) 2005, *Eksempler på Good Practice i uddannelse - højdepunkter og faldgruber*, Impressum, Roskilde, Denmark & Bonn, Germany.
- Smirthwaite, G. 2005, *Genusperspektiv och genusvetenskap*, Swedish Secretariat for Gender Research, Karlstad.
- Smirthwaite, G. 2007, *(O)jämsliddhet i hälsa och vård — En genusmedicinsk kunskapsöversikt*, Sveriges Kommuner och Landsting, Ingen uppgift.
- Soilevuo-Grønnerød, J. 2005, *Miesten kesken, naisen silmin*. Tutkijanaisen naistutkimuksia miesten välisistä suhteista, Joensuun yliopiston yhteiskuntatieteellisiä julkaisuja No 77, Joensuun yliopisto, Joensuu.
- Sollamo, R. 1988, 'Feministiteologian tieteellinen paradigma' in *Naistutkimuksen ajankohtaisia ongelmia*, *Yhteiskuntatieteiden tutkimuslaitos sarja C 30/1988*, Tampereen yliopisto, Tampere, pp. 7-25.
- Søndergaard, D. M. 1992, 'Når betydningen af køn forhandles i en akademisk kvalificeringskontekst', *Senter for Kvinneforskning (University of Trondheim)*, vol. 3 *Utdanningskultur og Kjønn*, pp. 117-143.
- Søndergaard, D. M. 2000, *Tegnet på kroppen - Køn: koder og konstruktioner blandt unge voksne i akademia*, Museum Tusulanums Forlag, University of Copenhagen, Copenhagen.

Søndergaard, D. M. 2001, 'Consensual and disensual university cultures: gender and power in academia', *NORA - Nordic Journal of Feminist and Gender Research*, vol. 9, no. 3, pp. 143-153.

Søndergaard, D. M. 2002, 'Subjektivering og desire – begreber på empirisk arbejde i academia' in *Psyke & Logos: Subjektivitet i det 21. Århundrede*, eds. B. Karpatschhof et al, Psykologisk Forlag, Copenhagen, pp. 38-64.

Søndergaard, D. M. 2003, 'Orientering og desorientering i Akademia' in *Akademisk tilblivelse – Akademia og dens kønnede befolkning*, eds. L. Højgaard og D. M. Søndergaard, Akademisk Forlag, Copenhagen, pp. 61-99.

Songe-Møller, V. 1997, 'Filosofers kjønnsblindhet - en utfordring for feminister', *Kvinneforskning*, vol. 21, no. 3-4, pp. 88-92.

Sørensen, H. 1995, 'Natur/teknik - for pigernes skyld?' in *Natur/teknik didaktik*, ed. P. Støvring, Gad & Grafisk, Copenhagen, pp. 45-53.

Sørensen, K. H. 1991, 'Mot en omsorgspreget teknologi? Om likestillingspolitikens muligheter og begrensninger på et mansdominert område' in *Nye kvinner, nye menn*, ed. R. Haukaa, Ad Notam, Oslo, pp. 207-227.

Søyland, A. 1998, 'Å koke kaffe på én - eller en annen - spiker. Refleksjoner om likestilling, kvinneperspektiver og kvinneforskning', *Kvinneforskning*, vol. 22, no. 3-4, pp. 72-79.

Stabel, I. 1994, 'Kjønnskvotering - til beste for hvem?', *Nytt om kvinneforskning*, vol. 18, no. 3, pp. 34-40.

Staberg, E. 1992, *Olika världar, skilda värderingar. Hur flickor och pojkar möter högstadiets fysi, kemi och teknik*, University of Umeå, Umeå.

Ståhle, B. 1993, *Forskningspersonale og forskerrekruttering på de højere uddannelsesinstitutioner i Danmark*, Forskningspolitisk Råd, Copenhagen.

Ståhle, B. 1998, *Kvinder og mænd i dansk universitetsforskning i 1990'erne*, Undervisningsministeriet (Ministry of Education), Copenhagen.

Ståhle, B. 2003, *Forskere søges – ansøgere mangler. Forskerpersonale og forskerrekruttering på danske universiteter 1998-2000*, UNI-C, Copenhagen.

Steinsholt, I. M., Rygh, E. & Thesen, J. 1990, 'Kvinner i legeyrket. Utviklingstendenser i spesialisering og karrieremønster', *Tidsskrift for Den norske lægeforening*, vol. 110, no. 25, pp. 3255-3259.

Stolte-Heiskanen, V. 1988, *Women's participation in positions of responsibility in careers of science and technology: obstacles and opportunities*, Tampereen yliopiston sosiologian ja sosiaalipsykologian laitoksen työraportteja, sarja B 26/1988. Tampereen yliopisto, Tampere.

Sulkunen, I. 1988, 'Naishistorian kysymyksenasetteluja ja tutkimusteemoja' in *Naistutkimuksen ajankohtaisia ongelmia*, ed. L. Simonen, Yhteiskuntatieteiden tutkimuslaitos, Sarja C 30/1988. Tampereen yliopisto, Tampere, pp. 27-38.

Sundin, E. & Berner, B. (eds.) 1996, *Från symaskin till cyborg. Genus, teknik och social förändring*, Nerenius & Santéus Förlag, Falun.

Suomen Akatemian työryhmä 1997, Naisten tutkijanuran edistäminen. Suomen Akatemian asettaman työryhmän muistio, Suomen Akatemian julkaisuja 13/97. Edita, Helsinki.

Suominen-Kokkonen, R. 1992, The Fringe of a Profession. Women as Architects in Finland from the 1890s to the 1950s, Suomen Muinaismuistoyhdistyksen aikakauskirja 98, Helsinki.

Tænk tank om flere kvinder i forskning 2005, Alle talenter i spil - flere kvinder i forskning, Videnskabsministeriet (MInistry of Science), Bredgade 43, 1260 Copenhagen K., Copenhagen.

Takala, H. 1998, Tasa-arvonäkökulma julkishallinnon tutkimuksessa, Tasa-arvoasiain neuvottelukunta. Sosiaali- ja terveysministeriö. Naistutkimusraportteja 1/1998, Helsinki.

Taksdal, A. & Widerberg, K. (eds.) 1992, Forståelser av kjønn i samfunnsvitenskapenes fag og kvinneforskning, Ad Notam Gyldendal AS, Oslo.

Tasa-arvoasiain neuvottelukunta 2006, Feministinen aikamatka - tasa-arvoasiain neuvottelukunnan tutkimusjaosto 1981-2006, TANE julkaisu nro 6, Tasa-arvoasian neuvottelukunta, Sosiaali- ja terveysministeriö, Helsinki.

Teigen, M. & Tvede, O. 1993, Framtid i forskningen? En undersøkelse av kvinnelige og mannlige forskerrekruarters situasjon og karriereveier, NAVFs utredningsinstitutt, Oslo.

Teigen, M. 2000, 'Likestilling som legitimeringsstrategi: Rekrutteringsnormer og likestillingspolitikk ved NTNU', Sosiologisk tidsskrift, vol. 8, no. 2, pp. 125-147.

Telhauga, A. O., Mediås, O. A. and Aasenc, P. 2006, The Nordic Model in Education: Education as part of the political system in the last 50 years, Scandinavian Journal of Educational Research, vol. 50, no. 3, pp. 245–283.

Tiihonen, A. 1999, 'Oikeita miehiä – ja urheilijoita? Urheilun miestutkimusta ' in Mies ja muutos. Kriittisen miestutkimuksen teemoja, ed. A. Jokinen, Tampere University Press, Tampere, pp. 89-120.

The Norwegian Research Council, Division for strategic priorities 2002, Kvinner i forskning - fra kvotering til integrering, The Norwegian Research Council, Division for strategic priorities, Oslo.

Thomsen, B. M. 2002, 'Om kvinders snørklede karriereveje - omveje eller forandringer?', Vandfanget, vol. 3 Mænd og kvinder, pp. 6-8.

Thurén, B. 2003, Genusforskning - Frågor, villkor och utmaningar, Ord&Form AB, Uppsala.

Tolstrup Holmegaard, H. 2007, 'Interesserer rigtige piger sig for teknik og naturvidenskab?', Ungdomsforskning, vol. 3, pp. 31-36.

Þórðardóttir, Þ. 2005, 'Konur og kennsla' in Kynjamyndir í skólastarfi, Rannsóknarstofnun Kennaraháskóla Íslands, Reykjavík, pp. 67-83.

Þórisdóttir, Þ. 2002, 'Kvennabylting í háskólum. Stórt spurt- stutt svör', Vera, vol. 21, no. 6, pp. 46-51.

Þorvaldsdóttir, M. 2001, Konur í hefðbundnum karlagreinum.

Þorvaldsdóttir, Þ. 2002, Kynlegar víddir í dómnefndarálitum” Er kynbundinn munur á umfjöllun um karl- og kvensumsækjendur í dómnefndarálitum Háskóla Íslands?. Downloaded on 09/09/2008, available at:

<http://www.lme.is/Apps/WebObjects/Hl.woa/swdocument/1004574/Kynlegar+v%C3%ADddir+%C3%AD+d%C3%B3mnefndar%C3%A1litum.pdf>.

Törnqvist, M. 2006, Könspolitik på gränsen: debatterna om varannan damernas och Thamprofessorerna, Arkiv, Lund.

Töttö, P. 2000, 'Naiset, miehet ja matematiikka', Naistutkimus, vol. 4/2000, pp. 33-45.

Toubro Hansen, J. 2003, Gender-forskning I dansk arkæologi – hvor er den teoretiske diskussion?, Institut for Arkæologi og Etnologi, University of Copenhagen , Copenhagen.

Trojer, L. & Swedish Research Council 2000, Genusforskningens relevans. Slutrapport från integreringsarbete i åtta svenska forskningsråd, The Swedish Research Council, Stockholm.

Tvede, O. 1990, Nærlys på forskerrekutteringen. Opplæring, aktiviteter og forskningsforhold, NAVFs utredningsinstitut, Oslo.

Universitetet i Oslo Likestillingsutvalget 1984, Kvinner på Universitetet 100 år, University of Oslo, Oslo.

Vedelsby, M. 1991, Myter og realiteter - Kvinder i naturvidenskabelige og teknologiske uddannelser, Forskningepolitisk Råd, Copenhagen.

Vänje, A. 2003, 'Teknik och emancipation. Doing gender som interaktivt förändringsarbete', Kvinnovetenskaplig tidskrift, vol. 1, no. 82, pp. 92.

Vänje, A. 2005, Knäcka koderna: praxis kring kön, industriell organisation och ledarskap, Luleå tekniska Universitet, Luleå.

