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Gender Balance Initiatives in Research Funding

Barriers and Possible Measures to Increase the Share of Women within Natural Science and Technology

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Barriers and possible measures to increase the share of women
within natural science and technology



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The VILLUM Foundation, 2019
Research memorandum

TABLE OF CONTENTS

| | |
|---|-----------|
| EXECUTIVE SUMMARY..... | 3 |
| FINDINGS AND RECOMMENDATIONS..... | 4 |
| 1. Introduction | 6 |
| 2. Addressing gender imbalances at Danish universities..... | 7 |
| 2.1. National and organisational policies | 8 |
| 2.2. Natural sciences and technology as male dominated faculties..... | 9 |
| 2.3. Addressing gender imbalances in research councils and funding institutions | 9 |
| 3. Barriers and initiatives towards achieving gender equality in science..... | 10 |
| 3.1. The leaking pipeline | 10 |
| 3.2. Recruitment and career development | 11 |
| 3.3. The academic working environment..... | 11 |
| 3.4. Work-life imbalances and career obstacles | 12 |
| 3.5. Unconscious bias and gender stereotyping | 13 |
| 3.6. The one-sided perception of academic excellence..... | 13 |
| 3.7. Lack of gender diversity at the professorial and management levels | 14 |
| 4. The gender challenge in research funding..... | 15 |
| 4.1. Gender and success (or lack of success) in funding..... | 15 |
| 4.2. The gender composition of board and committee members | 15 |
| 4.3. Research councils and funding institutions as key levers for change | 16 |
| 5. What works? | |
| Introducing a selection of specific actions and possible measures in funding practices | 16 |
| 5.1. Certification and pre-qualification in funding processes..... | 17 |
| 5.2. The use of earmarked funds..... | 19 |
| 5.3. Bias training: Levelling the playing field | 20 |
| 5.4. The use of observers in evaluation panels..... | 22 |
| 5.5. Ensuring public accountability..... | 23 |
| 5.6. Counteracting the motherhood penalty | 23 |
| REFERENCES..... | 25 |

EXECUTIVE SUMMARY

The underlying causes of the gender imbalances in academia are numerous and complex. However, as outlined in this memorandum, several factors can be highlighted: The phenomenon of 'the leaking pipeline', recruitment and career development practices in academia; the academic working environment and its attendant work-life imbalances and career obstacles (related to for instance childbearing and caregiving), unconscious bias and gender stereotyping both within universities and research funding organisations, a narrow perception of academic excellence, as well as a general lack of gender diversity at the professorial and management levels.

While the problems thus are complex and often interrelated, many of the various approaches designed to try to tackle them (at least in a Danish context) often seem unidimensional and short-lived. Various efforts have been made over the years, for example through the setting up of various think tanks and task forces, making changes to the legal framework requiring universities to develop gender equality plans, by way of trying out earmarked funding programs for female scientists, etc. In the Danish context, the government has been reluctant to interfere in the autonomy of the universities, while other countries (for instance Norway, Sweden, the UK, Ireland and the Netherlands) have taken on a much more proactive and interventionist approach. What is missing from the Danish research sector is a comprehensive, overarching and persistent plan for achieving gender balance in both the universities as a whole and in research funding. From a European perspective, discussions of the role of research funding institutions in addressing the gender challenge have gained ground in recent years. The argument has been that the European and national research councils and funding institutions can put pressure on the universities from the outside; thereby assisting in pushing the universities to give their equality work higher priority and achieve results. In the current Danish research climate, where universities and research organisations are increasingly dependent on acquiring external funding, it seems plausible that funding organisations may, in fact, lead the way in promoting gender balance in Danish research through setting norms and targets for change.

A number of specific actions and possible measures in funding practices have already been tried out at home and abroad. In the review of literature on this topic, the message emerges that:

- It is important for research funding councils and institutions to take the gender challenge in funding seriously; they can act as key levers for change.
- Funding organisations need to be willing to scrutinize their own practices.
- Efforts should be made to improve transparency in research funding.
- Addressing gender imbalances in funding should be persistent and not just limited to short time periods.
- The gender equality perspective should be incorporated at the programme level (in all core documents) and should be considered in all core activities at all stages of the funding procedures and practices (in calls, grant application and allocation process, and in management of funds).
- Leadership for change is required.

FINDINGS AND RECOMMENDATIONS

Based on desk research, this research memorandum presents in total six promising practices and short summaries of existing experiences regarding what works in addressing the gender gap in research funding. While the identified gender balancing initiatives and measures stem from numerous national contexts, each of them are characterised by focusing mainly on one specific part of the grant allocation process – whether it be early in the process, where measures such as certification of applicants and/or earmarked funds are a possibility, or while applicants and projects are being assessed, or in the post-award phase, where measures to ensure public accountability for funding schemes and counteracting the motherhood penalty are distinct possibilities. Following the presentation of the promising practices below is a number of clear and concise recommendations on possible actions to be taken. However, the perhaps main and most important recommendation is that research councils and funding institutions can take advantage of *introducing a broad spectrum of initiatives at the same time*. Thus, implementing a combination of smaller and larger measures (or ‘softer’ and ‘harder’ actions) simultaneously. Also, it is worth noticing that none of the identified promising gender balancing initiatives and measures can stand alone; their functioning and expected effects will be enhanced if they are introduced and implemented in a supplementary manner.

Promising practice #1: Certification/pre-qualification in funding processes

Promising practice #2: The earmarking of funds

Increase funding applications from and success rate among female scientists, for instance by:

- Introducing a *gender balance-certification* (title suggestion: VILLUM Balance) as a requirement to natural sciences and technology faculties/departments for being eligible to apply for funding at the Villum Foundation; either in relation to earmarked/targeted programs or in all programs. Alternatively, introduce *institutional gender equality promotion grants* to put pressure on natural sciences and technology faculties/departments to make up gender equality plans of their own (at many universities the gender equality plans are at the university level, making them less visible/pressing at the level of faculties and departments).
- Encouraging women to apply in the call text and/or reviewing gender proofing of language of call texts with the aim to avoid gender biased/one-sided wordings of what defines excellence. Also, seek to include gender-sensitive and work-life balance provisions.
- Introducing targets for proportion of women funded, either as an absolute target or as a target relative to the applicant pool.
- Introducing a gender balanced composition of the research team as a ranking criterion at review stage, in line with practices already established by the European Commission (H2020) and other international funders.
- Launching earmarked funding for women and/or targeted funding supporting either projects with a female Principal Investigator or projects with a male Principal Investigator that includes the employment/retainment of young female researchers – or combine both kinds of targeted funds.
- Introducing measures to ensure promotion of gender-diverse composition and balanced distribution of responsibilities and activities within research teams (also see gender indicators as monitoring tool, cf. below).

Promising practice #3: Bias training: Levelling the playing field

Promising practice #4: The use of observers in evaluation panels

Make efforts to address and mitigate gender bias and stereotyping, for instance by:

- Increasing gender sensitive knowledge and capacity building for key actors in the funding process (advisors, applicants, evaluators, etc.).
- Providing effective unconscious bias training and training on gender stereotypes in research assessment/evaluation procedures.
- Formalize attention to possible unconscious gender bias at funding assessment meetings, for example by 'calibrating' evaluations ahead of meetings, assigning formal responsibility for seating arrangements to committee chairs etc.
- Introducing the use of 'gender equality observations' at funding assessment meetings to contribute in mitigating against gender bias.
- Improving gender balance in the recruitment of evaluators and reviewers and in the final composition of committees and scientific evaluation panels in order to ensure that women and men participate equally in the funding decision-making process. Make sure to analyse the mechanisms for nominating and appointing not only board and committee members, but also Chairs as well.
- Scrutinizing the evaluation procedures of proposals and monitor for possible gender bias on a regular basis. Raise awareness on gender-sensitive criteria in addressing the possible challenges in this regard relating to tackling the causes of the persistent leaking pipeline.
- Consider introducing gender indicators in the assessment procedures of applications, for instance by looking at the gender balance in project dissemination and communication activities, proportion of women in international advisory boards, share of women as first authors of publications and research papers, etc.

