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GENDER EQUALITY MEASURES IN ACADEMIA

Literature review commissioned by the Gender Equality Commission of the
Swiss National Science Foundation

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Introduction

The present literature review is an outcome of the research project “Gender Equality Measures in Academia” commissioned by the Gender Equality Commission (GEC) of the Swiss National Science Foundation SNSF. It surveys the state of research on gender inequalities in academia and measures taken to address them by research funding organisations and higher education institutions alike and how these measures are discussed and evaluated. Thereby we aim to encourage and facilitate an informed and evidence-based discussion about further necessary actions to promote gender equality in academia, research and innovation.

What is at stake?

Gender equality still remains an unattained goal in academia – addressing it requires decisive action and the structural transformation of numerous features of the research and innovation system. The underrepresentation of women¹ in academia is problematic from the perspective of social justice and democratic values; it is also problematic because of the loss of valuable talent to the detriment of academic excellence and innovation².

Recent *She Figures 2021* analyses³ show that while in 2018, women represented around 48.1% of doctoral graduates at the European level, men continue to be overrepresented in the European researcher population at 67.2% of the total population (Directorate General for Research and Innovation 2021: 4). The analysis concludes that a glass ceiling persists at the European level (ibid.). In 2018, men were twice as likely as women to hold a grade A⁴ position, with 15.7% for men and 7.6% for women (ibid.). In Switzerland, the proportion of women holding professorships was 24% in 2019, and the proportion of women newly appointed as professor between 2017 and 2019 was at 32% (swissuniversities 2021).

The underrepresentation of women varies across disciplines. Women are more likely to graduate in the arts and humanities, social sciences, journalism, and business administration and Law (Directorate General for Research and Innovation 2021: 40). The underrepresentation of women is more severe in STEM areas, particularly in information and communication technologies and engineering, manufacturing and construction. Women were, however, over-represented in the life sciences (ibid.: 39). The horizontal gender segregation in fields of study is reflected in the proportion of women professors across disciplines in Switzerland, with the highest proportion of women professors in the Humanities and Social Sciences at 37% and the lowest in the technical sciences and economics (18% each) and the natural sciences (17%) (swissuniversities 2021).

In addition to this horizontal gender segregation, vertical gender segregation poses a further important challenge to gender equality in academia. The underrepresentation of women in leadership positions remains pronounced: In 2019, women occupied less than a quarter of board leader positions

¹ Until the present, research on gender equality has mainly focused on the underrepresentation of women and mostly does not consider all gender identities. The binary system of gender as a historical and cultural construct often still serves as the unquestioned basis in collecting and analysing data. Accordingly, the present survey refers to this dichotomous frame of knowledge production, while also calling for future research that integrates the variety of gender identities and for measures that take these findings into account.

² Gender is not the only category relevant in social discrimination in academia, but the clear focus of this review. As gender itself is an intersectional category, other categories of discrimination are touched upon. Further research on the intersectional dimension of inequalities in academia is necessary.

³ *She Figures 2021* monitors the state of gender equality R&I across Europe based on the latest available statistics. The 2021 edition of *She Figures* is accompanied by seven briefs on policy priorities related to gender equality in R&I. The topics of these briefs are: women’s presence, participation and progression in science; institutional culture, research excellence and institutional change; the gender imbalance in Europe’s research leadership; the gender dimension in research and innovation content and training; a holistic view of STEM education at the undergraduate level; promoting a gender perspective in innovation; and intersectionality. Unfortunately, the analysis and policy briefs were published late in November 2021, which was well beyond the research phase of this literature review. Its content could therefore not be considered in the present study, apart from a few key indicators included in the introduction.

⁴ Mapping academic career progression, *She Figures 2021* defines grade A as the single highest grade/post at which research is normally conducted within the institutional or corporate system.

and just over a third of board member positions in research organisations in Europe. Only 23.6% of heads of higher education institutions were female. This underrepresentation also shows in the declining shares of women researchers per higher grade, the portion of women being 47.1% in grade D (the lowest grade), 46.6% in grade C, 40.3% in grade B, and 26.2% in grade A (the highest grade) (Directorate General for Research and Innovation 2021: 24). The same goes for Switzerland, where women accounted for only 22% of new full professor appointments but for 46% of new assistant professor appointments with tenure track and 34% of new assistant professorships without tenure track (data for 2017 — 2019, swissuniversities 2021).

The popular metaphor of the leaky pipeline which aims to describe the cascade of underrepresentation of women in R&I misleads: it suggests that women mysteriously drop out of academia and therefore conceals **structural barriers and the inherently gendered arrangement of the academic system, which disadvantages women in their career progression.**

Numerous studies examine the reasons and mechanisms which impede women from moving up the career ladder or prompt them to leave academia altogether. These studies record a gender bias in research evaluation criteria and procedures that consequently affect recruitment, promotion and funding. The gendered division of labour and the unequal distribution of care work in society mean that women often find having a family incompatible with the demands of an academic career, which are based on the norm of the careless academic. This conflict may be further aggravated by a lack of supportive national family policies and by institutional settings hostile to the needs of caring academic staff. The academic culture, characterised by uncertainty, intense competition and a skewed work-life balance, is tailored to the normative ideal researcher which is inherently gendered. Gendered networks combine with the tendency of people in power to encourage, hire and promote others who are similar to themselves. Thereby these homosocial institutions contribute to the persistence of male dominance in academic leadership positions. Steep hierarchies and relations of dependency make academia particularly prone to abuses of power and sexual harassment, which is a form of gender-based violence. Studies have found a high prevalence of sexual harassment in academia, an issue disproportionately affecting women.

The treatment of **gender in research content poses a further challenge to gender equality** in and beyond higher education institutions. Much of conventional research fails to explicitly consider sex and gender: just under 2% of European research publications included a gender analysis, with the proportion ranging from 0.2% in engineering and technology, to 0.8% in the natural sciences, 2.1% in the arts and humanities, 2.4 % in agricultural and veterinary sciences, 3% in the social sciences, and 3.8% in medical sciences (Directorate General for Research and Innovation 2021: 34). Such failure to integrate a sex and/or gender dimension into research can constitute omissions and distortions that jeopardise excellence in research and innovation.

By ignoring these gender inequalities, gender-blind research policies and institutional practices risk reproducing or even exacerbating inequality in academia and beyond. It is therefore, firstly, crucial to thoroughly **understand the reasons and mechanisms leading to gender inequality in academia.** Secondly, it is vital to **consider the gender dimension in all research policy, on the one hand; and, on the other hand, to design specific measures that aim to eliminate these gender inequalities.** These efforts in pursuit of gender equality contribute to social justice and thus to a robust and socially responsive R&I sector. They also contribute to the efficient use of academic talent and to the quality of R&I. Gender experts and equality practitioners have already undertaken extensive action and achieved considerable progress in this matter. While **much work remains to be done, the challenges have been identified and the recommendations on the actions needed to effect fundamental change are laid out by numerous policy briefs.**

Objective and procedure

This report is based on an in-depth analysis of published research on barriers to women's careers in R&I as well as policies and best practices promoting gender equality in academia. The material analysed includes the information that actors in the field published on their websites, in action plans, and in

working papers. It also includes scholarly publications which evaluate and critically explore the transformative potential of various approaches and measures aimed to promote gender equality in academia. The report integrates the findings from these sources in order to simultaneously present the different approaches, policies and measures practised in the field and how they are assessed in current research. In addition to compiling a literature database and making available the sources cited, this literature review may serve as a resource for future research and policy measures on gender equality at the SNSF. Our aim with the present overview and analysis is thus to contribute to ongoing informed and evidence-based research and deliberation on further measures to advance gender equality in higher education.

In pursuit of these objectives, we conducted a targeted search of relevant sources, spanning information on programmes, action plans and policy briefs by actors in the field, as well as literature by scholars. We focussed on the reasons and mechanisms which still hinder women researchers from succeeding in academia and on the impact of measures that respond to these challenges. In the first phase of the research process, we conducted interviews with three experts on gender equality in R&I to gain an initial overview of the topics of interest and to ensure no important issues were overlooked: Simona Isler, Marcela Linková & Anna Wahl. These interviews provided us with vital insights and pointed us to key debates, which we then included in our analysis. The results of our preliminary literature search were complemented by a systematic search through tailored search strings of relevant literature databases (ERIC, Gender Studies Database, Web of Science). A systematisation and synthesis of the findings formed the basis for the present report. Throughout the research process, preliminary findings were discussed with Michèle Amacker and Simona Isler, our partners at the SNSF, harnessing the SNSF's experience in gender equality matters and ensuring that our focus aligned with the knowledge output relevant to the SNSF.

Monitoring gender equality measures

Producing gender statistics is crucial to understand the realities of women and men researchers. These statistics render visible gender inequalities in the distribution of resources or access to power, thereby often disproving biases as well as stereotypical beliefs which underestimate existing discrimination (GenPORT 2017; United Nations, Economic Commission for Europe 2010). Evidence of existing inequalities helps to promote change, to design and prioritise policies, and to evaluate the results of interventions (GenPORT 2017: 1).

While gender statistics are crucial to grasp the challenges and respond with adequate policies, **producing such knowledge is a complex process** which comes with its own challenges. **Generating gender statistics requires an understanding of gender issues in society, formulating corresponding indicators, choosing suitable data collection methods, and analysing and interpreting results properly** (GenPORT 2017: 2). A lack of gender sensitivity and expertise, can generate failures in any of these stages, thereby perpetuating biased results (Hedman et al. 1996). For instance, if the share of women in grade A professorships is taken as the sole indicator for gender equality without any other indicators or qualitative evaluation of policies as context, the conclusions are skewed. The high share of women in grade A positions may reflect the comparatively low remuneration and precarious conditions in R&I at the national level, which does not attract many men (see [section 2.4.1](#)). Another challenge consists in the need to collect and analyse data which includes further gender positions such as transgender, intersex or non-binary persons as well as intersections with other social categories that impact on gender such as age, class and ethnicity (Westbrook and Saperstein 2015).