Vänskä, A. 2006, Vikuroivia vilkaisuja. Ruumis, sukupuoli, seksuaalisuus ja visuaalisen kulttuurin tutkimus, Taidehistorian seura. Taidehistoriallisia tutkimuksia nro 35, Helsinki.

Vehviläinen, M. 1996, 'Maailmoista ilman naisia. Tietotekniikan sukupuolieroihin.' in Työelämän sukupuolistavat käytännöt, Vastapaino, Jyväskylä, pp. 143-170.

Vehviläinen, M. 1997, Gender, Expertise and Information Technology, Department of Computer Science A-1997-1, University of Tampere, Tampere.

Verne, G. 1988, 'Hokus Pokus - fra kritikk til alternativ? Andre synspunkter på informatikkfaget', Nytt om kvinneforskning, vol. 12, no. 5, pp. 22-26.

Vetenskapsrådet 2004, Medicinsk grundforskning - teori och begreppsutveckling, Vetenskapsrådet, Uppsala.

Vetenskapsrådet 2005, Genusvetenskapliga projektansökningar inom humaniora-samhällsvetenskap - en uppföljning av Vetenskapsrådets beredning och utfall år 2004, Vetenskapsrådet, Stockholm.

Vetenskapsrådet 2006, Reaching for science. Excellence in gender research, Vetenskapsrådet, The Swedish Research Council, Bromma, Vetenskapsrådets rapportserie 6:2006, vol. 6.

Vetenskapsrådet (ed.), Wernersson, I. 2007, Från förskola till högskola – Vilka avtryck ger forskning om jämställdhet?, Vetenskapsrådet, Stockholm.

Vetenskapsrådet 2007, Genus i forskningsansökningar inom utbildningsvetenskap - en uppföljning av vetenskapsrådets beredning och utfall år 2004, Vetenskapsrådet, Bromma.

Videnskabsministeriet 1997, Kvinder - kvalitet – forskning. Downloaded on 30/10/2008, available at: <http://videnskabsministeriet.dk/site/forside/publikationer/1997/kvinder-kvalitet-forskning/html/index.htm> .

Vilmundardóttir, E. G. 1980, 'Konur og raunvísindi' in Konur skrifa, Sögufélagið, Reykjavík, pp. 37-43.

Voldgaard, V. A. 2005, 'Ensomt forskerliv skræmmer kvinderne væk', Magisterbladet, vol. 15, pp. 14-17.

Waagene, E., Gunnes, H. & Hovdhaugen, E. 2007, Kvinners og menns tidsbruk i akademien, NIFU STEP, Downloaded on 28/11/2008, Available at: [http://www.nifustep.no/norsk/publikasjoner/kvinner\\_og\\_menns\\_tidsbruk\\_i\\_akademien](http://www.nifustep.no/norsk/publikasjoner/kvinner_og_menns_tidsbruk_i_akademien)

Wager, M. 1994, Constructions of Femininity in Academic Women. Continuity between Private and Professional Identity, Suomalainen Tiedekatemia Toimituksia Sarja B Nide 275. Suomalainen Tiedekatemia, Helsinki.

Wendel, L. 2001, Om androcentrisk socialisering vid tentamen första terminen på jur kand-programmet, Lund Universitet, Centrum för genusvetenskap, Lund, Genusperspektiv i undervisning och lärande, pp. 49-59.

Wennerås, C. & Wold, A. 1997, 'Nepotism and sexism in peer-review', Nature, vol. 387, pp. 341-343.

Widerberg, K. 2003, 'Norsk kønssociologi - från problemorienterad empirism till poststrukturalistisk empirism? Några betraktelser från en "outsider within"', Sosiologisk tidskrift, vol. 11, no. 1, pp. 45-53.

Winter-Mäkinen, A. 1995, Naisjuristien 1. vuosisata. Poimintoja naisjuristien historiasta, Lakimiesliiton kustannus, Helsinki.

Wissing, L. 1998, '40 nye professorater forbeholdt kvinder', Magisterbladet, vol. 22, pp. 3-5.

Wistedt, I. 2001, Five Gender-Inclusive Projects Revisited - A Follow-up Study of the Swedish Government's Initiative to Recruit More Women to Higher Education in Mathematics, Science, and Technology, National Agency for Higher Education, Kalmar.

WomenIT 2005, Koulutus, sukupuolisosialisaatio ja teknologia – näkökulmia segregatioon, Oulun yliopisto, Kajaanin yliopistokeskus, Raahe.

Ylöstalo, H. 2006, 'Naisia, miehiä vai ihmisiä? Sukupuolten tasa-arvo työpaikkojen tasa-arvotyössä ja feministisessä tutkimuksessa', Naistutkimus, vol. 3/2006, pp. 17-28.

Zeuner, L. & Linde, P. C. 1997, Livsstrategier og uddannelsesvalg, Socialforskningsinstituttet, Copenhagen.

## 5. Annex

This annex provides further details about the research questions and methodological approaches of the main publications for each topic.

### 5.1 Horizontal and vertical segregation

In *Denmark*, the experiences of women studying economics and gender equality practices within economics were first studied (Bonde 1991). The idea was to analyse the barriers women face in this male-dominated discipline. This study was followed up by two other studies that demonstrated how the unequal gender distribution in academia started at senior post doctorate level and how the recruitment of Ph.D. students at the Faculty of Natural Sciences was gender related (Løgstrup 1994 and Ipsen 1995). Later, Rienecker (1996) explored the reasons why the natural sciences in particular failed to attract women.

Henningsen (1998) focused on women in academic medicine in order to get a fuller understanding of the processes underlying the division of opportunities and resources between men and women. Female staff members were investigated at preclinical departments at the University of Copenhagen in 1970 and 1996. Egeland (2000 and 2001) argued theoretically that the gender barrier problem is not merely a question of solving the issue, but also a question of constructing and representing the problem. Hence, the question of gender inequality is safely located outside academic culture and this is a challenge for the construction of research questions.

The Danish reality of the leaky pipeline was studied by Henningsen and Højgaard (2002) and comparative statistics were used to identify the features of the educational and scientific system. In addition, cultural mechanisms were a focus of interest. The disciplines studied were physics, chemistry and medicine. Nexø Jensen (2003a) studied the career tracks of Danish Ph.D. students and their employment possibilities, especially in relation to the selection process of academia. Ståhle's (2003) report examined the employment of scientific researchers in the period 1998-2000 and the development of the research staff at Danish universities until 2000. The report focuses on the competition for research positions and on the gender proportions in the recruitment of scientific researchers. Langberg and Vestergaard's (2006) study focuses on scientific research staffs in both the private and public sectors in Denmark from 1995 to 2004. Special focus was placed on the university staff and Ph.D. students, and an analysis of staff entering and leaving academia (thus point up the leaky pipeline) in Denmark in the period 2000-2005 was also provided.

Sørensen (1991) examined why there are relatively few female inventors and even fewer women in technological and natural scientific research and development work. Later, Teigen and Tvede (1993) studied which factors can promote or hinder research recruits' situation and careers. The research recruits' gender, motivation for research, supervision, organization, or research and family situation were important aspects to study.

Gjerberg's (2002) thesis study was on gender differentiation in doctors' choice of specialization in medicine. The focus was on changes in women doctors' pattern of specialization during the last decades and the process of completing specialization. Brandt et al. (2002; also Hovdhaugen et al. 2004, Sangolt 2005, Gunnes and Hovdhaugen 2008) gave a picture of overall gender segregation in the Norwegian research sector. The basic question was why fewer women than men were recruited into research, and why women researchers showed slower career progress than their male colleagues. In addition, the report evaluated the role of equality advisers and the measures they implemented in the universities.

In *Sweden*, Einarsdóttir (1997) analysed in her thesis the role division between women and men with regard to scientific and clinical activities in medicine. In addition, Fridner (2004) studied why women physicians were underrepresented in senior academic positions at medical faculties in Sweden. A particular focus of attention was on gender equality in the postdoctoral careers of physicians. Vånje's (2005) thesis identifies processes and praxis in the organization that create both opportunities and obstacles for women who have made an untraditional choice of career as engineers and managers. The thesis helps to elucidate the complexity of gender-creating structures, processes and practices in an industrial organization.

In *Iceland*, the report of Menntamálaráðuneytið<sup>30</sup> (2002) identified the status of women in science in that country. The purpose of the report was to provide policy makers and other stakeholders with information on the state-of-the-art of women in science. The report gives a comprehensive overview of the status of women and men in science in Iceland and focuses mainly on the period 1990-2001. Fanngeirsdóttir's (2003) report introduces a study undertaken in 2003 at Reykjavík University to explore the reasons why so few women enrol in the Department of Computer Science. The aim was also to find new ways of appealing to female students. Árnadóttir's (2004) article discusses networks of career advancement in relation to the engineering profession and the status of female engineers in Iceland. Engineers in Iceland are usually involved on large scale in R&D in their specific field (high-tech hydropower construction). A report of Jafnréttisnefnd Háskóla (2004) is about the status and trends in equal opportunities at the University of Iceland. The University has followed the trend at universities elsewhere and in the work on equal opportunities in general.

The first *Finnish* study (Ihalainen 1987) investigated women's role as foresters and their progress in professional life in silviculture, a very important economic sector in Finland. The profession of forester profession has been persistently male-dominated, with male values and traditions. Stolte-Heiskanen (1988) was a pioneer in studies of women's careers in science and technology. This review of the problems of women's careers in science 1) focused on the reasons why the position of women in science was an important issue; 2) reviewed the state of the art of research in this field and 3) indicated the major problems and gaps. Rantalaiho (1989) discussed problems related to the professional identity of female researchers within the academic community. It was based on certain themes of the study "Women of Academe" and on the collective experiences of the Feminist Research Network of the Academy of Finland.

Rahkonen and Alha (2004) analysed gender differences in students' study paths in engineering study programmes. The study examined the development of the male/female ratio in the Faculty of Technology at the University of Oulu, especially during the last decade. Furthermore, the book includes the statistical and graphical analysis of the structures within the curricula. Paloheimo and Stenman (2006) examine gender, communication and comfort in relation in higher-level computer science education. Jiehua (2009) concentrates in her thesis on women's managerial careers in the IT industry in Finland and China. The aim of this research was to present a cross-cultural comparison of women's career experiences and how women themselves understand and account for their careers. The study explores how the macro- and the micro-levels of cultural and social processes are manifested in the lives of individual women.