Promising practice #5: Ensuring public accountability

Promising practice #6: Counteracting the motherhood penalty

Make public accountability the focus of strategic attention in the foundation, for instance by:

- Monitoring data and publishing the results; direct attention towards sex-disaggregated data on number of applicants, number of grants allocated, success rate of applicants as well as on the gender composition of review panels and funding decision-making bodies.

Make efforts to adopt evaluation and funding criteria that take into account motherhood/parenthood as a potentiality in researchers' lives, for instance by:

- Introducing measures targeting (women) researchers in different career phases and/or measures facilitating work-life balance in research.
- Designing and implementing specific grant management policies to deal with the needs of researchers during periods of maternity/paternity/adoptive leave. Including men who become fathers in the policies is important in order to encourage more male researchers to take paternity leave.
- Clearly communicating and emphasizing family friendly initiatives and procedures so that potential applicants with caring responsibilities do not hesitate to apply and/or include young (female) researchers in their research team.
- Expanding the eligibility window for researchers who have had periods of parental leave.

- Granting supplementary funding for researchers who take parental leave, so that the PI will have all additional costs covered and not hesitate to include young females in his/her team.
- Granting supplementary funding for employment of a replacement in case of parental leave in order to ensure the continuation of the project. This will ease the burden on researchers with care responsibilities and diminish the perceived barriers for hiring young, female researchers.
- Support flexible work time, both regarding work hours and duration of a project.
- Revise the rules for mobility grants so that these funds can be spent on child care, housing, etc. that represent considerable expenses for young researchers with families.

1. Introduction

The objective of this research memorandum is to identify and describe what constitutes the significant barriers against achieving a better gender balance at Danish universities, in particular within natural sciences and technology. The memorandum also addresses the question of the possible role of research funding institutions in relation to gender imbalances in academia, and in particular which actions and measures have been put in place in order to prevent women from remaining disproportionately underrepresented within natural sciences and technology. The memorandum is based on well documented recent research, and highlights:

- What are the main reasons for the skewed gender distribution within (natural science and technical) research?
- What efforts (national and international) have proved effective in increasing the proportion of women in research?
- What instruments have national and international funds used to address gender disparities - and with what effect?

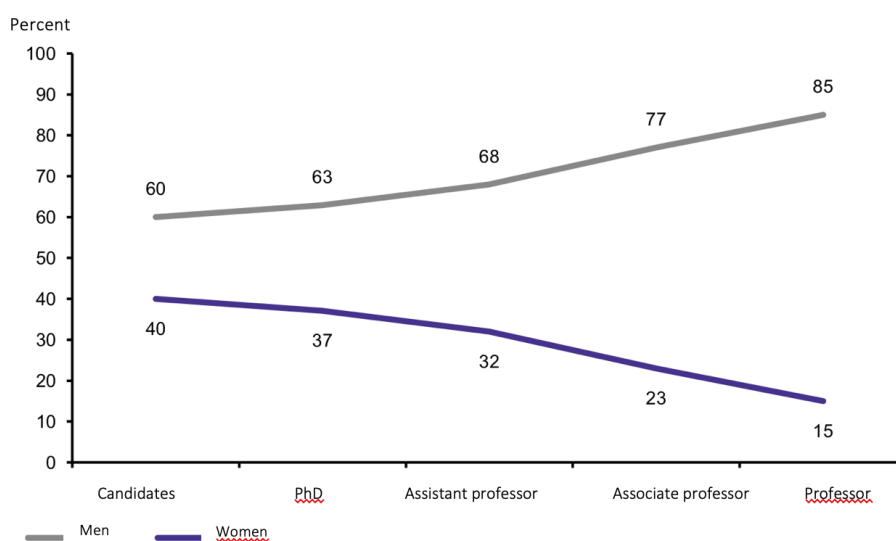
The memorandum is based on desk research, focusing on recent national and international literature on barriers against achieving gender balance in research. Chapter 2 focuses on the situation in Denmark, and briefly presents the current overall gender gap, as well as the specific lack of women within natural sciences and technology. Furthermore, chapter 2 presents recent national initiatives to address the gender gap in science, both at political and organisational levels, as well as within research councils and funding institutions. Chapter 3 widens the scope, by drawing on national and international literature on the underlying causes for the skewed gender distribution in research – here, focus is on the research sector as a whole (and not just natural and technical science), as the underlying problems have been documented to be largely the same. There is in fact evidence of initiatives developed in particular to address the lack of women within natural sciences and technology; however, these are often designed to affect girls and young women’s decision to enter the field (for instance by way of organising science camps at the universities to encourage more girls and young women to study math or science). Such initiatives are not included in this memorandum where focus is on women’s careers from PhD level and onwards. Chapter 4 discusses the gender gap in research funding in some detail, with a main focus on Denmark, while chapter 5 presents six different initiatives from both Denmark and abroad which have been tried in attempts to ensure a better representation of women among grant receivers. The initiatives in each their way aim at addressing barriers to women’s careers in science, and hence are not specific to natural sciences and technology, although these may well be the research fields in which such initiatives are most called for, as documented in chapter 2.

2. Addressing gender imbalances at Danish universities

Despite the fact that Denmark is often considered to be a country known for its gender equality, Danish universities are characterised by a high degree of gender imbalance. Comparing statistics across European countries clearly reveals that the percentage of female researchers is lower in Denmark than in our Nordic neighbouring countries, and even lower than the EU average (European Commission 2019). Among the Nordic countries, Finland, Norway and Sweden have been identified as particularly proactive in promoting gender equality in research (European Commission 2009). Denmark has been less active and can be characterised by an irregular commitment. In the Danish society, gender imbalances are often denied or its dimensions and impacts underestimated as the general perception appears to be either that gender equality has already been achieved or that gender issues are not relevant in an academic setting.

Although the existing 'talent pool' is gender balanced, with the proportion of women among doctoral graduates being 48.5% in Denmark, the number of female scientists employed at Danish universities decreases significantly in particular after the PhD level, and as they are moving up the academic ladder. The proportion of women among Danish scientists in total is 33.8% and the proportion of women in top academic positions is significantly lower: In the Danish scientific community, only 20.7% of full professors are women (European Commission 2019: 19, 59, 118). Within the literature *the leaking pipeline* is an often-used metaphor to describe the fact that female scientists gradually disappear before they are able to obtain tenure. The leak of women out of the scientific pipelines is represented as a loss of talent and wasted professional/human resources (Goulden, Mason & Frasch 2011). Within natural and technical science, the leaky pipeline is particularly conspicuous. In the discussion of why those leaks occur, "the cracks and gaps" (Grogan 2018: 1) are explained by the biases and barriers faced by women at different stages in their careers. The leaks are often depicted by way of a curve, that displays the disappearance, or 'evaporation', of women as they climb the academic career ladder. Below is a curve as it appears when depicting the gender composition within Danish natural and technical sciences:

Figure 1: Men and women in a typical academic career path within the natural and technical sciences, 2017



Source: The Danish Agency for Science and Higher Education (2019): *Men and women at Danish Universities*, page 55. Based on the candidate- and PhD-register from Statistic Denmark as well as reports from the universities to the Ministry of Education and Research

The gender challenges within academia are also visible when analysing the working conditions, where statistics reveal that more female than male scientists work part-time or within the scope of contracts characterised by precariousness. Also, there is evidence of both gender pay gaps, motherhood penalties and gender funding gaps (European Commission 2019).

2.1. National and organisational policies

For a number of years, it was assumed that gender disparity at Danish universities would automatically offset over time as a result of an increased intake of female students and PhD students. Since then, the discussions went on to say that such a development is subject to uncertainty and that the development no matter what went too slowly. However, despite several of years of attention and various policy initiatives, the proportion of female researchers at Danish universities has only increased slightly; from 27% in 2007 to 34% in 2017 (The Danish Agency for Science and Higher Education 2019: 8).

As part of the work to ensure better gender balance at the universities, the problem identification in recent years has changed. Whereas women's lacking presence, especially on the upper career stages of the universities, was previously explained by individual opt-out and preferences, over the years, there has been a greater focus on organisational development as the key to changing the skewed gender composition in academia. In the research literature, this is referred to as a turn from a "fix the women"-approach (focus on women; the individual level) to a "fix the organisations"-approach (focus on structures and cultures) (Schiebinger 2008, Ulvestad 2017, Burkinshaw & White 2017).