Gender equality policies must be based on analyses of the status quo, which require robust evidence generated through either statistics or qualitative research. **The implementation of the measures designed on this basis should constantly be monitored and evaluated** (Wroblewski 2019: 4). When such monitoring and evaluation accompany implementation, the measure can be continuously adapted, while ex post evaluation measures the effectiveness of the intervention (ibid.: 4).

Evaluations of the effectiveness of various gender equality interventions in academia are, however, often either totally missing or still inconclusive. Several reasons explain these deficits. First, because

relations are multicausal, it is hardly ever possible to identify strict causality between measure A and outcome B. Most often a number of measures to effect change are taken simultaneously; furthermore, individual interventions are embedded in larger societal contexts with numerous complex dynamics shaping the outcomes (Schubert, Hettlage and Wolf 2020: 10). Second, insufficient time and financial resources may hinder the evaluation of gender equality measures, especially in smaller institutions. These obstacles notwithstanding, it is crucial to evaluate interventions as best as possible. This is essential to understand what works well and what not, to continuously further develop measures, to strategically demonstrate what has been achieved, and to secure further support for these interventions.

Whenever evidence on the effectiveness of measures is available, it is included in the present literature review. Where this survey does not offer information on the impact of interventions, this is due to the absence of robust evidence-based evaluations of the measures under discussion.

Outline

Londa Schiebinger (2011: 13) distinguishes three levels of analysis regarding gender equality in academia:

1. The participation of women in science – or fixing the numbers
2. Gender in the cultures of science – or fixing the institutions
3. Gender in the results of science – or fixing the knowledge.

In the present literature review, we follow Schiebinger's threefold analytical distinction to organise the research literature on and measures taken in pursuit of gender equality in academia.

Section 1, "Improve access and empower women academics", surveys challenges affecting women academics and the interventions seeking to provide a remedy or fix the identified challenge. We examine barriers which limit women researchers' access to academic careers and corresponding measures to remedy this ([section 1.1](#)), such as unconscious bias ([1.1.1](#)); research evaluation criteria and procedures ([1.1.2](#)); and the reconciliation of work and family life ([1.1.3](#)), on the one hand. On the other hand, we survey measures which aim to empower individual woman academics ([section 1.2](#)) such as mentoring, coaching and training ([1.2.1](#)); protected time and career return programmes ([1.2.2](#)); dedicated funding schemes and prizes ([1.2.3](#)); and quotas ([1.2.4](#)). While this focus on empowering individual women has been criticised for teaching them how to better succeed in a man's world, it is nevertheless crucial to support women's research and careers as long as the system fails to provide even conditions for all researchers (ibid.: 14). Measures to improve access and empower women academics therefore need to be accompanied by reforms of academic institutions and research methods.

[Section 2](#), "The gendered structures of academia and political responses", scrutinises key structural issues in the predominant norms and cultures of academia which perpetuate gender inequalities as well as attempts to fix these structural problems by means of political action and policy interventions. [Section 2.1](#) analyses the inherently gendered norms of the ideal academic and researcher and how the dominant concept of excellence itself has gendered effects. Three aspects of this notion of excellence especially harm women academics: the norm of the genius academic, the passionate academic and the careless academic. These norms form a powerful template for aspiring researchers against which they measure themselves and against which others measure them, producing either a feeling of belonging or the repeated experience of not fitting into the picture. [Section 2.2](#) examines academic work culture, which is aligned to the norm of the ideal male academic. It considers four particularly challenging features of academic work and their gendered effects: uncertainty and intense competition ([2.2.1](#)); workload and work-life balance ([2.2.2](#)); the gendered division of labour within academia ([2.2.3](#)); and homosocial reproduction in academic careers ([2.2.4](#)). [Section 2.3](#) explains how academia is particularly prone to gender-based violence and sexual harassment owing to its hierarchical structure and strong relations of dependence and concentration of power with few individuals. The chapter reviews research on the prevalence of sexual harassment ([2.3.1](#)); its profound consequences for individuals and academia as a whole ([2.3.2](#)); measures for both intervention ([2.3.3](#)) and prevention ([2.3.4](#)); and actions taken by research funding organisations ([2.3.5](#)). [Section 2.4](#) explores the political framework and collective initiatives aiming to fight gender inequalities and effect institutional change. It does so by assessing three specific policy instruments which shape the promotion of gender equality in academia in the European

research and innovation field, and where applicable, Switzerland more specifically: Gender equality as a priority in the European Research Area (ERA) and as part of National Action Plans (NAPs) (2.4.1); Horizon Europe and the tool of Gender Equality Plans (GEPs) (2.4.2); and the increasingly widespread instrument of certification and award systems, including a closer look at Athena SWAN and CASPER (2.4.3). Change also needs to come at a third level, namely research, by eliminating the inherent gender bias in research content and methods and mainstreaming gender and sex analyses in research practices (ibid.: 20f.).

Section 3, “Integrate Sex and Gender in Research Content”, investigates the gender dimension of research content and practices related to research and innovation. It describes in which ways gender bias is detrimental to the quality of research and explains why and how a gender and sex dimension needs to be integrated into research content (3.1) and methods (3.2). It also maps out collective actions taken or recommended to be taken by research funding organisations (3.3.1) as well as editors and publishers (3.3.2). It describes the integration of gender in teaching content (3.3.3) and the challenges that must be addressed to improve the quality of research and innovation.

Summaries of key issues and challenges follow each subsection, thereby offering an overview of the most important take away messages of each section at a glance. The survey ends with an integrated summary of key issues, challenges and measures that stakes out topics for further research and possible action.

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1. Improve access and empower women academics

Gender equality in research and innovation can be promoted in multiple ways. Notwithstanding their different starting points and perspectives on gender inequalities and the different strategies they pursue to solve the problem, these multiple approaches complement each other and need to be combined to ensure optimal success. **The first approach aims at fixing the number of women and their overall representation in research and innovation and in leadership positions especially.** The fix the numbers approach can be subdivided into two strategies: The first strategy to fix the numbers is to **correct the shortcomings of the research and innovation system** or to “fix the bugs”, so to speak. This includes: eliminating unconscious bias; adjusting research evaluation criteria to better reflect the actual quality of a researcher; reviewing grant allocation as well as recruitment and promotion procedures; and improving childcare and the reconciliation of family and career ([section 1.1](#)). **The second strategy** to fix the numbers is to **apply temporary special measures to correct gender imbalances.** This can comprise both quotas for the share of women and/or preferential treatment of the underrepresented gender until the objective is reached. It can also include special programmes or services for women, such as mentoring programmes, awards, or dedicated funding ([section 1.2](#)).

1.1. Improve access to the field

This section surveys strategies to correct and improve shortcomings of the academic system. This includes measures to eliminate unconscious bias; how to address research evaluation criteria and procedures and their gendered effects; and a review of measures aimed at promoting the reconciliation of work and family which poses a significant barrier to women’s careers especially.

1.1.1. Unconscious bias

Unconscious bias applied to gender refers to the differential assessment and treatment of women and men. It is the result of the **internalization of the widespread social belief** that men are more capable than women. Such gender biased perceptions are found in men and women. It is ubiquitous and systemic. Unconscious bias affects many fields, including academia, and manifests itself in the **assessment of researchers’ quality, in the structures and norms of science; and in the kind of knowledge produced.** Most often unconscious bias is used narrowly to describe the, often psychologically framed, skewed perception and treatment of women researchers; it is still rarely used in assessing academic structures or knowledge production.

The **widespread and drastic effects of unconscious bias have been clearly** demonstrated Men’s performance – as students, colleagues, authors, and experts – is consistently evaluated as superior to that of women, even where the only distinction is in the name (Reuben, Sapienza and Zingales 2014; Knobloch-Weserwich, Glynn and Huye 2013; Moss-Racusin et al. 2012; Steinpreis, Anders and Ritzke 1999). A pivotal study of postdoctoral grants awarded by the Swedish Medical Research Council in 1997 demonstrated that in order to be assessed as equal, women needed to publish significantly more than men in the most prestigious journals (Wenneras and Wold 1997). Preliminary results indicate that gender bias is reduced when grant reviewers focus on the quality of the research proposal instead of the CV (Guglielmi 2018). Unconscious bias also manifests itself in the ways women and men are assessed in tenure assessments and letters of recommendation (Judson, Ross and Glassmeyer 2019; Madera et al. 2019; Dutt et al. 2016; Marchant, Bhattacharya and Carnes 2007; Trix and Psenka 2003). Men are described as analytical, competitive, independent, and as leaders and risk takers, whereas women are described as understanding, sensitive and submissive (Marchant, Bhattacharya and Carnes 2007). In addition, recommendation letters for women are usually shorter and more frequently refer to the women’s personal situations, while letters for men tend to focus on their research and publications more (Trix and Psenka 2003). Award committees chaired by men, when compared to those chaired by women, are significantly less likely to award prizes to women (Hedin 2014; Lincoln et al. 2012). Men were found to be less likely to cite female than male authors (Hutson 2006; Maliniak, Powers and Walter 2013) and cited themselves more often than women did (King et al. 2017). Gender bias was also identified in the

evaluation of teaching (Peterson et al. 2019; Mengel, Sauermann and Zölitz 2019; Macnell, Driscoll and Hunt 2015). These studies provide evidence that women are held to higher standards than men and must perform better to be assessed equally to men (Linková 2017); this is the case even if it were assumed that equal conditions apply and if the inherently gendered norm of what it means to be an academic as well as the academic culture were bracketed. This starkly contradicts the ideal of meritocracy, which is upheld in the academy.