## 5.2 Pay and funding

In *Denmark*, Henningsen et al. (1999) examined the relation between gender and grant procedures in the Governmental Research Council for Social Sciences between December 1997 and May 1998. The Danish Governmental Research Council for Social Sciences had carried out an examination of its own grant procedures and assessed whether there were any systematic differences in grants awarded to men and women (i.e. to see if differences in the evaluation of grant applications were related to gender).

In *Sweden*, Gönäs et al. (2005) studied differences in salaries between women and men. The purpose was to study the causes of the partial differences in salaries registered at the annual audits of salaries at the University of Karlstad in the years 2000 and 2003. What processes contribute to the creation and recreation of partial differences in salaries between men and women? Vetenskapsrådet (the Research Council) (2005) analysed scientific research applications in humanities and social science from the gender perspective. This is a follow-up of the work in the area of humanities and social science and accounts for how gender aspects are handled in research applications. The following questions were asked: What definitions are used? How do the researchers use and interpret aspects of gender in their application? What criteria result in approval and why are applications rejected? Jacobsson et al. (2005) analysed the research funding of the Swedish Research Council in order to find out to what extent the goal of gender equality had been reached during the period of 2003–2005. The report of Glynn et al. (2006) showed the results of the study of all research applications received by the Swedish Research Council in the period 2003–2005, about 17 000 in all.

Vetenskapsrådet (2007) presented the Swedish Research Council's Gender Committee's evaluation of gender research applications. One of the aims of this follow-up report was to assess the effect of this change on gender research. Focusing on the issue of gender, the Committee looked at: 1) how the term "gender"

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<sup>30</sup> The Ministry of Education

has been used and interpreted by applicants and members of the evaluation panel; 2) the extent to which both applicants and members of the evaluation panel were qualified in gender studies and 3) the success rate of applications with a gender angle.

In *Iceland*, Einarisdóttir (2004) studied the research funding system and the incentive system used at the University of Iceland. The author presents data obtained from the Icelandic Research Fund (Rannís). Another study presented the results of an enquiry made by the Equal Rights Committee of the University of Iceland in 2007. The focus was on grants given by the University's Research Fund for the Departments of Social Science, Humanities, Health Science and Engineering and Natural Science (Jafnréttisnefnd Háskóla Íslands 2007).

### 5.3 Stereotypes and identities

#### *Denmark*

In Denmark, Rasmussen and Wittrup (1988) studied two fifth-grade classes divided into boys' and girls' classes. The purpose was to work towards equal opportunities for girls and boys. The researchers wanted to create awareness among the pupils of their strengths and weaknesses as gendered individuals through working with equality as a topic. They learned how to respond to the challenges of mixed classes. Kolmos (1989) carried out a theoretical and empirical investigation of women's approach to engineering. The main questions were how women understood their own position as women in this male-dominated discipline and whether women brought a different approach to the contents and pedagogical structure of engineering studies. Vedelsby (1991) continued questioning women's role in natural science and technology studies. In several subjects, such as physics and mathematics, the proportion of women decreased in both relative and absolute terms. Exploring one of the subtopics of technical sciences, Elkjær (1991) asked whether or not the question of girls and information technology was indeed a problem. It could be problematic that gender stereotypical theories might drive research to legitimize, rather than challenge, gender stereotypes.

Frimodt-Møller's and Ingerslev's (1993) study deals with grammar school girls' home lives, school lives, spare time activities, (for instance, sports) and the girls' own opinions of their strong and weak points. Sørensen (1995) studied education as well, specifically the introduction of the subject in primary school in order to give girls a better basis for learning physics and chemistry later on. Boys have experiences with technical things-- mechanical and electrical toys and practical crafts. The aim of this experience was to give girls these skills as well. Kruse (1996) continued Wittrup's experimentation of distinct girls' pedagogy and boys' pedagogy. She presented her own and other education researchers' experiences with gender-segregated education, which she appreciated and supported. Hoffmeyer (1996) continued the debate on the failure of natural sciences failure to attract female students.

Højgaard (1995) opened the discussion on men's studies. This article explored the relationship between working life and the social construction of fatherhood. The author's understanding of the concept of fatherhood is related to the social construction of gender.

Hasse (1998a and 1998b) conducted fieldwork at the Niels Bohr Institute in Copenhagen. The object of the fieldwork was to examine gendered behaviour and conceptions among physics students. The social codes of the institute were embodied in the way the agents used the social space and positioned themselves as students (later, same topic in Lund 2005). Gomard (2000) studied male and female Ph.D. students in chemistry. The main part of the paper is an analysis of the discussions of two research groups in chemistry at a university in Denmark. Later, Gomard (2002) analysed a Ph.D. educational programme for humanist researchers. She asked how male and female doctoral students presented themselves as researchers and with respect to their gender.

Hasse (2003) was interested in the importance of body language in educational cultures. The author asked how the interpretation of body language (male/female) is incorporated into an educational culture. She hypothesized that students not only learn the contents of their education but also a specific cultural logic that connects body language to moral evaluations.

Balling Rasmussen (2005) studies the differences between girls and boys in the PISA study. The author presents the central differences in the results of girls' and boys' performance in the second round of OECD's PISA investigation (Programme for International Student Assessment) – PISA 2003. Denmark's

Evalueringinstitut (2005) continued the evaluation of boys' and girls' performance in education. The report presents the results of a Danish national examination of the significance of gender in pupils' performance in the educational system.

School education was Møller Jensen's (2005) subject. She asked whether it was true that the school is not able to aid in the educational development of both boys and girls with different approaches for each sex. She draws attention to features in the school system, such as classroom culture and the teaching of literature, which may have increased the gender divide in the educational system.

Jespersen's (2006) thesis analyses young people's choice of technical and natural scientific subjects and studies. The main question is whether or not young people study technical and natural scientific subjects in general, including why so many of them drop out of their studies. Tolstrup Holmegaard (2007) was also interested in technology and natural science and especially in whether girls were interested in technology and natural science. The article focuses on the construction of gender at technical high schools.

Bloch's (2007) study is about emotions and emotional culture in academia. It asks how ones handle one's feelings in connection with perceptions of femininity and masculinity. There are gendered norms of emotions and different expressions of emotion that are perceived differently depending upon whether the actor is male or female.

## Denmark

### Life Strategies and Educational Choices

The Institute of Social Research has made an investigation into the life strategies and educational choices of pupils in Mathematical High School and Technical High School in relation to their socio-economic level and gender. Its conclusions concerning gender are: 1. Boys are more interested in in-depth knowledge both during their studies and their work life. 2. Boys are more interested in taking advantage of the possibilities created by globalisation. They are more willing to invest in studying abroad, and to be a part of the global labour market. 3. Girls in particular find it important that their work benefits others. For girls the consideration of others is important, while boys focus more on their personal future. 4. Few girls are interested in Technology; instead they seek the general natural scientific orientation. 5. Boys purely seek natural scientific subjects sometimes combined with Social Science, while girls choose a combination of natural scientific subjects and humanist subjects. 6. Boys want to work with development and trade; while girls want to work with teaching and health care. In conclusion the report states that there are marked gender differences in young people's choices. Boys ascribe to the exact ideal of knowledge (that things can be measured objectively); while girls ascribe to the personality-developing ideal of knowledge (knowledge is situational and relational). Boys develop the conquering strategy (conquering the world) while girls develop the saviour strategy (saving the world). Boys seek the technical and natural scientific subjects, while girls seek the humanities and health science. Boys seek development and production, girls seek education and health care. Thus there are two gender cultures.

Zeuner, L. & Linde, P. C. 1997, *Livsstrategier og uddannelsesvalg*, Socialforskningsinstituttet, Copenhagen.

## Norway

In Norway, Haavind (1986; same topic in Holter 1989) presented a critique of patriarchal social science based on the philosophy of science. The writer discusses how women's research in the social sciences can represent an understanding that is different from the established research tradition.

In the field of higher education, Berg and Aamodt (1987) were interested in female and male students' use of time and how much time they spent on studying. Later, Imsen (1995) studied gender equality in education. Education has received various degrees of attention from women researchers over the last 25 years. In the 1970s, it was obvious that education was a necessary condition for equality, and much interest was directed towards the structural framework of the school and gender differentiation and discrimination.

ICT was the topic of Håpnes' (1996) article, which presents a study of young men who saw themselves as real hackers or semi-hackers, all of them students at the Norwegian Institute of Technology at the master's level. Within a larger academic culture that mainly educated engineers, they had chosen to spend a

substantial portion of their daily life in a subculture they called the Software Workshop (SWW). The aim of the study was to explore how hackers might increase our knowledge of how consumers of computer technology proceed to develop their patterns of use, with a focus on their machine activities and way of working.

In the field of women's studies, Rogg (1998) asked whether research policy is only for experts. In the autumn of 1997, the Centre for Women's Research in Oslo organized a series of meetings in which the topic was research policies. The aim was to invite women researchers to share experiences and discuss their interest and engagement in research politics in the past and present as well as challenges of the future. Lotherington and Markussen (1999) examined the oppressive practices of science and considered whether good practices of knowledge production could counteract them. The fourteen authors of this book discussed the possibilities of scientific practice within a feminist theory of science: What is knowledge? What is gender? How do gender and other kinds of differences manifest themselves in the production of knowledge?

In her doctoral thesis, Annfelt (1999) studied gender in education and hegemonic positions and negotiations around professional identity in medicine and teacher education, raising questions about gender neutrality. Two previously single-gendered educational arenas with opposite gendered signs were chosen as the primary fields of study. Annfelt explored how gendered values, interest and ways of understanding were woven into these fields of single-gender traditions. She further questions the idea of the genders as equal and/or different in relation to these contexts of education.

From the epistemological point of view, Rustad (1999) asked how equal women are. Are women so equal that they can be the bases for a common politics and common knowledge? On the other hand, are women so different that they lack a foundation for political action and production of knowledge? These questions, part of the equality vs. difference debate, have been important in women's and gender studies both nationally and internationally over the last ten to fifteen years.

Holst (2001a) discussed the development of Norwegian women and gender sociology after 1970, with an analytical perspective focusing on generations: What characterized the different generations of researchers' ways of doing research? What theoretical, methodological and political presuppositions were important in the different generations of researchers? And how have these changed since the 1970s? Holst also analysed the various generations of researchers' constructions of gender identities with a focus on academic-political frames of reference. Holst discussed the researchers' constructions of femininity, of intellectuality and of practical-political identities. Aasebø (2002) continued with questions about present gender research. The article starts from the perspective post-structuralist criticism and discusses whether gender is a suitable category for research. In particular, the writer was interested in whether gender was a useful analytical category or whether there other and better ways of talking about gender. Egeland (2003) continued to explore the criteria that feminist research is based upon. Does feminist research hold a special position in relation to other research and does it represent a contribution to a political project? Egeland explored negotiations of meaning that defined limits to how feminism can be described in a meaningful way.