Throughout the years, political attention has increasingly put pressure on the universities to make them address the lack of gender balance and to raise awareness of both the structural and cultural barriers that can affect the gender composition among employees. The Danish legal framework does not require universities to have gender equality policies in place, but different Acts do help to facilitate such plans to be prepared, for instance the Gender Equality Act, stating that public authorities (thus, including universities) shall within their respective areas of responsibility seek to promote gender equality, incorporate gender equality in all planning and administration, and at all levels work towards achieving equal gender-balance e.g. by requiring a balanced gender composition on boards, councils and committees - and if this is not possible, then set targets for the number of the underrepresented gender. Although the Danish legal framework does not require it, the majority of Danish universities have introduced gender equality plans, but there are substantial variations in the degree and the extent to which these plans contain active measures or merely contain 'symbolic' statements. By way of the Act on Universities, the Ministry of Higher Education and Science supervise the work being done by having the universities draw up three-year agreements (Development Contracts), defining clear targets and objectives for the universities. Gender equality may be included in the contracts, but it is not a requirement and the vast majority of Danish universities have chosen to leave it out.

In Denmark, the government has been reluctant to interfere in the autonomy of the universities, while Norway and Sweden has taken on a more proactive and interventionist approach. Thus, in both those countries, gender quotas or earmarking of positions in academia for women or the underrepresented gender have been implemented (Bergman & Rustad 2013). Most recently, a law has been passed in Sweden that requires Swedish universities to integrate gender mainstreaming before the end of 2019, so that all activities and decision-making processes at the universities are well thought through from a clear and systematic gender perspective (Department of Education 2017). In the Danish context, on the other hand, there is a softer approach, whereby 'political nudging' through setting up commissions and think tanks

characterise attempts to try to combat the tendency for gender issues to be neglected or given lower priority compared to other issues and activities in day-to-day work and university decision-making. The most recent example, *Taskforce for more Women in Research*, was set up by the Danish Minister of Higher Education and Science in 2015. This task force first of all pointed to the importance of gender and gender equality becoming a focus area at management level at all universities. At the same time, focus was on recruitment, career paths, talent management and on the work culture at the universities (Ministry of Higher Education and Science 2015a; 2015b).

2.2. Natural sciences and technology as male dominated faculties

The scientific main areas vary greatly in size, measured by the number of researchers. The fields of natural science and technology are the largest in Denmark, corresponding to 49% of all researchers. However, within these two scientific areas the gender gap is significant in the Danish context. Though the size of this gap has decreased over time, male scientist still outnumbers female scientists. In international comparisons of the proportion of female researchers (based on numbers from 2016), Denmark ranks as only number 34 out of a total of 38 countries that are compared in the field of natural sciences. Denmark only has a share of 29% women in natural sciences where the country ranked highest has 59% (Bosnien-Herzegovina). Within technology, Denmark is ranked number 25 in comparison with in total 38 countries; with a share of only 25% women where Romania being the highest ranked country has a share of 45% women (The Danish Agency for Science and Higher Education 2019: 28-29).

The striking disparity between the share of male versus female scientists in natural science and technology prompts a number of efforts to explain it. One reason appears to be cultural beliefs and negative stereotypes about gendered differences in abilities and interests, leading few girls and young women to enter the fields, and in some subfields, such as physics, engineering, and computer science, the difference is dramatic, with women earning only a very small percent of bachelor's and master's degrees. According to a recent study from Innovation Fund Denmark, the share of young women accepted into so-called STEM bachelor's programs (Science, Technology, Engineering and Mathematics) is almost unchanged since 2011, constituting only one-third of the students in 2018 (McKinsey & Company & Innovation Fund Denmark 2018). However, the lack of women in STEM is not only about not being able to attract and recruit women, but also about retention, or lack of such, of female scientists. Thus, research has shown that women are less satisfied with the male-dominated academic working atmosphere and, thus, are more likely than their male counterparts to leave it earlier in their careers (Hill, Corbett & Rose 2010) (also see Pascale 2018).

The low number of women within the natural sciences and technology has, for several years, been a target of real concern, e.g. in the EU and in OECD. Here it has been pointed out that gender inequality is particularly inappropriate, because there may be differences in which research topics men and women put on the agenda, and which perspectives men and women involve in the specific research design (OECD 2018). This call for concern has also been directed towards the research funding councils and institutions, as they both control *who gets funded* and *what gets funded*, and therefore also have a say in *who is being studied* in the research that gets funded. This perspective raises the question of whether funding processes and decisions adequately ensure that research includes and benefits both boys, girls, men, women, and gender diverse persons equally? (Tannenbaum 2017).

2.3. Addressing gender imbalances in research councils and funding institutions

When taking a closer look at the Danish policy framework for integrating gender equality into

universities, it is also relevant to account for developments in the research funding mechanisms of the Danish research system. In a recent report from The Danish Council for Research and Innovation Policy, the conclusion is that gender imbalances in relation to the distribution of funding contributes to the low share of women in Danish research (The Danish Council for Research and Innovation Policy 2019: 60). Within the past two decades, the Danish government and the Ministry of Higher Education and Science have initiated two affirmative action programs, namely FREJA (1998) and YDUN (2014). Both programs aimed directly at encouraging more women to seek research funding – not only within the natural and technical sciences but across all academic disciplines - and to become research leaders in order to promote a more balanced gender composition in Danish research.

In Denmark, not only under the auspices of the Danish Council for Independent Research, but also of the Innovation Fund Denmark, the focus has been on monitoring the gender distribution among applicants and grant recipients and identifying barriers for women's research careers. In 2018, Innovation Fund Denmark hosted a so-called *InnoTalk* under the heading “How do we strengthen the gender balance”, just as the board took four concrete initiatives: Appoint a corps of role models, integrate gender diversity as part of the new entrepreneurial strategy, adjust application requirements and formulations, and conduct interview studies with groups which does not normally seek the grants of the Fund. In addition, the Fund will focus on gender diversity in relation to panel candidates and distribution of prizes (Innovation Fund Denmark 2018).

In a European context, the Commission has long been working to influence the gender balance of European universities, e.g. by establishing an incentive structure via the research support program Horizon 2020. This program requires applicants to account for the gender composition of the entire research team, as well as for possible gender aspects in the formulated research project. Both of these requirements have since been similarly integrated, also within the Danish Research Councils.

By comparison, the governments in the UK, Ireland and Australia have stood up to ensure progression in the elimination of gender imbalances in academia. They have introduced the so-called *Athena Swan Charter*, making universities compete for bronze, silver or golden medals in relation to their work towards achieving gender equality. In addition, the three largest research funding agencies in Ireland (the Irish Research Council, Science Foundation Ireland and the Health Research Board) have joined forces, requiring that researchers employed at Irish Universities are, by the end of 2019, only eligible to apply for funding if their university have managed to attain an Athena SWAN gender equality accreditation (Hindhaugh 2017).

3. Barriers towards achieving gender equality in science

3.1. The leaking pipeline

As already mentioned, the leaking pipeline is a metaphor being used to describe the fact that female scientists tend to leak out of the scientific pipeline. Compared to, for example, Norway, Sweden and Finland, Denmark is less able to maintain women at assistant professors and associate professor level. Thus, women accounted for only 33% of all researchers at the level of associate professors at the Danish universities in 2016. The figures for Finland, Norway and Sweden, on the other hand, are 49%, 46% and 46% of all researchers at the associate professor level (for Sweden, the figure is from 2015) (The Danish Agency for Science and Higher Education 2019: 14).