These findings have met with two main reactions: The first response is to reject the existence of bias, to refute any doubts about objectivity (Moss-Racusin et al. 2015; Kaatz, Gutierrez and Carnes 2014). The second response is to recognise unconscious bias as a serious threat to excellent scholarship and an undermining of the meritocratic principles that inform academia. Thereby unconscious bias is identified as **a loss of talent and potential for research and innovation. Accordingly**, it is agreed that measures need to be taken to eliminate all forms of bias. Since most decision makers and scientists in R&I uphold the ideal of meritocracy, unconscious bias training has become a widely accepted and widespread measure to counteract the most blatantly unfair treatment of women and men in academia. Unconscious bias training has become a standard in many research performing and funding organisations alike to sensitise decision makers to the relevance of gender in recruitment and grant allocation. The Science Europe Working Group on Gender and Diversity for instance recommends the following actions: checking for differences in the success rates of men and women researchers; conducting awareness-raising activities and training staff, evaluation panels and decision-making bodies on a regular basis and monitoring the success of training efforts (Science Europe 2017).

Box 1: Selected introductions, training materials and resources on unconscious bias

compiled by Science Europe (2017):

- Royal Society (2015): Understanding unconscious bias ([short video and material on biases and diversity by Uta Frith](#)).
- [A conversation with Claude Steele](#): Lecture at US National Academies organised by the CWSEM, and invited speakers (2015).
- Equality Challenge Unit (2013): [Unconscious bias and higher education: Literature review](#).
- Valian, V. (2006). [Tutorials for change. Gender schemas and science careers](#). Hunter College of the City University of New York.
- STRIDE : Committee on strategies and tactics for recruiting to improve diversity and excellence. [Advance program](#), University of Michigan.
- [Breaking the bias habit: A workshop to promote gender equity](#) (2015). WISELI – Women in Science & Engineering Leadership Institute, University of Wisconsin.
- [Reviewing Applicants: Research on bias and assumptions](#) (2012). WISELI –Women in Science & Engineering Leadership Institute, University of Wisconsin.

The Center of Excellence Women and Science (CEWS) provides both

- A compilation of [videos on how to reduce gender bias](#)
- And a [compilation of strategies and methods for reducing and avoiding bias](#) as well as tutorials, checklists and handouts

Findings on the **effectiveness of gender bias training differ**. On the optimistic side, Guglielmi (2018) concludes that training reviewers to recognize unconscious biases seems to correct this imbalance. Likewise, Peterson et al. (2019) show that anti-bias language in forms in which students evaluate teachers can reduce gender bias. Preliminary results from several case studies show that bias interventions such as training and awareness raising can reduce gender biases in the short run, and that these small gains can amount to bigger change in the long run (Correll 2017; Girod et al. 2016; Carnes et al. 2015).

On the other side, some research suggests that telling people to resist their biases may have adverse effects (Apfelbaum, Sommers and Norton 2008) or that framing biases as involuntary and widespread contributes to their normalisation, thereby increasing rather than diminishing prejudice (Duguid and Thomas-Hunt 2015). This ties into the feminist critique that the notion of unconscious bias strips gender equality work of its critical approach by relegating discrimination and inequalities to behavioural psychology and individual choices, and thereby neglecting social contexts and structural inequalities (Pető 2017: 25). Similar arguments exist regarding institutional racism and other dimensions of social inequality (Tate and Page 2018). Nentwich and Offenberger (2018) note that the framing of

unconscious bias training as a measure to promote true excellence and safeguard meritocratic principles make it more difficult to question the concept of excellence and its gendered effects ([see section 2.1](#)).

Furthermore, the political context needs to be considered: In the European Union (EU), the concept of unconscious bias has become a welcome and inoffensive frame for gender inequalities in comparison to calls for structural change, as increasing right-wing conservative backlash and a lack of acceptance of gender equality policies in the new member states inhibit more disruptive political action (ibid.). Nevertheless, **the persistence of gender biases speaks in favour of interventions which should be part of a comprehensive strategy that simultaneously addresses individual and structural levels**: *“It is vital that unconscious bias is tackled not just at an individual level but also systemically at an institutional level, where policies and practices can be introduced to mitigate unconscious bias.”* (Gvozdanović and Bailey 2020: 121)

1.1.2. Research Evaluation

Research evaluation is **key to assessing the potential of an individual researcher** in recruitment and the allocation of funding. While training and sensitization are important interventions to reduce biased research evaluation, the **evaluation criteria and evaluation procedures themselves** are two key aspects which also need to be examined concerning their gendered effects.

Research Evaluation Criteria

Research evaluation criteria have received increasing attention over the last years. Several researchers and organisations point to the adverse effects of current research evaluation criteria and **call for a change in research evaluation systems**. In a broader context, an increase can be observed in international rankings based on research indicators (IREG Observatory 2018; Rauhvargers 2013) and in national research evaluation exercises (Arnold et al. 2018; Lepori et al. 2007), and more and more funding instruments are linked to successful evaluation (Sandström and Van den Besselaar 2018). This evaluation culture is associated with demands for greater accountability concerning the use of public funding. It is also related to growing competition for funding and positions as well as the desire to measure and benchmark research quantitatively, all which increases pressure on researchers (Gadd 2019).

Doubts have been raised about the ability of **metrics-based assessments to capture the quality of research; correspondingly unintended effects have been pointed out**. Concerns include **methodological queries regarding impact factors** – such as that they are field specific; that journals or researchers inappropriately boost impact factors (Martin 2016); and that data and algorithms for calculation of impact factors lack transparency. There are also more fundamental **doubts on the extent to which quantitative metrics can capture the quality or impact of research**. The focus on citations and publications in high-impact factor journals contributes to scientific fraud, positive results bias, and a lack of replication studies in the natural sciences especially (Moore et al. 2017; Smaldino and McElreath 2016; Higginson and Munafò 2016; Brembs 2018). Simplistic definitions and measures of excellence can lead to strategic behaviour and unintended incentives for unwanted outcomes. Such measures may particularly harm interdisciplinary approaches (Rafols et al. 2012) and discourage innovative research. In a recent survey, researchers judged openness, transparency, quality, and innovation as highly important qualities for the advancement of research but estimated them to be overlooked by evaluation criteria and in career advancement (Bonn and Pinxten 2021). At the same time, indicators which were connected to prestige and competition were rated as important to career advancement but irrelevant or even detrimental to the advancement of science (ibid.). Researchers expressed a desire to grant greater value to openness, transparency, and quality, including publishing open access, publishing negative findings and sharing data; the current research evaluation system was however found to inhibit precisely these valued practices (ibid.).

Growing evidence suggests that **narrow definitions of research excellence are restricting diversity in academia**, both in the structure of its labour force as well as in its ability to produce innovative and socially responsive forms of knowledge (Cohen et al. 2019). The narrow focus based on the dominant understanding of research excellence inhibits diverse career pathways, spanning research, teaching,

leadership and engagement with the public. It undervalues these aspects, which are key to meaningful academic careers. This narrow definition of excellence contributes to a monoculture of academics who predominantly produce written work for their peers (Cohen et al. 2019). And notably, according to a recent position paper by the League of European Research Universities (LERU), **the current research evaluation system fosters inequality in access and retention of specific groups of talented researchers, especially women and minorities** (LERU 2019).

Awareness is growing for the need to assess the academic and societal impact of research differently than by mere quantitative metrics such as journal impact factors and the h-index (Saenen and Borell-Damián 2019; Verma 2015) and **several initiatives call for change in the research evaluation system**. In 2012, a group established by the American Society of Cell Biology wrote the San Francisco Declaration on Research Assessment (DORA), advocating against the use of journal impact factors for the evaluation of individual scholars or articles. Over 18'000 individuals and 2000 organisations have since signed the Declaration. In 2015 academics from the CWTS research group at Leiden University published the Leiden Manifesto (Hicks et al. 2015). The Leiden Manifesto has a broader focus than the DORA declaration and proclaims ten principles for the responsible use of bibliometrics in research evaluation. A collective of Dutch public knowledge institutions and funders (VSNU, NFWO, KNAW, NWO and ZonMw) have committed themselves to developing research evaluation procedures which enable the diversification and vitalisation of career paths; acknowledge individual qualities of academics and recognise team performance; emphasise quality of work over quantitative results (such as numbers of publications); encourage all aspects of open science and value high-quality academic leadership (VSNU, NFWO, KNAW, NWO and ZonMw 2019). Other initiatives advocating for qualitative assessments of the variety of research outputs include 'The Metric Tide' in the UK (Wilsdon 2015), the principles developed by the Global Research Council (2018), and the joint statement between Science Europe and the European University Association (2019).

Efforts to redefine and broaden the notion of academic excellence for the assessment of the quality of research and researchers are important to ensure the quality and robustness of knowledge production. Such a revised definition of excellence should go beyond research output to also include impact, teaching, leadership, public engagement and acknowledge competences acquired outside the academy as adding value. These changes benefit all researchers and research quality as such, but may prove to benefit women researchers in particular. Studies indicate that women struggle to identify themselves with the current ideal of an excellent researcher or are denied identification by the academic community and society (see sections 2.1 and 2.2). **Broadening the scope of what academic excellence means may therefore increase the attractiveness of academic work overall, but especially for women**, who were historically excluded from the definition of excellence in science. This could possibly improve the retention of women in the academy. Apart from redefining research evaluation criteria and broadening the notion of scientific excellence, measures should also be taken to improve the procedures of research evaluation, e.g. in grant allocation and recruitment.