In the field of ICT, Nordli (2003), in her doctoral thesis, searched for the female hacker. People tend to question whether female hackers exist, Nordli claims, and even the Norwegian Research Council who provided the grant for her doctoral work doubted that she would find any. Corneliusen's (2003a) thesis explored how male and female computer students thought gender was relevant in relation to computing, and how they built their own relationships with computers and computing.

Lorentzen (2004) asked how men's studies was related to feminism and equality. He argues in his article, that feminism and equality politics need to become more open to the perspectives of men's studies. New questions have arisen, as feminism and equality politics, previously just for and about women, now included men.

Lilleaas (2004) continued the examination of gender studies and specifically the relation between ethics and politics in feminist research, seen in the light of the researcher's own experiences. One of the main topics within feminist research has been the question of how to produce knowledge about women in such a way that it captures their life and experiences. Another project has been to show how scientific explanations can contribute to changes in women's living conditions. However, how far can a researcher go in her political project before the ethical questions become too pressing? Are the feminist researchers attentive to what they do and how they do it when using qualitative methods? Larsen and Widerberg (2007) are interested in how interdisciplinary interdisciplinary gender research really is. They ask how interdisciplinarity is interpreted and enacted within gender research. Interdisciplinarity is now mainstreamed, but what does this mean for

researchers? The authors question whether researchers actually have made use of and explored all the possibilities of interdisciplinary research. Are there methodologies, themes or norms that are still not allowed within our disciplines as well as in gender studies?

Sinnes (2006) uses feminist a critique of science as a starting point for a discussion of different understandings of how sex/gender influences pupils' approaches to science education. Three theoretical approaches are grounded in a distinct understanding of how sex/gender affects pupils' engagement in science education.

### *Sweden*

Feminist studies interested Elverdam and Hertzberg Johnsen (1990), who surveyed the development of research on women and of feminist studies within the social sciences and, more precisely, research on women in folklore, ethnology and cultural sociology. They were dealing with the emerging research established since the women's liberation movement of the 1960s.

Benckert and Staberg (1990) investigated science textbooks of lower secondary schools. Their research question was whether they were aimed more at boys than at girls, and the answer was "yes". The authors studied physics and chemistry books and booklets looking at different aspects of, one of which was how scientists, contemporarily and historically, were portrayed. Staberg (1992) too was interested in education, examining how boys and girls responded to physics, chemistry and technology at the upper level of compulsory school. The study also explored their activities in and thoughts about these subjects. The study had a feminist perspective, focusing on girls.

Women's studies interested Eduards et al. (1992). As feminist researchers, they asked how the "deviant" behaviour of feminist researchers was to be interpreted, when their feelings, wishes and actions have contributed little to setting norms in society and when the conditions of everyday life have not been part of any integrated level of analysis in science. The writers' contribution to the task of interpretation in women's studies is an attempt to answer these questions by analyzing the change and stability of women's conditions as parallel processes. The discussion is conducted in abstract and theoretical as well as in empirical terms.

In the field of education, Berge (1997) studied gender on the level of the classroom level pointed out possibilities for as well as obstacles to the work of teachers and students. What happens when the teacher tries different pedagogical approaches in order to change the gender power relation? How do the strategies of female and male teachers meet the needs of girls and boys in the classroom? Forsberg (1998) also examined gender equality in pedagogy. The idea was to analyse what and how an individual teacher can contribute to the development of pedagogy from the gender equality perspective. The latest school reform had an obligation to achieve many developmental goals and now there was room to do developmental work in the field of gender equality as well. Dryler (1998) was interested in gendered educational choices and in a large quantitative study, examined the influence of gender, family origin, and other social contexts on these choices.

Berner et al. (1997) were interested in feminist studies of technology and society. The book discusses gender practices in a wide range of technology and technical milieus. Various sociotechnical arenas, where definitions of masculinity and femininity have been constituted, were explored: work places, schools, museums, and homes. The authors examined feminist political practices aimed at influencing technical change, as well as recent efforts to reconceptualize the relationship between gender and technology. They asked what methods and theoretical tools were most fruitful for feminist technology studies. What political ends could be at the core of feminist analyses, based on the emancipatory agenda? Nyberg (1999) was interested in technology and innovations and offered an account of the state-of-the-art situation of research regarding women and innovation. Some ideas on the possible content of future research on women and innovation was presented. The focus was on women as creators of technology or products, rather than as workers in production or as users.

Education and school was the topic of Jacobsson (2000), who approached a gender perspective of motivation and learning and studied students' learning of theoretical subjects in upper secondary school. The major purpose of the thesis was 1) to review research on gender differences in motivation and learning and 2) to study gender differences in motivation and learning among students in upper secondary school. Hedlin (2004) continued this line of research and asked what the gender equality goals of schools were. What is gender and a gender perspective? What does gender perspective have to do with the education of teachers?

Women's studies evolved into gender studies at the turn of the millennium and Thurén's (2003) intention was to give the reader an insight into the many angles of gender research, and its gradual development into a mature – if not homogeneous – paradigm. A large number of gender researchers contributed with viewpoints and information. One chapter deals with questions recently debated among Swedish gender researchers, such as the process of subject construction and the new variants of male research and queer studies. The chapter also contains a review from a workshop in 2002 as an example of what is currently on the agenda as gender researchers try to define the immediate challenges.

Information technology interested Elovaara (2004), who likens it in her thesis investigated to a black box and discusses how to open it. Concepts of information technology must be explored, questioned, transgressed, blurred and opened up. In her study there were six specific and unique stories, each with their own actors, context, location and situation. The stories were connected through Actor Network Theory and feminist technology studies. The intention was to step further into stories and practices that do not yet exist.

Härnsten and Wingård et al. (2007) studied the gender aspect in higher education. The report reflects the results of a research project on the academic world. The research approach was participation orientated and with gender perspectives. Students and colleagues in the Department of Education contributed to the research with memory work, and interviews and participated in the discussions around interpretations and analyses. Doing so has brought insight into the cognitive and epistemological approaches and power structures.

### *Iceland*

Gender difference in career choices was Einarsdóttir's (2005) subject. The author discusses interest inventories in relation to the work of John L. Holland. His theories and methods assess career choices with the intention of helping people to make decisions concerning their future studies and occupational choices.

One study of Bergsdóttir's (2006) is on the situation of female computer scientists. The aim was to explore the views of female computer scientists on their education and work situation as a minority group in a male-dominated profession. The women were asked about the use of technical equipment in their homes.

### *Finland*

The first study in the GSD on women's studies in Finland was that of Rantalaiho et al (1986), 'Men's Science, Women's Doings'. The main theme of this book is social reproduction and the role of women in the reproduction process. To analyse this process it was important to specify the role of the social sciences as generators of knowledge of this process. However, even more important was to define the role of women's studies as a part of the social sciences. Rantalaiho and Saarinen et al. (1987) continued reflecting on the interdisciplinary problems of women's studies, the topic of this seminar report. The seminar programme included questions of the status of women's studies in a science system and methodological questions of women's studies. In addition, a relationship between women's studies and the feminist movement and the status of women researchers themselves in the scientific world were discussed. Another common question was whether one could really conceive of women's studies without thinking of men's studies as well. The discussions always come back to the dualism between men and women. Is it possible to produce relevant knowledge of women's and men's lives without this divided world view?

Simultaneously, a discussion on men's studies began. The Expert Group on Men's Studies (1987), initiated by the Research Division of the Council for Equality under the Ministry of Social Affairs and Health, produced report on the so-called "new men's studies". The task was to chart the existence of men's studies in Finland. The expert group also discussed what should be studied in the future in connection with the position, role and image of Finnish men. Keränen (1989) was interested in men as the subject of policy science. Who are the subjects of policy sciences? It appears that women were outside the bounds of policy sciences, but what kind role do the men play as subjects of policy sciences?

Wager (1994) studied the constructions of femininity of academic women and their private and professional identity. In this dissertation study, the focus of interest was on the continuity between private and professional identity and constructions of femininity. Raehalme (1996a) reflected on the role of gifted women as doctoral students. The study examined those factors that were connected to the development of giftedness. Gifted women are represented in this study as women engaged in writing their doctoral dissertations.

Koivunen and Liljeström et al. (1996) continued the focus of feminist research. Their collection of articles is a reading of feminist theory formation, its current situation and history by eight Finnish women researchers. The idea of the book was to construct ten ways to approach feminist research. The book proposes methodological, epistemological and practical tools for conducting feminist research. Anttonen's (1997) dissertation study 'Feminism and Social Policy' belongs to the field of feminist research and social policy science. It asks what kind of role feminism has in social research policy and a welfare state. What is the alternative understanding that feminism offers for deepening the self-understanding of social policy science? The central part of the book discusses feminist theories and their relevance to social policy science. What are the methodological, conceptual and interpretative argumentations and contributions of feminist theories?

Vehviläinen (1997) began the studies on gender and information technology. Her book explores the interwoven construction of gender, expertise, and information technology. She studied four positions of information systems development in Finland: 1) autobiographical accounts of male computing pioneers; 2) women developers' oral histories; 3) an office workers' study circle with related interviews and 4) the codes of ethics of the international computing professionals' associations ACM and IFIP.

Feminist epistemology is the subject dealt with by Ronkainen (1999), who reflects on the concepts of subjectivity, knowledge and agency of feminist scholars and researchers. These are all involved with post-structural or post-modern theorization. Can gender be understood in relation to subjectivity, knowledge and agency existing in time and space? These questions are discussed from several perspectives in this dissertation.

Töttö's (2000) nonconformist article on women, men and mathematics reexamines the common belief that males tend to get higher grades for their master's theses by considering data on 12453 students who graduated from the University of Jyväskylä during the period 1974–1997. Given the fact that in the natural sciences, dominated by male students, both genders were granted higher grades than in fields dominated by females, the grades have to be standardized according to the mean of the grades in each subject.

The discussion of feminist methodology continues in the book of Liljeström et al (2004) on feminist knowledge and its production. It evaluates what a choice of research methodology means for the production of feminist knowledge. What is the relationship between research data, gender and feminist research questions? Do certain methodologies produce more relevant feminist knowledge than others? How are the presuppositions of researchers, their epistemological ways of thinking and research methodologies connected? The book offers reflections on the possibilities of knowing in the framework of feminist research. Juvonen (2006b) focuses on the sexual body and asked where it is to be found in Finnish cultural studies and social sciences—and in what kind of perspective of sexual policy it is inscribed.