Research reveals that the transitions between each of the temporary positions and up to the first fixed position constitute the most critical phases in a research career. Unlike, for example, the US system, tenure track employment is rarely used in Denmark, which contributes to long periods of uncertain terms of employment (Nielsen 2014; 2016). Especially the younger female researchers, in particular within the natural and technical sciences, find that the universities offer poor career opportunities and unclear prospects (Grogan 2018). The frustration of the series of temporary contracts is often linked to the life situation the younger researchers are in, as the period for many coincides with the desire to want to start a family. This is a problem that particularly affects the younger female researchers, as it is difficult to combine the pursuit of long-term career qualifications with maternity and parental leave, and to have caring obligations for smaller children (Faber, Gemzøe and Nielsen 2017). Many younger women, therefore, choose to leave the universities to seek employment in sectors where employment conditions are more secure and working conditions are more family-friendly. This tendency is particularly indicative for the fields of STEM (Science, Technology, Engineering and Mathematics) where the abilities to retain women have proven exceptionally difficult (McKinsey & Company & Innovation Fund Denmark 2018).

3.2. Recruitment and career development

The meritocratic self-understanding that prevails at universities does not necessarily match the actual employment procedures. Nielsen (2016) thus argues that many of the selection processes at universities in practice take place *before* a position is announced, and that a researcher's chances of advancing therefore depend to a greater extent on, among other things, network. In this informal process, according to Nielsen, there is a gendered bias: the male employees become more visible, and the researchers who are to identify the talents will discover those who look like themselves. The research literature refers to the recruitment process, which often precedes an employment in the research community, as '*scouting*'. This concerns talent identification and a search for suitable candidates within the field for a given position. In a Danish study, Munar and Villesèche (2016) conclude that scouting processes constitute a complex field. They identify that the most commonly used procedure today is as follows: "Identify need/opportunity - identify and secure candidate - inform/lobby - announce - assess - hire". According to Munar and Villesèche, this approach is among other things a consequence of cuts across the Danish university sector; institutions wish to secure their own candidates with the few funds available. The consequences of this practice, however, are that the universities run the risk of undermining diversity-promoting measures (such as a broadly composed employment committees and broad announcements of positions). It also means that lobbying - both in the form of *scouting* and *nudging* (encouragement to selected employees to apply) - acquire more importance at the universities. Such tendencies most likely maintain gender inequality, because scouting and nudging are typically practiced by seniors and management, most often men, who - due to unconscious bias - tend to choose someone similar to themselves. These closed procedures run the risk of leading to a situation where associate professors, professors and management so to speak "reproduce themselves" (Van den Brink 2011; Ministry of Higher Education and Science 2015a; Munar and Villesèche 2016: 23-24; Nielsen 2016: 388).

3.3. The academic working environment

Being a scientist is by many perceived to be 'a calling' or 'a lifestyle' which can lead to a working environment with no upper limit to the working hours. Furthermore, being employed within academia is characterised by a high demand of flexibility and *voluntary commitment* which has

led the universities to be described as 'greedy institutions' (Brandth & Kvande 2001). This creates a situation where work and family life turns into a contest of the individual employee's time and presence. Having difficulties finding the right balance between work and family is particularly difficult for female researchers, who often try to build a career around their caring responsibilities (Media FHE 2019).

Furthermore, the working environment is characterised by a certain toughness and competitiveness which tends to create a lonely and 'chilly climate' for women; in particular within STEM, where the female scientists are to navigate as the 'underrepresented gender' (Monroe et al. 2008; Baker 2012). In a study of English universities, Fotaki (2013) found that women in male-dominated faculties tend to feel like strangers, for instance as a result of lack of recognition or career progression, exclusion from networks, because they feel isolated, and lack a sense of community because they experience being undermined, silenced or objectified (for a recent Danish study on women's negative experiences in academia, see Praëm 2019).

3.4. Work-life imbalances and career obstacles

Research has shown that 'babies matter' with respect to female scientists' employment and promotion possibilities. Within the literature, this tendency has been addressed as a 'maternal wall' hindering the career of female researchers - also paraphrased as the 'motherhood penalty' or 'child penalty', referring to the fact that the careers of female scientists with children tend to lag behind (Williams 2005, Baker 2009, Grummell, Devine & Lynch 2009). According to a recent Danish study by Munar and Villesèche (2016) family life, motherhood and prioritising care responsibilities is associated with a lack of dedication and ability to compete: The children are perceived to be stealing time from the research, and female scientists are likely to experience career setbacks. A recent report from The Danish Agency for Science and Higher Education concludes that, at Danish universities, female scientists with children are less likely to be promoted than male scientists, with or without children. While 40% of the male associate professors with children, who had obtained the Ph.D. degree in the period 2007-2009, had secured a permanent position as associate professors within 6 years, the equivalent number for female scientists was only 27% (The Danish Agency for Science and Higher Education 2019: 10; 59). Thus, having children can lead to career cul-de-sacs or cause delays in the career paths for female scientists.

According to Rivera (2017), within academia 'gendered scripts of career and family' implicitly rest on an idea of men's careers as taking precedence over women's. Thus, Rivera finds that in academic hiring, it is often assumed by committee members that (heterosexual) female scientists who are married to, or living together with, partners with academic or high-status jobs were not 'movable'. Thus, such women risked being deselected if there were 'viable male or single female alternatives'. In comparison, only occasionally did the committee members in Rivera's study discuss the status of male applicants' relationship, leading to the conclusion that gendered stereotypes and biased organisational practices risk disadvantaging women in academic hiring and hindering faculty diversity.

Although the issue of work-life imbalance is acknowledged, and universities frequently discuss family-friendliness, they have, at the same time, restructured with more institutional focus and priorities directed towards research productivity, internationalisation and external funding. According to Baker (2009), the prevailing emphasis on these priorities tend to exacerbate gender imbalances within academia, as the problem of combining full-time academic work with family life continue to challenge female scientists in particular (in terms of working hours, stress levels, work/care conflicts, etc.).

3.5. Unconscious bias and gender stereotyping

The relatively closed recruitment and promotion mechanisms that exist at universities make it especially important to be aware of how unconscious ideas about, for example, gender, ethnicity, disability, etc. can affect the assessment of performance and qualifications. Here, Munar and Villesèche (2016) point to the importance of bias training - if one does not consciously confront one's own biases, one risks engaging in discriminating practices: e.g. on the basis of ideas about what men and women may manage and prioritize.

A recent analysis and attendant recommendation by the League of European Research Universities concludes that unconscious gender bias plays a negative role in relation to career progression for women – thus, they conclude that gendered stereotypes has a tendency to impair women's careers in science (The Danish Agency for Science and Higher Education 2019: 10). The presence of unconscious gender bias is a major challenge for the universities, which have a strong meritocratic self-understanding and a built-in belief in the meritocratic system as objective. This results in employees not being encouraged to be self-reflexive about bias, just as research suggests that leaders in meritocratic organizations are more likely to choose men rather than women for the same reason (Castilla & Bernard 2010, Nielsen 2016, EIGE 2016).

Bloch and Henriksen (2013) point out that unconscious bias and gender discrimination does not only occur at the universities in connection with recruitment and promotion, but also permeates the grant system. Thus, they show that women who are recruited for research projects are almost twice as experienced as the men if, for example, one looks at the Ph.D. age for embedded post docs in DFF grants. They also look at how the post docs who were enrolled in applied DFF projects were recruited for the projects. Here, their results show that the proportion of men recruited to the projects by their PhD supervisor is almost twice the proportion of women. These findings indicate that meritocracy and conscious/unconscious selection and bias are concepts that are worth considering not only in recruitment but in relation to the entire academic culture.

In the discussion related to gender bias in academia the Norwegian Committee for Gender Balance and Diversity in Research (KIF) has recently warned against putting too much focus on implicit bias, as this actually risks slowing down the gender equality efforts. The critique addresses that the strong focus on bias is related to individual researchers, leaders and committee members (“fix the individuals”) instead of focusing on the structural imbalances (“fix the gender-skewed structures”) (Løvereide 2019).