Box 2: Ten ways to improve academic CVs for fairer research assessment

1. Provide clear instructions for researchers and evaluators
2. Prioritise actual achievements over the recognition endowed upon them
3. Focus on more recent achievements over historical information
4. Focus on activities and outputs that are relevant
5. Acknowledge and encourage a broad range of contributions
6. Balance and control incentives
7. Use researcher's academic not their biological age
8. Encourage narratives instead of lists
9. Use metrics cautiously
10. Use established open and interoperable data standards and systems

Developed by the **CV Evaluation Group (H-Group)**, excerpts from Strinzel et al. 2021

Research evaluation procedures

Grant allocation

Acquiring research funding is key to career advancement in academia. In early career stages, the lack of positions funded by universities themselves means that **access to external research funding determines whether an academic career can be pursued or not**. Often, acquired funding is also taken as an indicator of someone's academic excellence (see sections 2.1 and 2.2), which is important for recruitment and promotion decisions and therefore for further career advancement. Research funding and financial resources have been crucial to gender equality and women's equal opportunities in R&I. Studies on the gender dynamics of research funding have not found a systematically lower success rate for women in all funding contexts, but rather painted a more complicated picture (Cruz-Castro and Sanz-Menéndez 2019):

Over a decade ago, the expert report on the "gender challenge in research funding" (European Commission 2009; data refers to 2007) found that, in average proposals with a male PI had a 7% greater probability of being granted than those with a female PI but with a considerable variation among European countries and disciplines. For the US, an analysis of gender differences in research funding from three federal agencies (NSF, NIH and USD) found no gender differences in federal grant funding outcomes but found a **gender gap in the average amount of funding women received relative to men** (Hosek et al. 2005). A more recent study of early career life academics in the United States reports that doctoral-level men receive over twice as much start-up funding by universities (after which they are expected to fund their laboratories with competitive external funding) than do women scientists, with gender gaps highest at the largest hospitals and universities (Sege, Nykiel-Bub and Selk 2015). In its most recent gender monitoring, the SNSF has found that in its project funding (in contrast to career funding) the success rate of women was slightly lower compared to men until April 2018 and has since converged to similar rates, although the rates vary according to field and call (Heyard and Ott 2021). Also, gender disparities in the amount of funding could be observed (ibid.). Interestingly, **success rates for women tended to be lower than for men in fields where women's participation is higher**, such as in social sciences and humanities, and equally high as men's success rates in the STEM field (ibid.). Data from the ERC indicates another important gender challenge in research funding – **women tend to apply for grants less than men in relation to their eligibility and overall participation in a field** (European Commission 2014). Similarly, data from the National Institutes of Health (NIH) in the US show that men are more likely to apply for and receive subsequent awards (Pohlhaus et al. 2011).

LERU therefore deems it **essential to generate more research applications from female researchers**, especially at the post-doc stage, and suggests universities provide flexible funding for short periods to initiate grant applications (LERU 2012: 11). They also point to the need for **better career prospects for the mid-career stage following the PhD. This includes reducing periods of uncertainty** between projects and precarious short-term contracts through longer funding periods by research funders, which may have a positive effect on the retention of women scientists (ibid.: 11).

Including a gender dimension as a criterion for funding is identified as a further important field of action that research funders may consider: *"This can happen by ensuring gendered research is part of the research design if applicable in the life, social sciences and the humanities, or by promoting or demanding appropriate gender action plans as part of the implementation strategy for projects"* (LERU 2012: 15).

Another factor impacting the access of women researchers to research funding consists in their relatively high representation in the less generously funded social sciences and humanities (SSH) and their underrepresentation in the physical and life sciences as well as engineering, which tend to feature more grant opportunities and larger grants (ibid.). To capture these many variables, Husu advocates taking a more comprehensive perspective on the whole research funding cycle and funding environments when analysing potential gendered patterns in

"application behavior (who applies), applicant pool (who is eligible to apply), research group composition, funding instruments, the call texts, guidelines for applicants, eligibility criteria (age or position), assessment criteria, assessment procedures, potential biases in evaluation, recruitment of peer reviewers, peer review process, success rates, amount of funding applied and allocated, research content, funders' policy statements in general and related to gender equality, overall transparency of the funding systems, monitoring and availability of statistics by gender, and long-term career impacts of obtained funding." (Husu 2019)

She also points to further highly relevant aspects when considering gender equality in research funding: First, the so-called **excellence initiatives and centers of excellence have frequently benefited more male than female researchers**, even in countries with high levels of gender equality such as Sweden. Second, **formal and informal networks** are crucial to the pursuit of funding which makes research on gendered patterns of academic networking, integration into research environments and on homosocial reproduction a key to understanding funding access (Husu 2019). And third, the **political commitment to gender equality** is vital to how public funding organizations prioritise gender equality and address gender inequalities in research funding (ibid.).

Box 3: Selected promising examples of national research funding policies

“In Sweden, public research funding organizations, such as the Swedish Research Council and the national innovation agency Vinnova, all have governmental directives to gender mainstream their activities. In monitoring development, the Swedish research funders use not only statistics but also qualitative social science tools such as gender observers in the funding committee meetings.

Gender balance in public research funding boards has been a realized policy goal since the early 2000s in Finland, Norway, and Sweden, whereas in many European countries the boards continue to be male-dominated. Gender balance in the funding boards is not only an issue of equal representation and justice; equal representation in these gatekeeping positions is also important because it provides inside knowledge into how the funding system works and boosts scientific networking of those involved.”

Excerpt from Husu (2019)

“The Irish Research Council (IRC) has become a reference model for gender equality policies in RFOs [Research Funding Organisations]. The idea behind this initiative is that gender equality will ensure excellence and maximise creativity and innovation in Irish research. The IRC Gender Strategy & Action Plan 2013-2020 focuses on four main lines of action: support for gender equality in research careers; integration of sex/gender analysis in research content; fostering structural change for gender equality; limiting the potential effect of unconscious gender bias on internal processes. In addition, the IRC is tying its funding for RPOs to holding the Athena Swan Bronze Institution Award that recognizes a solid foundation for eliminating gender bias and developing a gender-sensitive, inclusive organizational culture, i.e. gender equality plan, diagnosis and structures.”

Excerpt from GENDERACTION (2019)

Box 4: Recommendations for gender equality measures for funding agenciesRecommendations to **address RFO's [Research Funding Organisation] structures and decision-making:**

- To establish sustainable and professional gender equality structures and to adopt comprehensive gender equality strategies with the advice of gender experts.
- To guarantee gender balance in funding decision-making bodies and scientific evaluation panels.
- To conduct gender equality impact reports and gender-sensitive budgeting.

Recommendations to **avoid gender bias in the research evaluation process:**

- To tackle the ideal of 'objective' evaluators acting on rational arguments without cognitive bias by conducting regular training on gender stereotypes and unconscious bias and its monitoring and evaluation.
- To review the gender proofing of language of call texts with the aim to avoid sexist language and include gender-sensitive and work-life balance provisions.
- To explore how/if the use of new metrics impacts men and women researchers at different career stages and disciplines differently.
- To adopt multi-dimensional evaluation criteria that enhance openness and transparency (including visibility and open access to those research outputs with a gender dimension), and contribute in mitigating against gender bias in research assessment/evaluation procedures.
- To adopt evaluation criteria that take into account parenthood as a potentiality in researchers' lives.
- To foster women Principal Investigators of R&I projects through temporary special measures.
- To critically assess the negative impact on women researchers of informal practices and unstated evaluation criteria.
- To consider the adoption of double-blind review processes where possible in order to avoid gender bias in people-based funding mechanisms, instead of the best project.
- To collect sex-disaggregated data on applicants, average size of grants and review panels by scientific field and funding scheme as well as on the composition of funding decision-making bodies, as recommended by Science Europe (2017).
- To ensure a gender balance among the nominees in prizes/scientific awards.

Recommendations to **promote gender in research and innovation content:**

- To allocate funds for specific programs on gender studies, aimed at fostering the production of new knowledge for a better understanding of gender issues.
- To require grant applicants to indicate whether sex and/or gender are relevant to their research proposal and how the gender perspective will be integrated into the entire research or innovation cycle. When sex/gender analysis is not relevant for the field of study, an explanation should be given by applicants.
- To disseminate guidelines for grant applicants and peer reviewers/evaluators on the integration of the gender analysis into research content, and to support their engagement with gender experts.

Excerpt from GENDERACTION (2019)

Recruitment, professorships and tenure

Recruitment is another crucial point of evaluating the quality of individual researchers and their achievements and of gatekeeping who participates in research and innovation. **Human resources management is essential to implementing gender equality measures in academia.** There is a wealth of literature on gender equality measures in R&I HR management and HR practitioners and experts have continuously revised recruitment and promotion procedures to be more gender equal. The European Commission has created the **Human Resources Strategy for Researchers (HRS4R) and Code of Conduct for the Recruitment of Researchers** which have a central role in European HR management in research (Nason and Sangiuliano 2020: 54). At the time of writing, 639 organizations have received the HR

Excellence in Research award, after having officially endorsed the Code of Conduct, self-assessed and proposed an action plan to better implement the Charter and Code principles (ibid.: 54). Gender-related principles in the Charter and Code include non-discrimination, calls for adequate working conditions and work-life balance, and the goal of gender balance in staff structure (ibid.: 55). A considerable focus of gender equality policies in R&I HR management is put on the key procedures of recruitment and promotion, as well as on working conditions which foster work-life balance and the reconciliation of care responsibilities with an academic career (see [section 1.1.3](#)).