The field of education and pedagogy is the topic of Luomalahti's (2005) dissertation, in which he studied female students' technological orientation in teacher education. The aim of this study was to shed light on female students' technological orientation in the multi-didactic studies of technology in teacher education. Three major research problems were investigated: 1) what kind of general image of technology do the female students have? 2) what are the female students' sources of motivation to study technology? and 3) what kind of beliefs of efficiency relating to their self-image in technological education do the female students have?

Soilevuo-Grønnerød's (2005) doctoral dissertation is a study on personal relationships between men constructed by women whose academic history is located within women's studies. Two types of relationships were focused on: first, positively experienced relationships between young men who play rock music in non-professional bands and second, representations of violent relationships between male characters in two different cultural products, the myth of Oedipus and the film 'Terminator 2'.

**Finland****Science, Knowledge and Gender.**

This articles book is about science and technology studies and gender. It questions the gender in science studies. There is a need to broaden the concept of gender to wider science structures, like financing, institutional structures, science communities, scientific networks etc. This book is the first summary of gender orientated science studies to be made in Finland. It has a specific gender sensitive perspective of science studies, deepening the perspective of women's studies, its methodologies and approaches. Its questions are: for example, does knowledge or science have a gender, or how does the gender appear in science, the science institutions, the producing of knowledge or in the everyday life of researcher. How the male domination affects the research questions, topics, methodologies and finally the concept of knowledge. In the articles, several essential topics are discussed. There is for example: a historical review of the first pioneering research women in Finland. Then a science community and its gendered structures and practices are studied. A particular focus is put on the scientific approach to study scientific community from the gender perspective. In another article this is a question of both national and international science policy too. After this there is a statistical overview of gender equality issues in Finland. Later articles are working with discipline specific questions of gender issues.

Husu, L. & Rolin, K. (eds) 2005, Tiede, tieto ja sukupuoli, Gaudeamus, Helsinki.

## 5.4 Science as a labour activity

### *Denmark*

The career strategies of young engineers is the topic of Kolmos's (1995) study, in which he examined how and to what extent four factors (gender, children, educational background and educational institution) influence young engineers' career strategies. Zeuner and Linde (1997) also studied life strategies and educational choices. They carried out an investigation into the life strategies and educational choices of pupils in Mathematics High School and Technical High School in relation to their socioeconomic level and gender.

The Minister for Research, Jytte Hilden (1997), discusses how the research sector must be reorganized to meet the new challenge of labour force scarcity. The younger generation had other objectives than to become researchers, it seemed, and currently research appears to be organized according to outdated male dogmas. Research has gained a sad reputation as an isolated occupation with antiquated pay and working conditions. Andersen (1998) tries to respond to this with an interview survey of 788 researchers. She analyses working conditions, motivation, merit generating activities, resources, social networks, influential posts and scientific assessments-- all from a gender perspective.

Nexø Jensen (2002) studied gender in the academic organization and career tracks of Danish Ph.D. students. The paper was part of a comprehensive investigation of gender in academia in Denmark. The main question was what determines Ph.D. students' choice of career. Hidden emotions in academia were Bloch's (2003) subject. She deals with emotional culture and the specific ways in which men and women deal with emotions. Studying emotions can be a way of studying the micro-political mechanisms of inclusion and exclusion in academia. Højgaard (2003) was interested in discourses of gender and research. She analyses how the category of researcher was constituted in the stories of male and female researchers talking about their research and about themselves as researchers.

Bruun et al. (2003) notes that in recent decades the amount of technical equipment used in science has increased tremendously This has raised the requirements of students' competences in handling and even developing advanced technical equipment for experimental research. However, there were noticeable differences as to how the two genders approached scientific technical equipment, and this is examined in this study.

Lützen's and Larsen's (2005) report focuses on women Ph.D. students and the factors that influence women's career paths at the university. The research project 'Gender and Research at the University of

Aarhus' consisted of interviews and focus groups with current and former staff and management in the five faculties of the university.

### Denmark

Kønnetts betydning – karrierer og barrierer i de højere uddannelser og forskning (1996-2001).

#### **“The significance of gender – careers and barriers in higher education and research”**

The project was an initiative across more research councils to investigate the educational process in universities and identify factors, which enhance or hinder students in having scientific careers, and how these factors interact with gender.

The data were collected from interviews, participatory observation and questionnaires with students at the chemistry and Nordic languages departments in three different phases of the educational process: 3rd semester, 8th semester (the point of choosing master graduation or continued studies at PhD level), and during the PhD course.

The two scientific fields studied appear very different. The dominant culture at the chemistry department perceives itself as gender neutral, while interviews reveal that a typically masculine character is entailed in the ideal image of a chemistry student. In both departments there appears to be an unexploited potential for recruiting researchers among the women students. Respondents emphasize lecturers' important role in recruitment; they should inspire and encourage students to attend the PhD courses.

For further information see the following literature in the GSD:

- Reisby, K., Knudsen, S. V. & Sørensen, H. 1999, Kønsblik – på forskerrekruttering i universitetsuddannelser, Danmarks Lærerhøjskole (Denmarks School of Teaching), Copenhagen.
- Knudsen, S. V., Reisby, K. & Sørensen, H. 2001, Kønsblik – på bacheloruddannelser, Danmarks Pædagogiske Universitet (The Danish university of Education), Copenhagen.
- Gomard, K. & Reisby, K. 2001, Kønsblik – på forskeruddannelser, Danmarks Pædagogiske Universitet (Denmarks University of Education), Copenhagen.
- Reisby, K. 2001, Kønsblik - resumé, Danmarks Pædagogiske Universitet, Copenhagen.

### Norway

Women's medical research was the topic of NAVF (NAVF's Secretariat for Women's Studies, 1991). Ragnhild Emblem discussed conflicts around and in women's medical research, based on her own experience as a researcher and a surgeon. Gjerberg and Hofoss (1995) discuss specialization in medicine and whether gender affects the frequency of specialization in specific fields among physicians.

Pioneering women in science and academia is the subject of Blom's (2005) presentation. She discusses the female pioneers of the early period, 1882–1932. Who were these pioneers? Where did they come from? Why did they choose an academic career, and what disciplines did they choose? The book of Sangolt et al (2005) commemorates the 70-year jubilee of this group. It highlights the female academic pioneers' access to university and working life, and the issues they fought for.

**Norway**

This article is based on a career history study of gender differences and similarities in recruitment to and transitions between specialities among Norwegian doctors. A questionnaire on career and family history was sent to all Norwegian doctors authorised in 1980-1983. Descriptive statistics and logistic regression were used to describe and analyse completion of specialisation in the specialty in which they started their career. Survival analysis was used to analyse transitions between medical specialities. The findings clearly contradict the idea that the low proportion of women in male dominated areas of medicine reflects women's lack of interest in specialities like surgery and internal medicine. Women were as likely as men to start their career in these fields. The problem is their not completing specialist training. A far higher proportion of men than women completed their specialist training in surgery. The reasons for this are complex. Heavy work loads with duties and nights on call make it difficult for women to combine childcare and work and make them change to other specialities. Also, female specialists in surgery and internal medicine postpone having their first child compared to women in other medical specialities. However, the fact that some women change from surgery to gynaecology and obstetrics, a specialty which to a considerable extent are comparable with surgery with regard to duty and work loads, indicate that structural barriers in combining childcare and a hospital career do not fully explain the flux of women. The possible existence of other closure mechanisms in surgery, as indicated by some doctors in this and in other studies, has to be further explored.

Gjerberg, E. 2002, '**Gender similarities in doctors' preferences: and gender differences in final specialisation**', *Social science & medicine*, vol. 54, no. 4, pp. 591-605.

*Sweden*

Mellström's (1995) thesis deals with engineers. It is an ethnographic study on the work, careers and life paths of thirteen men and four women. The underlying questions of this study were what makes sense to these people and how meaning is constructed in their lives as engineers. The thesis consists of two parts: 1) situated activities and social practices of the two engineering workplaces are focused on, with an examination of how meaning is produced, reproduced and socially organized in two micro-cultures; 2) the lives of the seventeen engineers are presented and their life paths examined through a series of questions.

Bron-Wojciechowska's (1995) study is about the life experiences and socialization of women and men researchers at different departments of Uppsala University. Twenty-four research students from three departments were studied through life-story data. For each department there was also an in-depth interview with two research students, one female and one male. Benckert's and Staberg's (2000) study 'Women and Science' attempts to shed light on women's participation in physics and chemistry at the university level by following their trajectories from family and school to university.

Pioneering women in academia was Markusson Winkvist's (2003) focus. The aim was to illustrate and analyse from a gender perspective the position of female post-graduates within and in relation to the male-dominated state universities and private university colleges in Sweden during the period 1883-1949. Academia is studied with respect to both its "frozen ideology", i.e. inability to change, and manifestations of ideas about the differences between maleness and femaleness.

Mählck (2003) maps gender in academic workplaces and has discovered ways that gender inequality is reproduced within the discourses of equality. The aim was to explore ways in which the social relations of researchers' everyday working lives are gendered. This involved studying the ways in which gender inequality is produced, maintained or ignored within the discourse of gender equality in Swedish academic workplaces and in Swedish society at large.

Nilsson et al. (2004) followed the lives of medical Ph.Ds after their dissertation at the Karolinska Institutet. The staff at the departments for research, research education, and personnel were carried through an investigation with persons considering their post-doctoral career. The study is important for the building of knowledge about gender equality issues and academic careers, which might lead to more judicious investments. Foreign researchers and scholarship holders are an important group to pay attention to and follow.

Bondestam (2004) focuses on gender equality in higher education. The aim was to explore what makes the discourse on gender equality possible in the context of Swedish higher education. Three aspects of this

discourse - gender equality work, positive discrimination and sexual harassment - were analysed in greater detail.

Sexual harassment in academia is Carstensen's (2005) subject. This dissertation focuses on how gender, heterosexuality and sexual harassment are constructed in an academic setting. The study is based on in-depth interviews with 15 female Ph.D. students who were asked how they talked about, understood and interpreted experiences of gender and sexual harassment in academia.

Berggren's (2006) thesis deals with access to higher education, and how different categories of students act in times of recession in relation to the admission system and when choosing their educational field. The purpose was to develop both a comprehensive and a fine-grained understanding of educational participation and attainment.

#### *Iceland*

Georgsdóttir (2001) conducted a survey among female physicians and asked them about various issues such as working hours or working environment. One purpose was to identify their special needs in relation to family responsibilities, workload etc.