3.6. The one-sided perception of academic excellence

The term excellence is widely used to refer to a central institutional logic within universities, related to objective key performance indicators, assessments procedures, and various aspects of universities' activities. As such, it represents what O'Connor and Hagan (2015) describe as a 'macro-cultural ideal' or 'an institutional myth'. In a Nordic report, it has been concluded that the term 'excellence' took centre stage in the Nordic countries throughout the 2000s, where the establishment of, and allocation of research resources to, centres of excellence and elite research environments became key instruments in the area of research policies. However, although the idea of excellence is often considered synonymous with fairness, or objectivity, research has shown that using 'excellence-in-research-initiatives' as instruments tend to favour male scientists over their female counterparts (Bergman & Rustad 2013: 10). Henningsen and Liestøl (2013) have expanded the discussion by pointing out that priorities of subjects and research funds in Nordic research policy are often presented as gender neutral, “despite the fact

that women and men are very unequally distributed over subjects and research traditions” (Henningsen & Liestøl 2013: 348). They convey the concept of excellence as an example of this trend, which precisely favours the subjects in which there are most men. According to Swedish researchers, the narrow interpretation of the concept of excellence has had negative consequences for gender equality in academia, among other things because it is primarily male scientists who are considered ‘excellent’ and therefore receive funding (Sandström et al. 2010).

Research from both Ireland, the Netherlands and Denmark recommend that the understanding of excellence be expanded (O’Connor and Hagan 2015, Van den Brink 2011, Van den Brink & Benschop 2012, Munar & Villesèche 2016, Nielsen 2016; 2017). For instance, Van den Brink and Benschop have demonstrated that both the definition of academic excellence and the practices involved in identifying and assessing excellence are highly gendered. According to them, the concept of excellence covers three elements when assessing a candidate’s suitability: professional qualifications, individual qualifications and networks. However, the three categories are not gender neutral. Male researchers are more than female researchers reaping the rewards of an international and elitist network, where men unconsciously recommend, cite and favor other men who resemble themselves (Van den Brink & Benschop 2012: 517-518). Also, the way researchers’ productivity is calculated has a gendered imbalance, concludes Van den Brink and Benschop: If you only count publication points, you ignore teaching and administration tasks, and in the assessment of productivity, leave or part-time periods are not always offset. Thus, “excellence” is an example of a concept that seems to be objective and neutral, but which, in fact, favors features that promote male researchers, since women researchers generally spend less time on research than men and more on teaching, advising students, and campus service (Winslow 2010, O’Meara et al. 2017, Van den Brink & Benschop 2012: 513-514).

3.7. Lack of gender diversity at the professorial and management levels

There is a lack of gender diversity within universities particularly at the professorial and management levels and within scientific boards. Compared to the EU-average, and compared to the neighbouring Nordic countries, with only 20.7% Denmark has the lowest share of women at the professor level (European Commission 2019: 118). Not surprisingly, the gender imbalance of professors within natural sciences and technology stands out, with only 15% female professors (The Danish Agency for Science and Higher Education 2019: 30; 53). Also, at the level of management women are drastically underrepresented. Thus, the share of women at the top-level management at Danish universities is only 18% (numbers from 2018) (The Danish Agency for Science and Higher Education 2019: 93).

In order to describe the invisible barriers for women’s advancement in academia, the metaphor of the ‘unbreakable glass ceiling’ is often used (Drakich & Stewart 2007, Jackson & O’Callaghan 2009). Research has shown that there are several negative mechanisms at play which can explain the glass ceiling and why women are less likely to be promoted within academia. Using the term ‘the merit paradox’, Castilla and Bernard (2010), as well as Rivera (2015), conclude that the focus on merit within academia risks, paradoxically, resulting in more biased outcomes. Because the merit-based system relies on assessments of how much ‘merit’ a scientist has, and because it favours those who have (or are perceived to have) most, it is problematic that women are significantly underrepresented in top positions and managerial roles and scientific boards, which is where, as part of organisational decision-making processes, the measurement and assessment of what is defined as ‘merit’ takes place.

4. The gender challenge in research funding

From a European perspective, discussions of the role of research funding institutions in addressing the gender challenge have gained ground in recent years. In particular, the gender-skewed distribution of funding has been problematized, as European statistics show that male scientists are more likely to receive funding than female scientists (European Commission 2009).

4.1. Gender and success (or lack of success) in funding

According to a recent Danish study from The Think Tank DEA (2019), two interesting trends have been identified: Firstly, that in general male scientists receive both a larger share of funding resources and a larger sum than female scientists: Thus, women make up 34% of the grant applicants, receive 29% of the number of grants and 22% of the total amount of funding. Part of the explanation for this image must be found in the fact that there is a higher concentration of male researchers in the highest career stages and in the fields of natural science and technology, which are some of the areas (which together with health sciences) account for the largest share of allocated funds. Secondly, the study finds that a large share of the research funds is allocated to a limited number of scientists. The latter has sparked a discussion at the national level about different funding strategies and effects such as '*concentration of funding*' (allocating resources to a small group of elite scientists), versus '*dispersal of funding*' (allocating resources in smaller portions to more research teams and to support careers of promising individual scientists) (The Think Tank DEA 2019; Aagaard, Kladakis & Nielsen 2018).

In an analysis of the distribution patterns from public funds, a recent report from the Danish Agency for Science and Higher Education concludes that the success rate of men and women varies from program to program and from year to year, and in many cases there are only small differences between the two sexes. However, a clear tendency has been identified; namely that men tend to have a higher success rate than women. This is especially true in the Danish Innovation Fund and in the Independent Research Fund Denmark. In the Danish National Research Foundation, on the other hand, there is a tendency for women to have a higher success rate than men (The Danish Agency for Science and Higher Education 2019: 74). The largest private research foundations in Denmark generally do not publish the gender ratio in their distribution of grants, so any direct comparison to the gender dimension in success rates is difficult due to a lack of transparency. However, one fund which published gender disaggregated data is the Villum Foundation. Also, here the vast majority of funding is distributed to male scientists. Thus, in 2017, only 44 out of 227 grant recipients were women; comprising a share of only 19% (The Villum Foundation 2019).

4.2. The gender composition of board and committee members

Looking at the gender composition of the members of the five national independent research councils (consisting of a total of 75 members), the share of women is highest in the Council for Society and Business (representing social sciences), namely 56% and lowest in the Council for Technology and Production (representing natural sciences and technology), where the female share is only 17%. However, this council stands out as one out of only two councils with a female council chair (The Danish Agency for Science and Higher Education 2019: 96-97). Only a few private research foundations comment on the share of men and women in their boards in publicly accessible annual reports (Realdania 2018; Tryghedsgruppen 2017).

From a European perspective, one of the problems behind the gender-skewed composition of board and committee chairs and members has been identified as being about the universities' tendency to nominate more men. However, funding agencies can play a role in

this as well, if they require that universities are asked to meet equity targets in their nomination procedures. In the Canadian academic community, eight female professors filed a formal complaint in 2008 to the human rights commission of Canada, “accusing the research agencies for not holding universities accountable to nominate more women for Chairs” (Tannenbaum 2017: 25). In order to highlight the lack of gender equality within research councils and funding institutions in Denmark, a number of Danish scientists launched the *Promote Me; Working to Bridge the Gender Gap in Science*-campaign in 2018 (<http://promoteme.co>).

It appears that the forerunners in strategic gender balancing initiatives are among the public foundations: The Independent Research Fund has launched an Equality Plan that is easily accessible through their website (The Independent Research Fund 2019). The Innovation Fund Denmark focusses on gender diversity in relation to panel candidates and in distribution of scientific awards, and has placed focus on identifying barriers to women's research careers (Innovation Fund Denmark 2018). With their report *Diversity and Excellence in Recruitment and Career Development*, The Danish National Research Foundation, too, has integrated a focus on gender and diversity in their work, making it a central topic for the foundation's latest annual meeting (The Danish National Research Foundation 2019).

4.3. Research councils and funding institutions as key levers for change

Compared to previous times, external financing of research plays a significant role today. Since 2006, resources from public and private funds have increased, while the basic research funding from the Danish government has decreased. The external funds are today closely tied to scientific career paths – the merit of being able to obtain funding is crucial in order to attain a permanent position. Also, the external funds play a central role in relation to advancement, as they can be used as part of negotiating a promotion to full professor (the Danish Council for Research and Innovation Policy 2019: 62). This shift within academia underlines the counter-productiveness of the gender-skewed distribution of funding in terms of achieving gender equality. While addressing this issue, Van der Lee and Ellemers have argued that “closing the funding gap is of particular importance, because this may directly retain women in academia and foster the closing of other gaps” (Van der Lee and Ellemers 2015: 12349). Likewise, other researchers have argued that funding agencies can assist in creating a cultural change (Tannenbaum 2017).