Box 5: GenPORT policy briefs on encouraging the recruitment and promotion of woman researchers

[GenPORT](#) is a community-sourced internet portal for sharing knowledge and inspiring collaborative action on gender and science, funded by the European Union FP7-SCIENCE-IN-SOCIETY-2012-1 programme. It offers a range of resources and online documents on the topics of gender, science, technology and innovation, and 25 own policy briefs on various relevant topics, including the recruitment and promotion of woman researchers. Policy briefs are adjusted to the level of implementation of relevant policies and contain a compilation of recommendations, further reading and useful resources and tools.

Encouraging the recruitment and promotion of woman researchers:

- [PB1: - Where to start?](#)
- [PB2: - How to consolidate?](#)
- [PB3: - How to lead?](#)
- [PB4: - How to innovate?](#)

Professorial appointment procedures deserve special attention and scrutiny as they are critical to increasing the share of women professors. Universities and gender equality practitioners have developed a wide range of guidelines and practices to promote gender equal appointment procedures. The announcement of a professorial position should be accompanied by the **diligent use of gender-neutral language** and perhaps even an encouragement for women to apply by stating that their applications are especially welcome, or that the department aims to increase its share of women professors (Schubert, Hettlage and Wolf 2020: 39). Too narrow profiles that exclude areas of specialisation where more women may be active within the discipline should be avoided (ibid.) Inviting suitable women candidates to apply proactively has also proven an effective measure to increase women’s applications as is activating women’s academic networks (ibid.). Appointment committees should be **as gender-balanced as possible and be sensitised and trained on gender and diversity issues in recruitment** and the evaluation of applications (ibid.). Appointing a person to be responsible for paying particular attention to diversity and gender equality during the appointment procedure is another favoured measure in many organizations. Sometimes this person is a member of the committee itself and has received adequate training; at other times a gender equality expert monitors the appointment procedure and committee (ibid.).

Box 6: Resources for gender equality in professorial appointment procedures

Compilation by the “EQUAL tools” catalogue of measures (Schubert, Hettlage and Wolf 2020: 41)

- Guidelines of the [ETH Zurich](#)
- Informational video of the [Université de Lausanne](#) for appointment committee members
- The [Technische Universität Darmstadt](#) proactively invites women candidates to apply for professorial vacancies; it achieved a share of 32% women in new professorial appointments in 2016, which is higher than most other comparable technical universities.
- Recommendations and good practices concerning professorial recruitment of [swissuniversities](#)

Tenure is another decisive point in an academic career where particular attention needs to be paid to gender challenges and potential bias. It is important to review existing criteria for the evaluation of candidates for tenure in order to curb potentially negative gendered effects and bias. Evaluation criteria should consider possible breaks due to childbirth or reduced work hours over a given time due to caring responsibilities (known as ‘stop the clock’). Once reviewed, such criteria must be made explicit at the start of each procedure and binding on all tenure committee members (ibid.: 42).

Box 7: Gender equality measures in tenure procedures: Stop the clock

Compilation by the “EQUAL tools” catalogue of measures (Schubert, Hettlage and Wolf 2020: 44)

Tenure Committee recommendations by the [ETH Zurich](#). This includes instruments for taking into account maternity leave or family-related absences (stop the clock).

At the [École Polytechnique Fédérale de Lausanne](#) tenure track professors can prolong their employment for up to two years per child cared for.

The [Technische Universität München](#) allows for a parental leave semester, a part-time professorial position and a prolonged tenure track employment phase for carers.

Evaluation criteria should focus on assessing **the quality of publications and research output rather than mere quantity** (ibid.). Further, it is important to sensitize and train tenure committee members for gender bias, including for instance the gendered language of letters of recommendation, and educate them about the rules of the tenure procedure aimed at reducing bias (ibid.).

1.1.3. Reconciling work and family life

Many excellent women researchers leave academia once they become mothers and **experience the incompatibility between the demands of their academic position and caring for their infants**. Of course, this may also be the case for present fathers. In addition, other life events like the illness of a close person and the need or wish to care for them often cannot be accommodated within academic positions. Academia is still organised around **the norm of academics without care responsibilities** (see [section 2.1](#)). **HR and family policies** are thus important tools to support researchers across life phases and care responsibilities. This may reduce the loss of talent – especially female talent, because women still disproportionately perform the societal care work.

National legislation on maternity, paternity and shared parental leave influence gendered career patterns in academia. This may require additional support policies by research performing and funding organizations in order to remain attractive in the international competition for talent and ensure new mothers find working conditions and career prospects with attractive perspectives. The **childcare infrastructure** in each country is crucial for the ability of researchers to access affordable and quality childcare in order to be able to continue with their job and career (Science Europe 2017). **Comparative studies continue to rank Switzerland at the bottom of surveyed countries in respect to childcare infrastructure and family policy** (Gromada and Richardson 2021). **Working culture in organizations and institutions** also play a decisive role in enabling caring parents to continue a successful academic career. Not holding meetings in the evenings (Schubert, Hettlage and Wolf 2020: 82) and providing childcare for conferences so parents can participate and take infants along when traveling (ibid.: 72) are important measures as well as flexible working models such as job-sharing (ibid.: 88), remote work (ibid.: 86) and flexible working hours (ibid.: 83f.). Financial support for childcare or other relief measures are another effective way to support researchers with caring responsibilities (ibid.: 92). Similar measures as those for institutions can be adopted by research funders. **Research funders** can allow grant extensions with continued salaries in case of maternity or paternity, adoption, or other periods of absence related to care. Other support by research funders can include additional funding to subsidise childcare or allow for the reduction of parents’ working hours to enable the desired balance between academic career and family commitments. Also advisable is additional funding to hire a substitute for the time in which a parent is absent, thereby ensuring the successful continuation of a research project (Science Europe 2017: 43f.).

The norm of the careless academic (see [section 2.1](#)) mostly implies a partner who sets aside their own career to take care of children and housekeeping. The prevalence of this relationship model is decreasing, while women researchers have historically never been able to rely on a partner who stands back to support their career. The rise of egalitarian relationships means that researchers nowadays often struggle to reconcile the demand for academic mobility in their own career and the mobility needs of their partner (Dubach, Graf and Stutz 2013; Rusconi 2013; Solga and Rusconi 2007), especially during the phase of uncertainty characterised by short-term contracts. In response to this, some universities have thus established **dual career services** to support partners of newly appointed professors in finding a suitable

career opportunity at the new locality (Hochfeld 2014). Most often, such dual career provisions target academics at the professorial level. Accordingly, less senior researchers are excluded from this solution to the mobility their careers demand and the ensuing strain on their personal relationships (Schubert, Hettlage and Wolf 2020).

Key issues and challenges

- **Gender bias is widespread and has drastic negative effects on women academics:** with the same CV or number of publications, women are perceived as less excellent than men; letters of recommendation use gendered language and describe women with attributes that are less valued for an academic career; women are less likely to be cited by their colleagues; and they receive harsher teaching evaluations by students.
- **The persistence of gender biases speaks in favour of bias interventions and training, notwithstanding diverse** results in studies on their effectiveness. These interventions should not stand alone but be part of a comprehensive strategy that simultaneously addresses the individual and structural levels.
- Efforts to **redefine scientific excellence** and consider other aspects of academic quality and impact than mere quantitative output may reduce inequality in access and retention of specific groups of talented researchers, especially women and minorities.
- The gendered effects of research evaluation procedures as well as **gender gaps in funding success and amounts of funding received** should be continuously examined. **More research applications from female researchers should be generated** by screening calls for gendered effects and purposefully encouraging female researchers to apply, thereby countering the tendency for women to apply for grants less often than men in relation to their eligibility and overall participation in a field. **HR management and appointment procedures need to take gender into account** and provide diversity training for the personnel involved.
- Higher education institutions and research funding organizations should apply measures that make it possible to **reconcile work and family life**. **This major challenge to women's careers in academia** is accentuated in Switzerland by a lack of supportive family policies and sufficient childcare infrastructure. Institutional **working culture and HR policies should respond to the needs of researchers with caring responsibilities**. **Research funders** too should adopt measures to support researchers with caring responsibilities. **Suitable measures** include grant extensions in case of maternity or paternity leave, adoption, or other periods of absence; additional funding to subsidise childcare or reduce parents' working hours; or additional funding to hire a substitute for the time of absence to ensure the successful continuation of a research project.

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1.2. Empower women academics

The aim of gender equality policies in general and in academia is substantive equality. Substantive equality implies effective, de facto equality; it goes beyond mere formal equality, which on its own does not result in substantive equality. **Substantive equality is a constitutional mandate in Switzerland (Art. 8. Para. 3, Federal Constitution of the Swiss Confederation)** and an international obligation to which Switzerland has committed itself through the ratification of the CEDAW Convention. The CEDAW Convention explicitly allows for positive action as a legitimate tool to achieve actual equality and makes clear that this does not constitute a contradiction to the norm of non-discrimination (CEDAW Committee 2004). **The objective of substantial equality therefore legitimises the differential treatment of social groups which have been subjected to persistent historical discrimination**, like women and People of Colour: “The ‘same treatment’ approach in the background of the individualistic value system dominant in the R&I precludes a discussion of imbalances in the starting positions as well as structural barriers and biases in the way merit is attributed.” (GENDERACTION 2020). These measures, including quotas or special programmes for women only, are conceived as temporary since they are expected to only be necessary until the desired results are achieved and the historic inequalities balanced out (ibid.).