The historical status of women within the scientific community interests Einarsdóttir (2000), who asks whether education is indeed the key to equality. The article focuses on the status of women within the scientific community, in particular at the University of Iceland. The author covers the period 1911-2000 and uses secondary sources such as studies, regulations, laws and statistical information in her analysis of women's integration into the scientific community.

#### **Iceland**

##### **Gender difference in career choices - a real difference or a bias in interest inventories?**

The author discusses interest inventories in relation to the work of John L. Holland and his theories and methods of assessing career choices with the intention of helping people to make decisions concerning their future studies and occupational choices. Research has revealed significant differences between males and females concerning outcomes on these inventories. Questions have been raised as to whether the outcomes can be gender restrictive in any way, e.g. resulting in women being advised to look into traditionally female jobs and men into traditionally male dominated occupational area. The author discusses the situation in the Icelandic labour market with regard to the distribution of women and men across different occupations, linking the results to Icelandic research on gendered outcomes in interest inventories. The author concludes that there is a gender bias in interest inventories, similar to findings found in the USA. Hence, cultural and social factors seemed to have little influence. The argument is supported by research data collected at the University of Iceland among students seeking counselling at the Education and Occupation Counselling Office at the University of Iceland and students at primary and secondary schools. The data was examined using a mensuration model that falls into the category of IRT-theories enabling researchers to explore, with greater accuracy, biases in psychological assessment tools. Professionals using interest inventories as a tool have to be aware of this bias when advising a client how to choose a discipline to study and a career to pursue. However, gender difference in career choices does not only exist in interest inventories on the grounds of an inbuilt bias. There is also a real gender difference in career choice most likely caused by gendered socialization that needs to be addressed in a wider context if the intention is to reduce the gendered outlook of the labour market.

Einarsdóttir, S. 2005, 'Kynjamunur á starfsáhuga - raunverulegur eða skekkja í áhugakönnunum?' in Kynjamyndir í skólastarfi, Rannsóknarstofnun Kennaraháskóla Íslands, Reykjavík, pp. 103-119.

*Finland*

In Finland, Luukkonen-Gronow (1983) studied women researchers' work and family life. The article combines the family role of women with their role as scientific researchers. The gender-related problems they experienced and the relations between male colleagues and women in research work are analysed.

Silvennoinen (1992) studied the hierarchies of academic education from the perspectives of gender and social background. It is widely recognized that a competitive national economy needs an efficient system for training its research and development experts. At the same time, it is agreed that education is an important investment and a form of cultural capital for all people living in modern society. This article looks particularly at how social background and gender are associated with selection into research education and with postgraduate placement.

Woman as architects in Finland from the 1890s to the 1950s was the topic of Suominen-Kokkonen's (1992) dissertation. The study examined women architects from the perspectives of education, practical work and their experiences of femininity, and situated the women in the context of Finnish architecture. The system of technical training and teaching was viewed in relation to the ideological framework of contemporary aesthetics and the functioning of institutions. This had direct links with the emergence and formation of professional praxis and its hierarchies.

Mankkinen (1995) explores sexual harassment and annoyance at the University of Helsinki. Basically the university was thought to be a good place to work, although the work schedule was demanding. However sexual harassment clearly existed and the forms of harassment were multiple and diverse. Harassment was divided into the following groups: 1) serious harassment, 2) an overemphasizing of sexual roles, 3) an ambivalent disturbance and 4) a disturbing student. The harassment could be 1) of a continuous nature, 2) demands for sexual favours in exchange for career advancement or 3) single harsh incidents.

In reality, the careers of talented women differ considerably from each other and are multidimensional. Thus Raehalme (1996b) examines whether it was possible for a gifted woman to combine a career and family. Can a talented woman take advantage of her intellectual resources while burdened with the responsibility of caring for a family?

Koski and Tedre (2003) charted academic women's problems with and exclusion from normal university practices. The theme of this article is the difficulty in acknowledging the central role of gender within the university. This article is based on data gathered in a memory work group of female university teachers and researchers.

The producing of doctoral degree holders in Finnish universities is examined by Julkunen (2004). This book is about women who did their doctoral dissertations at the University of Jyväskylä, Finland. It discusses what doctoral studies and examinations mean today for the women who have acquired the degree. The number of women Ph.Ds has been increasing constantly and today they represent almost half of doctoral degree holders in Finland.

## 5.5 Scientific excellence

*Denmark*

Andersen's (1997) report presents an analysis of the opinions, activities and images of science among Danish researchers based on a quantitative investigation of 1750 researchers in social science and natural science. The categories used for comparison were primarily the different disciplines, the different positions in the academic hierarchy, and the different universities. The report deals only briefly with gender, but reveals gender differences in the number of publications and in working hours. Bruhns (1997) is also interested in the productivity of female and male researchers. Many sociologists of science have found that male researchers generally produce more scientific publications than female researchers. It has also been stated that this difference is not due to marriage and motherhood. This anomaly is called "the productivity puzzle" and this is the subject of this study.

Wissing (1998) expresses interest in the 40 new professorships reserved for women. The Minister of Research, Jan Trøjborg, initiated the establishment of 40 5-year professorships reserved for women on the

basis of recommendations made by The Committee for Equality in Research (Udvalget for Ligestilling i Forskning). Drotner and Mouritsen (1999) thought that super-professorships would enhance quality. The debate on the introduction of 40 professorships earmarked for women was centered on the questions of how introducing gender as a requirement would lower the quality of research. Especially in the natural sciences, there were worries that the new professors would be perceived as second rate. *But if one assumes that men and women are equally intelligent, the overrepresentation of men in scientific positions means that in order to fill positions with men, quality must be compromised.*

Gender in the academic organization is the topic of Bendix Petersen's (1999) study, in which she made a comprehensive investigation of the situation in Denmark. The unequal number of men and women in academic posts (men make up 82.5% of the permanent staff) motivated the study. Bloch's (2002) paper is also a part of a comprehensive investigation of gender in academia in Denmark. In the sociology of science, social relations were discussed in terms of competition and recognition. The purpose of this paper was to broaden our understanding of the social relations of academia by incorporating the emotional dimensions of these relations into the understanding of academic life. Søndergaard (2003) focuses on the oppositions and paradoxes in the discursive practices of academia in relation to recruitment and inclusion. She examined the opposition between the discourse of neutrality and the practice of dissensuality. By dissensual practices she means that the different concepts and interests of the academic fields become part of the management strategies and the attempts of the participants to influence working conditions.

### Norway

In his reports Kyvik (1988 and 1991) analyses scientific publishing and productivity among female and male university researchers at Norwegian universities. The reports are part of a larger project aimed at studying various aspects of the university with a focus on the situation of the faculty members. The studies examine time and conditions for research, international contacts, recruitment and publication. The first part of Kyvik's (1991) book provides a comparative analysis of the publishing patterns in the humanities, the social sciences, the natural sciences, and medicine. The second part explores the underlying reasons for the large differences in productivity between individual researchers and between groups according to age, academic rank, and gender. In a survey, faculty members were asked to complete a questionnaire pertaining to working conditions, use of time, publications, international contacts and related information.

Throughout the 1980s questions about the recruitment of researchers were central in the Norwegian debate on research politics. Tvede (1990) asks, for example, how many research trainees Norway should have and how the number should be divided among the different disciplines. The qualitative questions concerned, among other things, new doctoral programmes and training. The focus of this report was on research trainees and how they saw their own situation. The following questions were important: 1) What made the research trainees begin a career in research? 2) What are the conditions in their period as research trainees with respect to supervision, training, and possibilities for research? 3) Why do some continue while others quit? 4) How useful do the research trainees find their training? 5) Are there differences between the different disciplines? 6) Are there differences between male and female research trainees? 7) How has this developed in the recent past? This report studied the new research trainees of 1978/79 and 1984/85.

### Sweden

Hamberg and Johansson (1998) studied physicians' experiences of their female patients. In what ways were the analyses of the interpretations coloured by the positions of the researchers as doctors, women and researchers? The authors claim that the qualitative methods brought forth circumstances, sometimes difficult ones, in which it was necessary to acknowledge the patients' own valid knowledge and apply this to clinical practice. One question was whether and how the doctor focused on symptoms and diseases typical of women.

University cultures and their relation to gender and power in academia is Søndergaard's (2001) topic. These vary with respect to the degree of cultural consensus and dissensus. Levels of conflicts, patterns of meaning-making and decision-making practices vary correspondingly. This empirically-based article investigates how these variations make up the different premises for understanding gender segregation and for introducing gender equality discourses. Finally, the article also examines the way newcomers deal with the multiplicity of standards and complexities on their way into and up the academic hierarchies.

Vetenskapsrådet (2006), in a conference summary, examines excellence in gender research. The conference had shown that excellence was a very broad topic and that one should keep in mind the wide

scope of issues of scientific excellence. Here the concept of excellence is discussed from the perspectives of strategic thinking and scientific pluralism. On the other hand, this plurality makes the use of the word “we” problematic as well as making it difficult to talk about anything that has to do with gender studies.

#### *Iceland*

Gender dimensions in the judgments of evaluation committees are discussed by Þorvaldsdóttir, Þ. (2002). She asks whether there is a gender difference in the discussion of male and female applicants in the judgments of evaluation committees at the University of Iceland. A discourse analysis was undertaken to identify the extent to which the evaluation of job applicants at the University had disfavoured female applicants. The analysis focuses on written judgments made by various evaluation committees of male and female applicants applying for academic positions during the period from 1997 to 1999.

#### *Finland*

Bruun et al. (1982) describes the interdependence between the official structures of science and informal contact networks. After a look at women’s roles in the formal university hierarchy, the participation of women in other echelons of science is examined. One specific concern is the degree to which women achieve formal scientific recognition. The gender distribution among contributors to scientific journals and their editors, recipients of acknowledgments in the prefaces to dissertations as well as the recipients of academic festschrifts and their contributors are examined empirically.

## 5.6 Gender in research contents

#### *Denmark*

In Denmark, the first studies were about computer science. Nielsen and Roepstorff (1985, also Lytje, 1985) give some examples of the masculine way of thinking within different areas of computer science. The aim was to show the masculinity in computer science and from this background to discuss the necessary changes from a female point of view, e.g. in concepts, methods, and theories.

Grønbæk Hansen (1993a) examines feminist research in the natural sciences. The article deals with the schism of female natural scientists studying gender inequality within their fields and humanist scientists studying gender inequality within natural science. Female natural scientists, although critical of the methods and theories of their science, have fought the cultural connotations of femininity that dichotomize women and science. It is more difficult for a woman to become a scientist in natural science than in the arts.