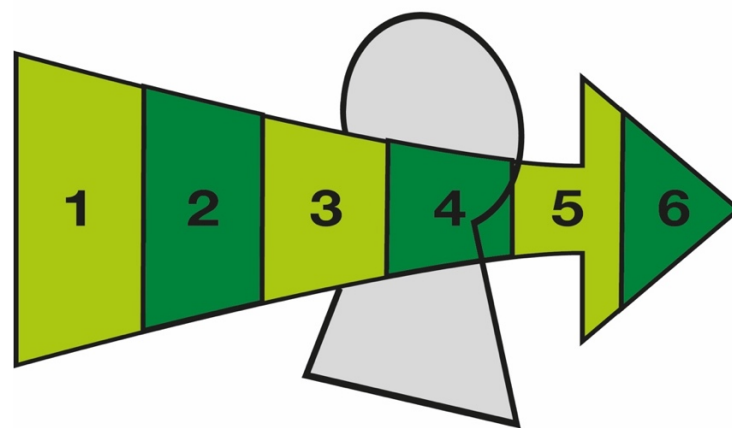
In the *council conclusions on advancing gender equality in the European Research Roadmap*, the Council explicitly invites research funding councils and foundations to assist in putting pressure on the universities by providing incentives that will encourage them to revise or develop gender mainstreaming strategies, gender equality plans and programmes and mobilise adequate resources to ensure their implementation (Gender Action, policy briefing 2019). According to a recent policy briefing from the *European Platform for Gender Action* research funding councils and foundations “are in a privileged position to introduce measures with the aim to accelerate change” (Gender Action, policy briefing 2019: 4).

5. What works? Introducing a selection of specific actions and possible measures in funding practices

Based on desk research, a number of recent actions and measures to counter the gender gap in funding from both Denmark and abroad have been identified, and these are briefly presented below. The identification of these measures is part of a mapping exercise of effects and evidence-based insights, focusing on which actions and measures may contribute to promote

gender diversity and support women’s careers specifically in natural sciences and technology in the Danish context. They each represent various approaches which seem promising in addressing some of the problems identified above. They are not ranked in terms of potential effect, but rather presented along a temporal continuum, associated with the stages in the application and fund allocation process where it is possible to activate the various measures. Graphically, the measures which together form the key to success may jointly be presented as illustrated in the model below:

Table 1: Promising practices in different stages of the application and fund allocation process



1. Certification/pre-qualification in funding processes
2. The use of earmarked funds
3. Bias training: Levelling the playing field
4. The use of observers in evaluation panels
5. Ensuring public accountability
6. Counteracting the motherhood penalty

5.1. Certifications and pre-qualifications in funding processes

One approach to closing the gender gap in research funding is to increase the proportion of female applicants *before* the assessment process takes place. Such measures include various pre-qualifications which institutions or individual researchers can be asked to meet when they apply for funding.

As a way of encouraging gender equality in research institutions applying for research grants, the UK Equality Challenge Unit established the already mentioned Athena SWAN charter in 2005 (Advance HE 2019). The charter stipulates that universities and research institutions can apply for and be granted a bronze, silver or gold award, depending on their effort to achieve gender equality. As of 2015, the charter was expanded to not only cover STEM-faculties but also arts, humanities, social sciences, business and law. As already mentioned, the Charter has also been introduced in Ireland, where the three largest research funding agencies stipulated that Irish universities from the end of 2019 must have an Athena SWAN bronze accreditation to qualify to receive research grants (Hindhaugh 2017, Science Foundation Ireland 2016a). A UK study found an increase in the share of female employment in UK medical schools, but did not establish a link to the Athena SWAN awards (Gregory-Smith 2017). Other studies conclude that even though the charter functions as a catalyst for structural change and

improved gender balance, the award system cannot stand alone without continuous attention and strong leadership (Munir et al. 2014, Caffrey et al. 2016, Ovseiko et al. 2017, Rosser et al. 2019). As part of such a certification process, the following concrete measures are often included:

Quotas for applicants: It is a pronounced aim for The Science Foundation Ireland (SFI) to ensure that research teams and PIs are comprised of at least 40% of each gender (Science Foundation Ireland 2016a: 6). In one of their grant programs, the research organizations are permitted to nominate a maximum of 6 (out of 12) male candidates. This has resulted in an increase of female awardees from 27% in 2013 to 54% in 2015 (Science Foundation Ireland 2018: 3). Another SFI initiative in their Professorship program is to require that “one of the next two successful Expressions of Interest [...] must be associated with a female candidate, which must then be followed up with the submission of a Full Proposal” (Science Foundation Ireland 2018: 3). A different kind of quota is used by the Swedish Research Council: Here, it is an aim to “ensure that women and men have the same success rates and receive the same average grant amount, taking into account the nature of the research and the type of grant.” The Swedish Foundation for Humanities and Social Sciences (Riksbankens Jubileumsfond) employs a similar approach in levelling out the resources (Husu & Callerstig 2018: 12). When distributing grants, The Research Council of Norway applies “moderate gender quotas” to increase the share of women awardees (The Research Council of Norway 2013-2017).

The gender dimension in research groups: Another initiative is to draw the applicant’s attention to the gender composition of the researchers within his/her group. The Independent Research Fund Denmark requires all larger project applications to account for this (The Independent Research Fund 2019). However, it does not count as an assessment criterion. Also, Science Foundation Ireland aims at ensuring gender balance in research teams and review panels. The both work towards increasing female representation within the Science Foundation Ireland funded portfolio (thereby contributing to attain the revised target: 30% of female award holders by 2020) and increasing the number of female reviewers (thereby contributing to achieve 40% representation of panellists of each gender in review panels by 2020). In their phase 2 programs, applicants are required to develop a gender action plan which is assessed as part of the review process as well as during progress reviews (Science foundation Ireland 2018).

The gender dimension in research: Many scientific fields, not least in the natural sciences, can be broadened and improved by including a gender perspective (European Commission 2013). In line with ERA (European Research Area Roadmap) and H2020, applications for the Netherlands Organization for Scientific Research, Science Foundation Ireland, The Research Council of Norway, and numerous other major funding agencies are required to include a sex or gender dimension in their research, if relevant (NWO 2019, Gendered Innovations 2019). Science Foundation Ireland is developing guidelines for reviewers and applicants to explore the gendered perspectives of their research areas (Science Foundation Ireland 2016a: 7). The Gendered Innovations Project at Stanford University specializes in these guidelines (<https://genderedinnovations.stanford.edu/>). The Swedish Innovation Agency (VINNOVA) has had gender equality as a priority since its launch in 2001. A government mandate to pursue this even further in 2015 spurred the development, so that the share of female applicants has increased from 17% in 2016 to 25% in 2018. VINNOVA aims to increase gender equality *both* through their equal distribution of grants, and by encouraging applicants to include a gender dimension in their research (VINNOVA 2018: 25-27).