1.2.1. Mentoring, coaching and training for women

Mentoring, coaching and training are tools to empower women to build a successful career for themselves and to reduce the drop-out of talented women from R&I. These measures are based on the understanding of the importance of homosocial reproduction for academic careers (see sections [2.1](#) and [2.2](#)) which means that **male networks are still often central for career development** and women tend to be excluded from these sources of support and transfer of knowledge. **Mentoring, coaching and training for women therefore provide mechanisms to compensate for this imbalance in access to career support and knowledge transfer** and to enhance the retention and progression of women along the academic career (Meschitti and Lawton Smith 2017).

Mentoring, coaching and training for women can either be offered alone or are often combined in career support programmes for women. **Mentoring** implies a one-on-one or group relationship between a mentor with professional experience and a mentee in an early career stage. The mentor typically shares career-related knowledge, introduces the mentee to their networks, and offers the mentee advice, encouragement, and support (Höppel 2000; 2015). Studies on mentoring for women in academia are mostly based on self-reported, subjective effects of the mentoring, as it is impossible to measure the exact outcomes and causally link those outcomes to the mentoring programme alone. Nevertheless, the mentoring literature largely reports positive results such as **increased retention, greater success in promotion and research grants, reduced feelings of isolation, and increased self-confidence and work engagement** (Meschitti and Lawton Smith 2017: 174).

Jäger (2011) studied the long-term effects and outcomes of the first ten years of WIN, the mentoring programme jointly offered by the University of Basel and Novartis as an industry partner. She concluded that the networks created during participation in the programme lasted well beyond the end of such participation and that the mentoring programme had a sustained positive impact on the mentees’ careers. On the other hand, mentoring programmes at the University of Basel, Jäger concludes, had a very limited effect on academic structures (Jäger 2010). Mentoring, which had been non-existent in the Swiss academic context, was established in the early 2000s at Swiss Universities under the Federal Programme for Gender Equality, along with equal opportunity offices (Bachmann 2005; Drack 2005; Spreyermann 2004; Müller et al. 2007). Mentoring has become a well-established and widespread measure to promote gender equality at Swiss universities, as the current programmes (see [box 8](#)) demonstrate. Policies by the European Commission and the National Science Foundation (NSF) in the US promote mentoring programmes and networks as tools for gender equality in R&I (Nöbauer and Genetti 2008; Rosser 2010).

Coaching is a complementary opportunity provided to women researchers by many universities and is usually offered by external professionals. It aims to support women in achieving self-defined goals or bring more clarity to career-related decisions. Coaching is often integrated into more extensive career support programmes for women academics, which also include mentoring, networking, and training (Schubert, Hettlage and Wolf 2020).

Networks for women academics are a further possibility to empower them in R&I. Such professional collaboration facilitates the advocacy of shared interests and increases the visibility of women academics (ibid.; see also [box 8](#)).

Special training events are also often part of integrated career support programmes for women and target issues such as grant applications or funding opportunities, applications for professorships, wage negotiations or communication skills (ibid.). Such training and workshops are often criticised for allegedly trying to “fix the women” and for training and preparing them for a male dominated system to which they

should adapt (Sandager 2021). As long as women are disadvantaged in the R&I field though, such training may **help individual women to better navigate the male dominated system and partially compensate for the greater barriers** they encounter as women pursuing an academic career. On the one hand, it is nevertheless essential that such training events are gender sensitive and reflect on the gendered nature of the academy. On the other hand, **these strategies to empower individual women need to be accompanied by coordinated efforts to transform the inherently gendered structure of the academic system and create an environment which accommodates a diversity of people rather than cater to a narrow segment of men without caring duties.**

Box 8: A selection of current mentoring, coaching and training projects

[Fix the leaky pipeline](#) A career-building programme for women in science established in 2007 and offering networking events, workshops, coaching groups and mentoring; jointly organized by all ETH institutes.

[Female Associations](#) and [Women Professors Forum \(WPF\)](#) at the ETH Zurich

[Réseau romand de mentoring pour femmes](#) provided by universities of French-speaking Switzerland

[«antelope»-Programm](#) for (post-)doctoral researchers at the University of Basel

[PRIMA leadership program](#) of the SNSF for excellent women researchers who show a high potential for obtaining a professorship.

[Forum Mentoring](#) – The German federal association for mentoring in academia

For more practical projects see “EQUAL tools” catalogue of measures by Schubert, Hettlage and Wolf 2020

1.2.2. Protected time and career return programmes

Protected time and career return programmes are further effective measures to support female researchers. These measures acknowledge the effects of life events, which impede the completion of research projects or interrupt careers. These include having children or caring for partners, relatives or other close persons. Reflecting the still dominant gendered distribution of care work, women researchers tend to experience such phases more often. Institutions can make it possible for academics to concentrate on their research by awarding **protected research time** in which other duties such as teaching or administration are suspended (Maes et al. 2012: 12). **Career return programmes**, on the other hand, support female researchers who have experienced a longer absence from research due to maternity or other caring responsibilities in getting back on track in their academic career. This helps retain valuable talent which is often lost due to the predominant norm of an uninterrupted full-time career (Schubert, Hettlage and Wolf 2020).

Box 9: A selection of current examples of protected time and career return programmes

A sabbatical without teaching is available for research active academics returning from maternity, adoption or long term sickness leave. This enables staff to more quickly re-establish their research. For example, at University College London it is one term, at the Université de Strasbourg it can be six months or a year. (excerpt from Maes et al. 2012: 21)

The University Heidelberg's [Olympia Morata Programme](#) for female post-docs offers protected time on a competitive basis. This 50% position, available for two years with the possibility of extension for another year, helps them reach the next stage in their career, prepare a project etc. So far, 72% of the participants have received an external professorship (internal professorships are ruled out by the legal regulations) and all the remaining ones have a permanent position. This protected time programme is accompanied by a mentoring and training programme. (excerpt from Maes et al. 2012: 21)

The University of Basel's ["get on track"](#) funding is aimed at PhD students who are parents and also offers support for them to finish their PhD within the allotted time, while ["stay on track"](#) is aimed at female PostDocs in the early stage of motherhood.

The [flexibility grant](#) of the SNSF is aimed at postdocs and doctoral students who take care of children at a decisive stage in their career and are therefore in need of more flexibility. The flexibility grant offers researchers two options to balance their professional and private lives: on the one hand, it can provide funding to help cover external childcare costs. On the other hand, it can be used to help finance the salary of a support person, allowing the grantee to reduce his/her working hours. The two measures can also be combined. (SNSF)

Lunds Universitet is developing a model aiming to reimburse women who take on duties on committees, boards or funding bodies to manage the gender balance in these groups. The reimbursement aims to bring in extra staff into the research group so that a woman's career is not hampered by too many obligations in administrative or decision-making bodies. (excerpt from Maes et al. 2012: 21)

The University of Zurich awards the [Suslowa-Postdoc-Fellowship](#) to a postdoctoral researcher who had a career break or a delay in research due to integrating family and career.

The Paul Scherrer Institute's [PSI Career Return Program](#) offers fellowships to female scientists and engineers returning to science after a career break. It has also been opened to male candidates who have taken an active role in raising children and supporting their partners careers.

CERN too offers a [Post-Career Break Fellowship](#). It is aimed at people looking to return to work in science and engineering after a break for personal reasons such as family or caring responsibilities or health issues for at least 2 years.

1.2.3. Funding schemes and prizes

Research funding and research performing institutions may aim specific grants and funding schemes specifically at female researchers to support their academic careers and increase the retention and promotion of talented women researchers in R&I. **A dedicated women-only funding line is a powerful instrument**⁵ to work against the many barriers women researchers encounter and increase the share of women in the R&I talent pool. Such dedicated funding would complement the mentioned revisions to grant allocation procedures for generic funding calls, the elimination of bias and adapting research evaluation criteria to equally accommodate male and female research careers ([section 1.1](#)). Combined with the difficulties to reconcile work and family, women often hesitate to apply for prestigious grants. The additional work they have to manage during the family phase and the fact they can mostly not work as flexibly as their male colleagues may discourage them from applying. Therefore, in addition to dedicated funding lines, **support grants or administrative assistance to prepare applications for prestigious grants** such as the European Research Council (ERC) and national funding agencies is another important support for

⁵ Obtaining grant funding not only supports one's research activities, but is often taken as an indicator of a researcher's quality (Archer 2008; Hornbostel et al. 2009; Sutherland 2017; van den Besselaar/ Sandström 2015) and is directly related to securing subsequent promotions and tenure (Gerritsen et al. 2013; Liner/ Sewell 2009; Schimanski/ Alperin 2018; van den Besselaar/ Sandström 2015).

securing funding (Maes et al. 2012: 12). Prizes aimed at women academics constitute an additional instrument to increase the visibility of excellent female researchers.

Box 10: A selection of funding lines and prizes dedicated to women

The Helmholtz Association's [Helmholtz Distinguished Professorship Program](#) funds up to three professorships at 600'000 Euros per position annually at Helmholtz Centres and their partner universities. These centres and partners are expected to provide additional financial resources for outstanding women scientists at the W3 professorship level. By funding such permanent appointments, it thus aims to create reliable career prospects.