Toubro Hansen’s (2003) area is gender research in Danish archaeology. Gender research and the theoretical discussion thereof seem to have been nonexistent in Danish archaeology. The author explores and discusses research tradition and, based on the feminist starting point of gender research, the conditions of women within the field. She makes comparisons with archaeology in Norway, where feminist archaeology and theoretical discussion have been valued.

#### *Norway*

Verne (1988) tries to find alternatives to male-dominated informatics. In this article, researcher and computer scientist Guri Verne asks what consequences this masculinity has for the content of the discipline and for the users of computer systems. By using concepts from social scientific women’s studies, she formulates her criticism and proposes alternatives for changes and improvements to make informatics more complete and friendly to women.

In a conference about men and research (Haukaa and Holter et al.1990), the audience were asked to consider three problems in particular: 1) Women in research have reflected on their gendered starting point, while men have done so to a lesser degree. What does it mean to male social scientists and humanists that they are men? 2) How can one explore men’s experiences and what are the possible hindrances to doing so? 3) What can research about men involve? What topics and perspectives can be fruitful?

Sørensen (1991) asks what meaning the increasing proportion of women researchers has had for new technologies. Will more female researchers influence technology with their feminine caring values? Can

technology and natural sciences be influenced by values, or is gender without effect in this field? Does selection and socialization into research environments mean that caring values disappear from constructions of technology? To answer these questions one has to analyse and compare the values and actions of male and female researchers. It is also important to define what we mean by care-orientated technology.

Understandings of gender in the disciplines of social sciences and women's studies were the focus of Taksdal and Widerberg et al (1992). They examine the question of whether the maps of social sciences are in harmony with the terrain "we can feel under our feet". Does it matter that we are women and men? In this book, central Norwegian women researchers confront six different disciplines within the social sciences with questions about gender. Are, for instance, psychological theories of development suitable for women? Does pedagogy take into account gender differences and different ways of learning? Dale (1992) attempts to understand gender in economics and Leira (1992) in sociology. Challenges for the discipline of history are presented by Blom (1993 and 1994; also Melby 1996, Hagemann 1999). One concern is to change women's history to gender history, and the other involves growing international cooperation. Connecting different groups of people with each other is a crucial question. Myklebust's (1996) topic is art history and cultural participation. Feminist art history research has developed in the last 25 years from the simple documentation of female artists to a broader documentation of art.

The contents of medicine interested Malterud (1996 and 1997, also Nordal 1996, Løvlien 2001, Njølstad and Løchen 2003). The medical diagnosis is the endpoint of a process of knowledge development in which human co-operation, perception and interpretation are central elements. Gender and power construct central, but often invisible, contributions to this process, and thereby to the product. Women's medical research aims to develop knowledge about 1) how gender inequalities as well as the oppression of women affects the development of diseases found among women; 2) how women's diseases and health problems are treated in medical theory and practice and 3) how medicine affects the perception of the body and femininity in our society.

Bratteteig and Verne (1997) examine the role of women's research in informatics. Can informatics learn anything from women's research? How can feminism be used as a basis for a constructive critique of informatics? Will a computer system be better if it is developed by female information scientists? Corneliussen (2003b and 2003c) attempts to understand men's and women's relationship to information technology and how this affects the contents of IT. A focus of this investigation is how male and female computer students in humanistic informatics think gender is relevant to computing and how they have built their own relationships with computers and computing.

### *Sweden*

Women's studies in technology is Haupt's (1990: later, the same topic in Salminen-Karlsson 2003) subject. One of the main objectives of the Centre for Women in Research and Working Life at Luleå University was the integration of a perspective based on gender theory into both education and research. What is women-orientated research in technology? Is it merely a question of technology or does it have a wider dimension of social responsibility? Later, Goodman (1995) pointed out that during the previous fifteen years, questions concerning gender, technology and knowledge had become increasingly recognized as central to the field of the sociology of technology. These issues were addressed through investigations of relationships between gender, work, knowledge and technology. Sundin and Berner et al. (1996; same topic in Vänje 2003) are also interested in gender, technology and social change. In this book there are contributions concerning the use of technology in everyday life and work, men's relation to technology and theories of gender and technology.

Women's medical research interested Almegård (1995), for whom it is clear that research on women's health from a comprehensive perspective is emerging in some countries, like the USA, Australia and the Nordic countries. Later, Eriksson (2003; same topic in Ahlgren 2004 and Jansson 2008) focused on how gender is constructed in the professional and a private arena based on participant observations at two university hospital clinics, a women's clinic and a general surgery clinic, and on interviews with gynaecologists, surgeons and heterosexual couples. First, the symbolic doing of gender by men and women physicians in their everyday professional lives was studied. Then the focus shifted to how the same actors constructed gender metaphorically when they talked about the medical profession and their everyday professional lives. There is a particular need to find alternative models for analysing both gender and biology in medicine.

Benckert (1997) asks whether physics is indeed sexless. Where are the women in physics and why are there so few of them? Many might look upon physics as impersonally defined. It is about particles, forces,

exchanges and reciprocity. In addition, since there are no people involved, there can be no gender. But why, then, are most physicists men? Physics is about objectivity and rationality and should be neutral. However, objectivity and rationality are connected to masculinity, which gives physics a connection to gender. Hamberg and Johansson (1998) examined patients' opinions of physicians. Through the deconstruction of the patients' reactions and actions in different situations and positions, the difficulties of the interpretation process are made visible.

Nygård et al. (2002) asks what it means to say that a "gender perspective penetrates research" and what one can do to promote equality between women and men. Both issues have been politically "hot" research topics and served as the background for the conference 'Forskning och kön' ('Research and Gender'). How are gender perspectives promoted in research? What do these perspectives look like? What happens when the concept of gender is used as a word with a positive connotation in medical research? Lykke (2003) is interested in the concept of intersectionality and argues for its usefulness in feminist research. The concept was used in recent international feminist debates in order to theorize how gender and other sociocultural power differentials such as ethnicity, race, sexual preferences, age and nationality interact.

In the field of biology, Hamberg (2002 and 2004) pose an important question: how do female and gender medicine respond to biological essentialism/determinism?—an examination of the forces that attempt to explain the subordination of women by "woman's nature" and biological arguments. The results of medical research have often been used as weapons in this debate. The book chapter provides examples of what gender can contribute to biomedical research and to a critical examination of the traditional priority given to the male aspect in interpretation. A decisive question is in what ways gender differences can affect medicine.

A two-day seminar on male research (Nationella sekretariatet för genusforskning 2004) focused on the integration of new critical research on men. Although Nordic conferences and workshops over the past years have been important for the growth of men's studies, it is also important that cooperation and the exchange of information and knowledge on a national level in Sweden be developed. This book is a collection of contributions to the seminar.

The National Agency for Higher Education in Sweden has published a number of books covering the gender aspects of different topics. In the book by Hammarström (2004; also Hammarström et al. 2004) gender and power within medicine are focused on. The author argues that gender research, with its reflective and critical approach and scientific anchoring in theoretical schools, has a great deal to contribute to medical research. In spite of resistance from positivistic-dominated academic medicine, medical gender research has found a place in the medical establishment.

Björkman's (2005) thesis deals with feminist technoscience strategies and educational practices in computer science. Parts of this work deal with issues of crossing the boundaries between disciplines and the foundations of computer science. An important question is what "knowing" means in computer science with respect to the field's epistemological pluralism and diversity. Goodman (2007) also offers a critical reflection on interdisciplinary research on gender, IT and learning.

## Sweden

### Gender booklets

The Swedish National Agency for Higher Education in cooperation with the Swedish Secretariat for Gender Research is publishing a series of booklets highlighting how a gender perspective can be applied on different scientific disciplines. The booklets are written by researchers within each scientific discipline and the aim is to supply a basic introduction to researchers, teachers and students about gender perspectives. To use a gender perspective on a subject is to add another scientific dimension of analysis. The booklets emphasize that this dimension can support the different subjects and give new tools for critical analysis of theories and research results. The booklets that have so far been published covering 15 different scientific disciplines: 1) national economy, 2) nursing science, 3) pedagogy, 4) medicine, 5) theology, 6) languages, 7) media and communication, 8) politics, 9) public law in gender issues, 10) archeology, 11) engineering, 12) psychology, 13) law, 14) cultural geography and 15) social anthropology.

*Finland*

Julkunen's (1984)'s focus is on women in the sociology of work in Finland. She asks whether women have been banished from the sociology of work and from what perspectives the work of women has been studied. What picture of the special characteristics of women did these studies convey?

Peltonen (1988; also Saarinen 1992) studied the women's movement, specifically through a methodological and strategically intermediated consideration of the relationship between the feminist movement and women's studies. The focus is on a debate in women's studies concerning a consciousness-raising method used by the new women's movement. Simonen (1989) explores methodological questions in the context of feminist social research. The main argument is that in order to make women's lives visible, it is important to call into question the research methods and strategies applied. An attempt is made to define an appropriate approach to feminist research and to the formulation of social policy for women.

Ahlqvist's (1999) methodological question is the relationship and intersection between phenomenology and sexual difference in radical feminism. The meeting point appears to be Edmund Husserl's claim to have given philosophy a new turn, known as the phenomenological reduction. Salonen (2000) is also interested in the multidimensionality of gender research. Psychological theories of gender and sexuality are formulated and structured in this article. Anttonen et al. (2000) present feminist strategies through the thoughts of 14 female theorists. This review is especially important from the perspective of women's studies and its theories and research questions. The book gives a picture of the characteristics of feminist discourses, their dynamics and multiform theorizing. Koski (2003) discusses perspectives on sociological women's studies. Sociological women's studies examine structures, a culture, a way of thinking, actions, communities and individuals from the gender perspective. What kind of places, positions, relations and possibilities do these structures open up? Lempiäinen (2003) continues along these lines in her dissertation, asking what the gender of sociology is. The dissertation examines how gender has been taught in Finnish sociology course books and how it is produced in the field of sociology.

The collection of articles of Oksala and Werner et al (2005) is about feminist philosophy. The book examines the contribution of feminism to philosophy and feminist philosophical thinking and action. What is the meaning of a philosophical writing style and metaphors? What is feminist epistemology? Does feminist philosophy exist at all? The book presents feminist philosophy through a compilation of feminism's different perspectives on reasoning, knowledge, justice, politicality, the body and the good life. It also seeks the common denominators and intertwined strands of the plurality of thinking.