5.2. The use of earmarked funds

A second approach to increase the proportion of female applicants *before* grant allocation, is to earmark funds for women. Such an approach has the advantage of quickly guaranteeing to raise the number of female scientist by enhancing their career possibilities and targeting the gender imbalance determinedly. In the Danish context, FREJA (1998) and YDUN (2014) are, as previously mentioned, examples of government funding initiatives earmarked for female scientists. When the Ministry for Higher Education and Science in 2010 requested an official external evaluation of the effects of the FREJA initiative, the evaluation uncovered that the interest for the programme had been immense, and with an overall success rate of less than 5%, the competition surrounding the program ended up being more intense than what was the case for the ordinary research funds allocated by the research councils (Faber & Haase 2010). The YDUN program was equally popular, and ended up with a success rate of only 3%. According to the 2015-evaluation of the YDUN program, the program managed to motivate an increased number of women, even more so than for other grant announcements, to seek research funding with themselves as research leaders. Of these, a larger proportion were first-time applicants, and on average a total of 4.6 years younger than female applicants for the five comparable instruments in the 5-year period up to the program (from 2009-2014). Thus, one of the positive conclusions about the effect of the YDUN program was that the program had helped not only to support, but also accelerate, the career of female researchers (Damvad Consult 2015). Despite of the success of the YDUN-program, the former Chairman of the National Research Council, Peter Munk Christiansen, expressed that he would not recommend the initiation of a similar program in Denmark in the nearest future due to the controversies and resistance. He argued that such programs might work better in countries such as Sweden and Norway, where the culture is more accepting towards affirmative actions (Faber, Nissen & Bennike 2015; interview with Peter Munk Christiansen). The two programs sparked a strong public debate, partly because the legal basis had been unclear and there was a lack of transparency of the underlying motivation for launching the programs (primarily FREJA); partly because the programs were instantly met with claims that they were anti-meritocratic. The critique was two-fold: The programs were both perceived as discriminatory towards male scientists, and the fact that female scientists were positioned as being in need of 'preferential treatment' was problematized. Thus, although the aim of the programs was to support women in science, they came with a build-in risk of 'backfiring' as the female grant applicants risked being labelled as 'second-rate academics' (Faber & Haase 2010; The Danish National Research Foundation 2014; Oxford Research 2015; Watson & Hjorth 2015). However, the high number of female applicants to both programs did demonstrate that the programs were well received, at least by a share of the female academic community. It is also worth mentioning that both FREJA and YDUN were programs targeting women within all academic disciplines; including the humanities and the social sciences where the gender imbalance is less pronounced than within natural science and technology. It is likely that affirmative actions within the latter two faculties will appear less controversial as the gender imbalances here are considered more conspicuous/critical than within other faculties.

While the Danish Research Council has only twice tried using earmarked funds for female researchers - and only as one-off initiatives - in Norway, the approach has been more drastic and persistent. Thus, in the Research Council of Norway, the so-called BALANSE program (Gender balance in academic positions and research management) has been launched, which runs for a ten-year period (from 2012 to 2022) (see below). However, it is worth mentioning here that this program is not a research funding program as such, but rather an action program targeting universities and research performing organisations. The total budget of the BALANSE-

program is 115 million NOK. The program aims at making research leaders and management more conscious about their role in identifying, developing and recruiting female research talents (the Research Council of Norway 2017).

Before introducing the BALANSE-program, Norway worked specifically to increase the proportion of women in higher academic positions in mathematical, scientific and technological subjects (MNT subjects). In 2010, the Norwegian Ministry of Education initiated, on a proposal from the Norwegian Committee for Integration Measures - Women in Research (KIF), a trial scheme which was named the Incentive Scheme. The scheme included recruitment for associate professor (in the Norwegian academic categories: both 'førstelektor' and 'førsteamanuensis') as well as professor (both 'docent' and full professor), and a system whereby the nine universities and research institutions involved received NOK 300,000 for each woman who was hired in a permanent full-time position (tenure was not covered by the scheme). The incentive scheme was initially to last for three years, but was later extended by one year. However, the final evaluation of the scheme showed that there had been no change in the rate of growth in the proportion of women within the posts concerned during the four-year period that the scheme was running. For this reason, the scheme was phased out (Proba Samfunnsanalyse 2013).

The experiences with both FREJA, YDUN, the BALANSE-Project and the Incentive Scheme demonstrate that it is not unproblematic to introduce earmarked funds and initiatives, and at the same time, these experiences show that the desired effect risks not being achieved. However, experience also shows that the earmarked funds can be a powerful tool if they are launched in the right way. In a Danish context it requires, in particular, that work be done with strong and visible communication to counter resistance in the academic communities, and in the population in general, because affirmative actions are considered controversial.

5.3. Bias training: Levelling the playing field

Rather than focusing on which applicants are encouraged to apply, another way of attempting to alleviate the gender gap in funding allocation is to focus on those who make decisions about funding. Here the idea of bias training is a first possible measure to bring into play. It is, however, important to frame gender inequality as an issue of interest for both men and women rather than an issue primarily concerning women (Media FHE 2019: 7).

Research has shown that bias training can assist in combatting biases and gender stereotyping through raising awareness and establishing codes of practice to enhance career opportunities for women. In particular, raising awareness of underlying understandings of male versus female academic skills can reduce biases in recruitment and assessment procedures. Research has found that, in such processes, attributes such as being decisive, determined, challenging, competitive, superior, having leadership skills, being independent, etc. have a masculine connotation while attributes such as being committed, cooperative, connected, dependable, interpersonal, loyal, responsible, supportive, etc. have a feminine connotation (Cross et. al/European Commission 2016: 12). Thus, such underlying understandings in assessment and peer review processes tend to favour male applicants and disfavour female applicants.

While existing experiences with bias training tend to focus on recruitment and hiring practices, the same principles and procedures can be said to apply in assessing grant applications, and hence, measures and initiatives to counter gender bias are transferable also to funding decision procedures. A number of resources are already publicly available to support bias training, for example, Harvard University has developed a series of bias tests, which are

freely available in several languages from www.implicit.harvard.edu . Closer to Denmark, the University of Lund in Sweden has introduced mandatory bias training for all employees involved in recruitment. The training is based on course material developed by Danielsson (2003). The Catalan Research Center (CERCA) has also produced an instructional video about how to counter gender bias in hiring and assessment procedures at universities and research institutions (see <https://www.youtube.com/watch?v=g978T58gELo&feature=youtu.be>). The European Research Council (ERC) has made a habit of showing the CERCA video on unconscious bias to panel members and provides a briefing before remote evaluations and during in person meetings (Gender Action, policy briefing 2019). In a Danish context, bias training for staff members is something which especially Copenhagen Business School, but lately also University of Southern Denmark has worked explicitly on (Munar & Villesèche 2016; University of Southern Denmark 2019). As explained in the short video available on the SDU webpage, <http://unlimited.sdu.dk/>, unconscious bias is not possible to eradicate, but through proper training, awareness raising and open dialogue about it, it is possible to minimize its effects.

However, although excellent material is freely available online, the Media FHE report (2019) underscores that face-to-face training is highly important in ensuring accountability and commitment. Thus, “having mandatory equality and diversity training was one of the most frequently mentioned recruitment and promotion initiatives uncovered in the Advance HE (Equality Challenge Unit, Higher Education UK) review of successful applications” (Media FHE 2019: 7-8). Furthermore, other reports underline that bias training needs to be formalized and officially sanctioned by the leadership level, and not simply left to management, decision makers and assessment committee members to pursue on their own.

Another approach to increase funding committee members’ awareness of unintentional bias has been introduced by the Swedish Research Council. Based on their work with observers (see below), they have developed a series of practical procedures which overall have been introduced in order to ‘level the playing field’ before any meeting in an assessment committee starts. These procedures relate both to information given to committee members, but also to the practical set-up of meetings. Thus, in 2017, non-binding recommendations for seating arrangements during committee meetings were introduced. Observers had noticed how committee members sought out colleagues they knew before the meetings began, and when they went into the meeting, they usually sat down together. The observers noted that when people were sitting with people they knew on both sides of them, they tended to speak up more at the meeting. Therefore, the Swedish Research Council recommends that committee chairs assign seating around the table, placing international members near the committee chair and women and men in alternate seats around the table (there has been a rule about 50/50 gender distribution on research council boards in Sweden since 2001). Strategic seating may also entail that consideration is given not just to gender, but also to e.g. the reviewers’ experience, their geographical origin and any cultural/linguistic distance. Although this may seem like a trivial feature, the experience from Sweden is that such a formalised attention to the risk of gender bias in itself works as a preventive measure. The committee chair is specifically tasked with distributing name plates around the table before the meeting starts, which then functions as a reminder to include considerations of gender equality during the actual meeting. Further, as part of the formalised attention to gender equality in preparation for meetings, the Swedish Research Council informs everyone who participate in its evaluation processes about how important gender equality is to the evaluation. This information is communicated both in writing and orally, and instructions include explanations for example about the relevance of strategic seating, and about aiming for grant applications reflecting the original pool of applicants. Finally, before the

meeting starts, an administrative staff member 'calibrates' the members in the assessment committee. All members turn up to the first meeting having already rated the applications – these ratings are submitted in advance to the grant administration office. At the beginning of the meeting, a research officer presents a graph of how the reviewers have used the rating scale ahead of the review panel meeting, with the intention of reminding them that the rating scale is not a tool that is used in exactly the same way by all reviewers (Swedish Research Council 2017).