The Royal Society's [Dorothy Hodgkin Fellowship](#) is a scheme for excellent scientists in the UK at an early stage of their research career who require a flexible working pattern due to personal circumstances such as parenting or caring responsibilities or health issues. Female candidates are particularly invited to apply.

Every year the SNF awards the [Marie Heim-Vögtlin prize](#) to an outstanding young women researcher whose career progressed significantly thanks to a grant from the SNSF. The prize is worth 25,000 Swiss francs.

The Swiss National Science Foundation's (SNSF) [Gender Equality Grant](#) provides young female researchers already holding SNSF grants an additional CHF 1'000 per 12 months funded to use for additional career support measures.

The SNSFs [PRIMA grants](#) are aimed at excellent female researchers who show a high potential for a future professorship. The PRIMA grants cover the grantee's salary and project costs for a five-year period. This grant supports excellent female researchers in taking the next step in their academic career towards obtaining a professorship.

In its 2021 – 2024 multi-year programme, the SNSF has dedicated funding to female researchers at the PhD-level in the STEM disciplines and life sciences. This grant aims to motivate more women to pursue a career in STEM and life sciences and reduce the number of women who leave academia.

This set of SNSF funding schemes for female researchers is listed by the GENDERACTION Consortium (2020) as an example of interventions that promote gender equality in R&I.

1.2.4. Quotas

Quotas constitute effective temporary special measures to increase the equal representation of women in R&I and their participation in decision-making positions. **Quotas are a decisive intervention to distribute power more equally and ensure that women's perspectives are included in decision making.** They can be adapted to the specifics of a particular field, e.g. they can be progressive over a defined time-frame or they can be designed to exceed the overall average women's share in a field by a proportion of choice. Quotas attempt to **counteract the homosocial reproduction** by which most men in power recruit and promote younger men to whom they can relate (see sections [2.1](#) and [2.2](#)). There is considerable evidence on the effect of quotas (Peterson 2015; van den Brink 2010; Zehnter 2012), but the causal relationships still need to be fully tested and interpreted (Park 2020). The findings, which are ambiguous, are possibly a consequence of the **multidimensional ways in which quotas are conceptualised and their heterogeneous applications** as well as of varying methodological strategies and criteria to evaluate their impact (ibid.). Gender quotas in academia in general have not yet been sufficiently studied, although there is good research in the fields of politics and business (Voorspoels and Bleijenbergh 2019; Hughes, Paxton and Krook 2017). Park's (2020) study argues for the importance of including a time dimension in the analysis of the long-term impact of quotas, especially in academia.

Box 11: Examples of quotas for women in R&I

The Swedish government requires universities to set quantitative goals for the share of women among newly recruited full professors. Concretely, a percentage for a 3-year period is given to each university. For instance, Luleå Technical University has a goal of 33% women among professors recruited in the period, which is a much higher percentage than the share of women among all professors employed at present.

The Czech Higher Education, Research and Science Section of the Ministry of Education, Youth and Sports has introduced a directive on gender balance in advisory boards and evaluation committees in higher education. The target of 40% for both sexes will be monitored annually.

Austrian university bodies and boards have been required since 2015 to have at least 50% female members. The quota is monitored annually, as universities have to include indicators on the women's quota in their intellectual capital report.

(excerpts from GENDERACTION 2020: 3)

The Norwegian Gender Equality Act (2018) stipulates that higher education and public research institutions are obliged to have at least a 4:6 ratio of the sexes on boards and panels or in committees.

(excerpt from She Figures 2021 Policy briefs: 28)

Universities and research institutes in Germany have been obliged since 2012 to implement gender quotas according to the cascade model. This model determines targets for the proportion of men and women to be recruited or promoted to a certain career or hierarchical level based on the proportion of each at the level directly below.

In early 2020, the Irish government approved the creation of 20 women-only professorships aimed at tackling gender inequality in higher education, with a total of 45 posts to be allocated over a three-year period in areas where there is "clear evidence" of significant under-representation of women, such as physics, computer science and engineering.

(excerpts from She Figures 2021 Policy briefs: 6f)

The SNSF has [quotas](#) for its presiding board and its research council (both at least 40 per cent women and men, 20 per cent are flexible) and for other evaluation bodies (adapted to the field; share of women must be 20 per cent higher than share of professors in the field).

([SNSF](#))

Key issues and challenges

- The objective of substantial equality justifies the **differential treatment of social groups which have been subjected to persistent historical discrimination**, like women and People of Colour.
- Although sometimes criticized as attempting to "fix the women", mentoring, coaching and training **help individual women academics to better navigate the male dominated system and partially compensate for the greater barriers** they encounter pursuing an academic career. Positive effects self-reported by mentees include increased retention and greater success in promotion and research grants, reduced feelings of isolation and increased self-confidence and work engagement. **These strategies to empower individual women need to be accompanied by coordinated efforts to transform the inherently gendered structure of the academic system and create an environment, which accommodates a diversity of people** rather than cater to a narrow segment of men who do not perform caring duties.

- Due to the still gendered distribution of care work, women experience career breaks or phases of caring for infants or close ones more often. Supportive measures for women, but also for men taking up substantial caring responsibilities, such as **protected time** allow researchers to concentrate on their research. **Career return programmes** help them get back on track for an academic career after a longer absence. This is especially relevant to reduce the loss of talented persons who do not fit the predominant norm of an uninterrupted full-time career in contexts, which lack adequate childcare infrastructure or family leave, such as Switzerland.
- **Specific grants and schemes aimed at women researchers** are direct measures to increase their retention and promotion in R&I. As they are more hesitant (or lack time) to apply for prestigious grants and are still underrepresented in fields of research, which receive the largest share of funding, women need to be encouraged and supported on their way to applying. **Support grants or administrative assistance to prepare applications for prestigious grants** may increase female applications.
- **Quotas are temporary measures that aim to distribute power more equally and ensure that women's perspectives are included in decision making, thereby counteracting the prevailing homosocial reproduction in academia.** They can be adapted to the specifics of a particular field, i.e. they can be progressive over a defined period or they can be designed to exceed the overall average share of women in a field by a proportion of choice.

Measures that improve access and empower women academics are necessary as long as the dominant system in academia is structured to cater to and favour the ideal male academic who does not perform caring duties and as long as women are not supported and encouraged in the same way as their male colleagues. Fixing the inequalities and faults of the current system and helping individual women better navigate a male dominated environment remains important until gender equality is achieved in academia. But these measures cannot stand alone: They must be combined with the structural transformation of the inherently gendered norms and culture of academia in order to create an environment which allows a diversity of people to thrive. These structural and cultural barriers to women's and other minority groups' careers in higher education as well as policy responses addressing these issues are the topic of the following chapter.

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2. The gendered structures of academia and political responses

While support for women's research and careers is crucial as long as the system does not provide even conditions for all researchers, such measures need to be accompanied by an effort to reform research institutions and the academic culture and system as such (Schiebinger 2011). In addition to empowering individual women to succeed in a system oriented towards the norm of the ideal male academic, academia needs a culture change that creates conditions for a diversity of researchers to thrive. The present section surveys the key structural issues in the predominant norms and cultures of academia, which perpetuate gender inequalities as well as political action and policy interventions aimed at fixing these structural problems. [Section 2.1](#) analyses the inherently gendered norms of the ideal academic and three aspects, which emerge as especially harmful to women academics. [Section 2.2](#) examines the work culture in academia, which is aligned to the norm of the ideal male academic and takes a closer look at four particularly challenging features of this culture and their gendered effects. [Section 2.3](#) assesses gender-based violence and sexual harassment in academia and measures for prevention and intervention. [Section 2.4](#) explores the political framework and collective initiatives aimed at fighting gender inequalities and effecting institutional change.

2.1. Excellence as a gendered construct

Excellence has become the dominant norm of quality in research and defines the standard researchers must meet to succeed. While originally implying exceptionally high quality and excelling over others, excellence today is used in a broader sense of good research governance involving competition and efficient use of public funding (Deem 2009). **Excellence is located in productivity, citation indexes, publication in elite journals, successful funding acquisition and membership of editorial boards** (van den Brink and Benschop 2012: 508). So again, the definition of research evaluation criteria and the question of metric-based assessments as seemingly neutral criteria (see [section 1.1](#)) feed into this concept of excellence. In their empirical study of professorial appointments, van den Brink and Benschop list the following criteria for excellence which committee members seek out in professorial candidates: *“extremely successful researchers with outstanding reputations; an inspiring and innovative teacher; a strong but facilitating manager with substantive administrative experience and a sympathetic personality with an extensive and varied international network of high-status contacts who fits into the faculty, is ambitious and willing to work in excess of full-time hours, and who is successful in gaining research funding”* (van den Brink and Benschop 2011: 512). These features are often deemed objective and neutral indicators and as allegedly unproblematic and self-explanatory (ibid.), with experts in the field claiming to *“recognise excellence when they see it”* (Lamont 2009).