The challenge to university pedagogy in teaching lesbian- and queer-research is Juvonen's (2006a) topic. In this article, the experience gathered in lecturing on lesbian issues and teaching queer seminars is used to consider how such queer desire can be evoked among those students who would rather defend the normative heterosexual identity and nuclear family than to become acquainted with anything different. Vänskä's (2006) dissertation analyses the position of visual representations in the processes of knowledge production on acceptable genders, bodies and sexualities in contemporary Western societies.

## **5.7. Policies towards gender equality in science**

*Denmark*

The report of Pedersen and Reisby et al (1991) consists of different social science researchers' contributions to a project that assessed and described the development of gender equality in Danish elementary and secondary schools. The project had several tasks, which were studied by a group of evaluators.

The paper of Henningsen et al (1998; same topic in Fiig 1999) was part of a comprehensive investigation of gender in academia in Denmark. In 1995 the Danish Ministry of Education initiated a central registry of all appointments to academic positions with the purpose of obtaining knowledge that could explain the low level of hiring of female academic staff. The purpose of this paper was to contribute to a discussion of the mechanisms of inclusion and exclusion in the academic field.

Rømer Christensen's (2000) article focuses on how the concept of mainstreaming can be useful for the integration of the gender aspect into all branches of research. The author looks at the following issues: research and mainstreaming, research power and modernization, modernity vs. post-modernity and

mainstreaming in practice. She asks such questions as: Is it still useful for gender research to think in terms of centre and periphery? What are the perspectives for the integration of gender research into the individual subjects? Will successful mainstreaming mean the disappearance of interdisciplinary gender research? What resources does mainstreaming require? How can one establish a useable model for cooperation between research and politics?

Sendrup and Frimodt-Møller (2001) studied gender-segregated education, team work, and teacher cooperation. This report is the result of an experimental pedagogical project aimed at reorganizing natural science education in upper secondary schools in order to maintain students' interest in natural sciences. In their capacity as high school teachers, the authors tried to develop pedagogical methods.

The article of Christensen and Fox Maule (2004) is an evaluation of FREJA – Female Researchers in Joint Action. The Ministry of Science launched FREJA in 1998 with a view to increasing the number of female researchers and thereby improving the exploitation of research potential in Denmark.

The 'think tank about more women in Science' (Tænketank om flere kvinder i forskning 2005), established by the Danish Ministry of Science and the Ministry of Gender Equality in 2005, has assessed the problems regarding women in science in Denmark. This assessment is based on existing knowledge from analyses and statistics. The Danish research world is not capable of attracting, developing and retaining a segment of female researchers.

#### *Norway*

Gender quotas interest Stabel (1994, see also Teigen), who questions the rather uncritical presumption that they have been positive for women in general and in academia as well. There is, however, reason to ask whether the quota rules have fulfilled their mission, or whether they could be misused for completely different purposes. Perhaps other and more purposeful strategies could be employed to ensure that women get their share of scientific positions.

Søyland's (1998) work deals with the 'Action Plan for Equality in the Research and Development Sector 1998-2002'. The plan posed the question of whether it matters what kind of arguments are used in gender equality work in research and education. Many have argued for the need to focus on how women will bring quality, creativity and care into research, as well as on ideological reasons to support gender equality work. In her discussion, Søyland also compares the Norwegian equality plan with similar initiatives in Sweden and Denmark. Benterud (1998), an adviser on the Norwegian Research Council, assesses the 'Power and Democracy' projects that running in Denmark, Norway and Sweden. She presents the mandate of the committees, discussions about publicity and female researchers' strategies to gain professional influence. Mathisen (1998) is concerned with research on the political discourse of women's studies. Here Mathisen analyses a number of political statements on research by women and examines how women researchers' perception of science differs from the dominant idea of science and research politics.

The Norwegian Research Council, Division for Strategic Priorities (2002) discusses gender quotas and their integration. This report on equality in research was initially produced at the request of the Ministerial Department of Education and Research, who wanted a status report concerning the position of women in academia, an overview and evaluation of equality measures at the institutions and recommendations for further action (see also Melby 2007).

#### *Sweden*

The purpose of Aas's (1999) thesis was to analyse the research fields, problems and challenges of Nordic women's research policy and, through contacts and discussions, contribute to cooperation, discussions and publicity in this area.

Bondekam's (1999) report is an investigation of the experimental work with positive measures for research assistants at Uppsala University. The experimental work focused on research assistant posts where the needs for targeted moves because of gender inequality were greatest. Twenty-one research assistants were appointed--six women and fifteen men. This represented a considerably lower proportion of women compared to the women employed at the university as a whole.

Jordansson (1999) studied Tham professorships and asks whether this could be a solution for many gender equality issues in academia. The debate has made it clear that gender equality is a question of power, the

power of superiority in the interpretation of gender inequality and working conditions. This article points to a disparity between the overall objectives and their realization at the local level.

Trojer's and the Swedish Research Council's (2000) subject, in the joint final report of eight research councils, is the relevance of gender science. In 1996 the government issued a regulation concerning cooperation between research financing councils. Through specific common targets and assessment areas, these councils were to continue their work in promoting and coordinating research support activities.

In a follow-up study of the Swedish government's initiative to recruit more women into higher education in mathematics, science, and technology, Wistedt (2001) takes a second look at seven programmes launched in 1995 at five Swedish universities. In 1993 these five universities received about 3 million Swedish Kr each. The initiative tried to broaden recruitment into male-dominated programmes. The following questions were posed in the follow-up study: How did the recruitment of female students into these programmes develop over time? To what extent did the students in different categories succeed in their studies? To what extent were the educational reforms sensitive to the needs of these new groups of students? How were the programmes regarded? Did the ideas from the initiative spread to other programmes at the respective universities?

Forskargruppen för genusvetenskapliga studier<sup>31</sup> (2001) studied a research programme for gender science at Karlstad University 2001-2005. This booklet is a policy statement of the research programme, whose purpose was to critically analyse the constructions, reproductions and outcomes of sex/gender based-discourses, ideologies and actions. The objective was to try out different theories on what controls the relationships between the genders and to develop new ways to analyse gender relations. The core of the programme was to analyse the connection between the individual and the socially-organized level.

The study of Smirthwaite (2005) was commissioned by the Swedish Secretariat for Gender Research. It sheds light on how gender perspectives have been integrated into education in a number of subjects and programmes at fourteen Swedish universities. The report makes a clear distinction between gender science as a stand-alone subject and gender science as it is integrated into other subjects. The study does not only investigate gender science, but also how other subjects interpret and use the gender perspective.

Angervall (2005) studied the obligation of every organization in Sweden to work with issues concerning gender equality. Gender equality policy has been used for decades to increase the equality between men and women in Sweden. The comparative study is about how gender equality policy is implemented in two different organizations, a private company and a university. How were certain strategies to improve gender equality carried out and defined?

The research assistants of the Tham measure interested Mählick (2006), who studied what had happened to those who had received the research assistant assignments. Did they stay in academia? Did the assignments contribute to increased gender equality? Törnqvist's (2006) dissertation on gender politics and Tham professorships examines the struggle over concepts and categories in Swedish gender politics. The provocative issue of quotas for women is used to explore these processes and the boundaries of this gender equality project. The central questions posed were: What are the conditions under which gender politics can be justified in different arenas of social life? When and why do certain visions, definitions of problems and solutions succeed or fail to be recognized?

On the topic of women and innovation, Gunnarsson et al. (2007) ask how modern gender-theory research might provide a critical but fruitful contribution to the interactive research tradition. This is one question dealt with in the project 'Gender Equality and Gender Research' – an integration and development project within VINNOVA's organization and operations.

The topic of women becoming academic leaders is Haake's (2007) focus. The objective of the national programme IDAS is to increase the number of women in high academic positions. One of the supporting ideas is to investigate the conditions for women and men in academia from the point of view of leadership. The investigation could concern work with cultures, attitudes, and expectations. The main question in this report is whether there are special circumstances in which women could lead departments with a high level of scientific excellence. How do women respond in this kind of environments?

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<sup>31</sup> A research group on gender studies

Högskoleverket (2007) offers an evaluation of gender science at Swedish universities. The report concludes the quality evaluation of first cycle programmes and research education conducted by the Swedish National Agency for Higher Education in 2006. The report consists of two parts: the first part contains the decisions and reflections of the Agency based on the formal reports of the expert group; the second is the report from the expert group, general opinions, recommendations, descriptions of the subject, and the special impressions, recommendations and subject description from each of the ten universities involved.

A gender perspective on innovation policies in Denmark, Finland and Sweden is Pettersson's (2007) subject. The study includes a two-fold analytical process that examines 1) whether gender equality has been mainstreamed into innovation policies and 2) how gender is constructed in innovation policies.

#### *Iceland*

In Iceland the main focus has been on the trends and status of gender equality within the University of Iceland. One practical question is how the gender equality agenda at the University of Iceland could be improved. Another larger question is what good practices can be applied to improve the position of women in academia and research.

#### *Finland*

In Finland, the working group of the Ministry of Educational Affairs (Opetusministeriön työryhmä 1986) produced a follow-up report on the problems and obstacles of women's research careers. The follow-up group was set up by the Ministry of Education three years after these problems had been defined by the effective committee.

The organizing of women's studies and its teaching at the University of Tampere is the topic of Naistutkimustyöryhmä (1990). This is a working group memorandum on organizing women's studies in the University of Tampere, Finland. The task of the working group was 1) to elucidate the possibilities of setting up a new unit of women's studies and 2) to clarify the coordination and the division of responsibilities in women's studies.

A memorandum of the Finnish Academy's working group (Suomen Akatemian työryhmä 1997) is about the promotion of women's research careers. This working group was set up by the Finnish Academy on 21 October 1996. The tasks of the group were 1) to clarify and evaluate development needs to support women's research careers and to make suggestions for removing the obstacles that blocked such careers; 2) to examine the effects of hidden discrimination in scientific communities and 3) to prepare a proposal for the development plan 'Care of Women's Research in Finland 2010'.

A report of the Committee of the Ministry of Education (Opetusministeriön työryhmä 2004) on the development of research careers formulates a proposal for a strategy to develop such careers. It explores the kind of strategic measures needed to ensure wide and versatile expertise both in the public and private sectors, and attempts to ascertain how different funding bodies could contribute to the funding and development of the system. The aim was to make research careers more attractive, promote equality in women's research careers as well as to examine how internationalization should be taken into account at different stages of the research career.

Lohikoski et al. (2007) have made a practical guide promoting gender equality work in Finnish schools, especially in technical education in polytechnics and universities. The need for this guide is based on the strong horizontal gender segregation in the Finnish labour markets, even in the cases where women have achieved high levels of education.