Countering bias is particularly important for funding agencies, in order to detect and act on any possible bias in their assessment procedures and structures. However, a report from League of European Research Universities (LERU) warns that requiring changes in order to “reducing bias in an institution and its processes [...] almost always generates resistance. [...] Gender action typically redefines the rules of the power game” (LERU 2018: 15). It is argued, therefore, that university “leaders (and one could add: leaders within research councils and funding institutions, ed.) are better placed than anyone else to explain why change is necessary, invoke acceptance for change despite fears of loss, and provide incentives for supporting change while upholding and safe-guarding academic excellence” (LERU 2018: 15).

5.4. The use of observers in evaluation panels

This fourth measure is one that addresses the exact point in the process when grant decisions are actually made. Since 2012, the Swedish Research Council's grant allocation committees have systematically used observers to listen in on assessment meetings in which grant applications are being discussed. Not all meetings are monitored by observers, but they take turns and make sure to attend various meetings across the committees. Each observer comes to a meeting with a template, an overview of what she or he is supposed to focus on during the meeting. The observer starts by explaining their role to the panel and what the aim of the observation is. Panel members are ensured confidentiality. The observers do not intervene in the discussions or provide comments about the reviewers' work so as to minimise the observer effect, but their presence is naturally evident to those who are participating and they know they are under observation. The overarching issue for the observers is to document how the meeting functions. For example, the observers focus on questions such as; Does everyone get a chance to speak?; If not, who gets to speak the most?; Are male and female applicants spoken about differently?; Are they evaluated according to the same criteria?

The observers use the mobile app “Time to Talk” to measure the amount of time male and female committee members speaks. The number of participants at each meeting distributed by gender is entered into the app, which then registers the percentage of time each gender has the floor. Apart from this quantitative registration of distribution of talking time, more qualitative information about how applicants are spoken about and evaluated is also registered. Here, one finding has been that informal and non-verifiable information about for example a person's marital status or family relationships came up especially when the applicants were women. Another finding by the observers was that the issue of independence, or perceived lack of independence, is more often problematized when reviewers are evaluating women's applications. Hence, when female researchers had published collaboratively, it was assessed as 'a sign of dependence', whereas when men had published collaboratively, it was assessed as 'having abilities to network'. Using observers in assessment meetings should, according to the Swedish Research Council, not stand alone, but rather be supplemented with statistical follow-ups, for example focusing on whether the gender distribution among grant receivers mirrors the applicant pool (Swedish Research Council 2015; 2017, Lindstad 2017).

5.5. Ensuring public accountability

The fifth measure identified through the desk research involves what may generally be termed ‘public accountability’ among funding institutions. This procedure quite simply involves that funding institutions should make information publicly available both regarding the composition of the applicant pool, as well as who received how large a share of the total grants allocated. Such a procedure is already followed by several funding institutions both in Denmark and abroad, examples include the Research Council of Norway and the Swedish Research Council. In terms of easy overview and comprehensiveness, the Science Foundation Ireland, however, may in some respects be considered most transparent about funding patterns (see <http://www.sfi.ie/funding/sfi-policies-and-guidance/gender/dashboard/>).

Such measures to promote transparency reveal several interesting patterns, and may thus indirectly give cause for further awareness about implicit gender bias. For example, the figures published by the Science Foundation Ireland reveal that female applicants generally receive a smaller amount of funding but generally also receive funding closer to the amount actually applied for. While public accountability may be seen as a measure simply to increase awareness of gender imbalances, it may also be used more pro-actively to practice gender quotation, through aiming for a higher success rate for the underrepresented gender in the applicant pool. According to the Research Council of Norway, they do, indeed, use these figures to practice what is termed ‘moderate gender quotation’ (Lund 2018). For example, their figures reveal that in 2017, 38% of all applicants across all research fields were women, whereas 42% of grant receivers were women.

5.6. Counteracting the motherhood penalty

Finally, the last measure is one that addresses the post-application stage, however, it may also alleviate pre-application concerns for gender inequality. As discussed above, challenges with balancing work and family life in academia are well documented. Women’s caring responsibilities play a significant role in contributing to ‘the leaking pipeline’, however, men’s caring responsibilities as fathers may also be counteracted through appropriate means to generally address what may be termed ‘the parenthood penalty’ in academic career advancement.

Specifically, within research funding, initiatives may be taken to counteract the motherhood/parenthood penalty. Science Europe published a report in 2017 which addresses ‘how to improve grant management practices’ and which draws on a survey of best practice examples from across Europe. Focus is thus not on who gets the grants, rather on post-award management of research grants, so as to counteract the motherhood/parenthood penalty. Drawing on experiences across Europe, the report generally recommends various practices designed to increase flexibility and support work-life balance among grants receivers who are or become parents. These practices include supplementary funding during leave, possibilities to switch from a full-time grant to part-time grant, extending the grants at no cost, as well as other indirect measures to “increase the likelihood of researchers being able to take their grants to completion while ensuring a suitable work-life balance” (Science Europe 2017: 40). Breaking this down into more concrete recommendations, the report highlights a series of practices, among which the following may be possible to implement also in a Danish context:

Expanding the eligibility window: The European Research Council has adopted positive action concerning maternity and paternity leaves. Thus, in case of mothers, the eligibility window for applying for funding is extended by 18 months per child while for fathers the eligibility window is only extended for the period of parental/paternal leave actually taken

(Gender Action, Policy Briefing 2019).

Supplementary funding: Not all states pay the full salary of employees on statutory maternity or adoptive leave to host research organisations and universities, even if these often have a policy to provide 100% of the salary for researchers whose salary is funded through research grants. This may leave host organisations financially exposed. In order to remove any perceived barrier towards the hiring of women researchers, Research Councils UK and the Science Foundation Ireland provide additional funding to supplement the statutory maternity pay to 100% of the employee's salary when team members funded through research grants take a period of maternity or adoptive leave (Science Foundation Ireland 2016b; Science Europe 2017).

Replacement: "If it is necessary to employ a replacement to ensure the successful continuation of the research work during maternity or adoption leave, the Swiss National Science Foundation may approve such an arrangement and take responsibility for the corresponding additional costs" (Science Europe 2017: 43). With grants from the German Research Foundation, researchers can apply for extra funding, for example for an assistant in the project to carry out routine work while a core research member of the project is on maternity leave or when working part-time; furthermore, if an expectant mother's research involves dealing with material with mutagenic and reproductive toxicity properties, a substitute researcher can usually be funded using the financing already granted (Science Europe 2017: 53).

Flexible work time: "At the German Research Foundation, men and women grant holders can reduce working hours by as much as 50% due to family reasons, and by as much as eight hours per week when returning from family leave. Alternatively, research projects can also keep running despite the absence of a researcher due to family reasons; this can last for up to six months. In such a case, given sufficient justification and a management plan from the grant holder, the grant is extended correspondingly and the holder can apply for additional funding to support the management of the grant during their absence" (Science Europe 2017: 46).

Mobility grants: Mobility stays provide a special challenge, as these are generally encouraged among young scholars, who also tend to be at the time in their lives when they become parents. Therefore, it may be problematic for mobility grant receivers if the terms of their grant do not make it possible for them to bring their family along and/or take leave during the mobility grant period. "Mobility grant holders (early and advanced postdocs) at the Swiss National Science Foundation who become fathers may be granted paid paternity leave of up to four months in the course of a fellowship, if applied and justified, beyond the provisions of the Swiss welfare system" (Science Europe 2017: 44). Interviews conducted among young female researchers who left or planned to leave Aarhus University show that restrictions regarding mobility grants (e.g. that they may not be spent on childcare or housing) are a considerable obstacle and financial burden for young female researchers with children and care/family responsibilities (Praëm 2019).

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