However, **these notions of excellence – such as autonomy, individual performance, competitiveness, speed and primacy – are values that evoke historical and cultural norms of masculinity** (Linková 2017: 44). A variety of studies suggest that the seemingly objective and merit-based systems of academic evaluation actually (re-)produce numerous inequalities. This includes ignoring research in other languages than English and neglecting the study of contexts other than the USA and the UK (Adler and Harzing 2009; Descarries 2003, Meriläinen et al. 2008; Nkomo 2009), undervaluing interdisciplinary research (Adler and Harzing 2009; Jain and Golosinski 2009) and reproducing inequalities based on gender, race and class (Castilla 2008; Dovidio and Gaertner 2000; Özbilgin 2009; Talves 2016). Assessment of individual performance is heavily based on research output and the ability to bring in competitive funding; conversely it does not value excellence in teaching, work for the academic community (such as organising seminars and conferences, supporting early-career researchers, giving feedback on colleagues' papers) or public engagement (through outreach, mentoring, contributing to public debates on major societal issues), even when they are all vital for the academic system (Linková 2017: 59). Chapter 2.2 demonstrates how these undervalued tasks reflect the gendered distribution of labour in academia and are disproportionately performed by women researchers, limiting their time to research, publish and raise funds. Another much neglected aspect of a researcher's impact is their quality in leadership and mentorship as well as their ability to create equitable work conditions and an environment that supports other researchers in their career development (Linková 2017: 60). Van den Brink and Benschop therefore argue that *“academic excellence cannot be treated as an objective and measurable attribute”* but that it is

“a social construction that is always embedded within a social context” (van den Brink and Benschop 2011: 509). When, as a number of scholars argue (van den Brink/ Benschop 2011; Herrschberg, Benschop, van den Brink 2016; Linková 2017; Crabtree Shiel 2019), inequalities are inherent in the construction of excellence, it is not sufficient to correct bias and eliminate impairments to the seemingly fair, objective and meritocratic system. Rather, **the inherently gendered construct of excellence itself needs to be deconstructed and transformed.**

2.1.1. “Picture a scientist”

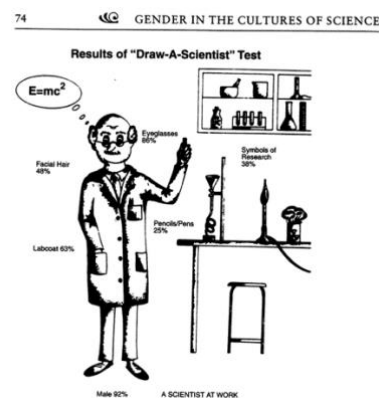
Cultural imaginations and imageries of researchers shape children’s sense of possibility insofar as they enable them to envision themselves pursuing a career in research. In addition, these images are **powerful templates for aspiring researchers** against which they measure themselves and against which they are measured by others, resulting in a feeling of belonging or in the repeated experience of not fitting into the picture. Londa Schiebinger (1999) examined how children draw scientists: in the 1980s the scientists they drew wore eyeglasses (86%), had facial hair (48%), were wearing white lab coats (63%) and last but not least: 92% were depicted as male (Kahle 1987). By the 1990s, the percentage of male scientists drawn by school children had declined to 70%, with 16% drawn as clearly female. Last time the draw-a-scientist test was repeated was in 2008: then only 61% of the drawings depicted males with 33% portraying female scientists. Although the representation of women improved, we can see standard gendered stereotypes in these images. ‘Harry’ is explosively experimenting in his laboratory – he appears to be a chemist. An unnamed female is portrayed in nature echoing the strong connection between femininity and nature found in children’s imagination of women scientists (Fralick et al. 2008).



Fig. 8 A scientist “observing”



Fig. 7 A scientist “experimenting”



These pictures render visible **cultural stereotypes of masculinity and femininity**, which infuse the norms and imaginations of ideal scientists. The following section examines three features of the implicit norms associated with an excellent researcher, which are inherently gendered as masculine: the genius academic, the passionate academic, and the careless academic. It also spells out the impact this has on female researchers, who by default do not comfortably fit these norms.

The genius academic

In a study covering over 4,000 academics from more than 80 fields, Muradoglu et al. (2021) found that **the imagery of research as a career for brilliant or genius individuals has serious gendered effects.** The more success in a field is imagined to require brilliance (raw intellectual talent or a gift that cannot be taught, in contrast to disciplines that are thought to value hard work and sustained effort), the more women – especially women from racial/ethnic groups that are traditionally underrepresented in academia – and early-career academics feel like impostors (Muradoglu et al. 2021). Impostor feelings were also found to be related to a lower sense of belonging in a field and a lower experience of self-efficacy. The authors emphasise the potential negative implications of the impostor phenomenon for academics’ long-term success and for the diversity of fields, which value brilliance. Believing that brilliance is a prerequisite for success may discourage participation by groups who are stereotyped as not having

this sort of brilliance. The authors suggest that the cultural environments and collective imageries in different disciplines may help explain the different rates of participation of women among STEM subjects and among social sciences and humanities, with physics, mathematics and philosophy respectively showing lower female participation than other disciplines, which supposedly value hard work instead of genius (Muradoglu et al. 2021). Not only do the cultures of different disciplines exacerbate individual insecurities especially of women and other groups stereotyped as less brilliant; how the research environment views and conceives women also poses a further barrier to their success. In her study of how lab leaders and research managers in the natural sciences in a Czech research institution construct excellence, Linková (2017) found a **prevalence of stereotypes regarding cognitive styles that allegedly distinguish women from men researchers**. According to this belief, men have a synthetic approach, a bird's-eye view, and a global perspective. Women, in contrast, are thought to be analytical, pay attention to detail and be suited for routine work. Some interviewees therefore preferred a gender balanced team to make the most of these alleged gender differences, even though this division of roles creates barriers to women's success in academia:

“This notion of complementarity of cognitive styles (analytical/synthetic) makes it possible to stress ‘gender balance’ within the team, but by distributing cognitive styles between men and women and associating one with leadership and vision and the other with meticulousness and routine, the unequal gender binary is reinforced while it is cloaked in the progressive language of diversity and gender balance. These attitudes create an obstacle located in women's cognitive styles against women's progress to positions of responsibility.” (Linková 2017: 58)

Gender-stereotypical perceptions of women's and men's capacities and roles undermine women's chances to succeed in academia, as the norm of excellence values the attributes ascribed to masculinity, namely genius and brilliance above diligence and sustained analytical work associated with femininity.

Women in academia are further affected by the double-bind of a **perceived conflict between femininity versus authority and leadership, which are constructed as mutually exclusive** (Eagly and Karau 2002; Heilman and Eagly 2008; Morley 2013). Women can either align with expectations of stereotypically feminine behaviour and are thereby thought to lack sufficient competitiveness or brilliance for leadership positions. Alternatively, they can perform a more assertive style and adopt behaviour stereotyped as masculine with the consequence that they are penalised for being too bossy and aggressive or in short, not likeable (Valian 1999; Williams 2005). While this double bind alone poses a consistent challenge to women academics, the situation is even more complicated for mothers and women carrying caring responsibilities (see [‘The careless academic’](#) below).

The passionate academic

Another feature of the image of the ideal researcher is their **great passion for science and research. This devotion is often expected to be absolute and exclude other passions because research is prioritised over everything**. The dominant norm expects a researcher to give total priority to work and suppress outside interests and responsibilities (Bailyn 2003; Bleijenbergh, Van Engen and Vinkenburgh, 2013). Due to their socialisation and involvement in caring for others, **women find it more difficult and less attractive to fit this norm of exclusivity and absolute dedication to research**.

Academia blurs the lines between work and leisure, so that *“the quest for academic self-improvement [becomes] a vocation rather than mere employment”* (Huppertz, Sang and Napier 2019: 784). The **expectations of a long-hours work culture** have further implications beyond the pressure to be productive. They also place considerable pressure on an individual to develop a particular subjectivity and kind of relation to their self (see [section 2.2](#)). This interview passage clearly expresses this requirement: *“Saturdays, Sundays, there is always work. Some call this workaholism but there is no other way. Either it gives you joy, and if it doesn't, you have to abandon it... I expect this sort of effort, whoever doesn't want that shouldn't be here.”* (Linková 2017: 52). This lab leader interviewed by Linková internalised the demands on the ideal academic completely and also **places these demands on other aspiring scientists**. These demands surpass the expectations of normal waged labour and require a total and absolute passion for science which **does not leave any space for other significant commitments or interests**. Researchers are expected to enjoy this sort of subsumption of their whole identity to research, anything less appears as a compromise.

This ideal becomes the template against which researchers are measured, already during recruitment (see [section 2.1.2](#)); aspiring academics who experience research as an equally valuable passion among other passions or interests may feel that they do not meet the requirements and may be discouraged to pursue academic careers. **Especially researchers with caring responsibilities, still overwhelmingly women, may find it hard or simply do not want to identify with this image of the academic whose only passion is research and whose whole life is oriented towards and centered around academia.**

The careless academic

Studies show that women struggle to fit the norm of the ideal academic, because they are automatically linked to motherhood, which is conceived as incompatible with the demands of a successful research career (Smithson and Stokoe 2005; Herschberg, Benschop and van den Brink 2016; Linková 2017). Smithson and Stokoe (2005) coined the term ‘generic she’ or ‘generic parent’ to describe how **women are automatically equated to (potential) motherhood** and how men are supposedly not concerned with difficulties to reconcile family and a career in research. That not all women are mothers and that men might face the same obstacles as fathers are ignored (Herschberg, Benschop and van den Brink 2016: 16). In all countries included in the study by Herschberg, Benschop and van den Brink (2016), there was a **cultural expectation that women are the main caregivers** and respondents argued that motherhood made it difficult to dedicate sufficient time to an academic career. These expectations towards full commitment were thought to be gender neutral and motherhood was conceived of as women’s individual choice. Motherhood was equated with choosing not to prioritize an academic career (ibid.: 18). The authors also found that these beliefs about motherhood and research – held mostly by senior men – can make women insecure about their future career in academia. In her study, Linková (2017) also found that motherhood and academic excellence were constructed as mutually exclusive: *“Being a good mother requires a whole person and her mind, just like being an excellent researcher does. No such demands were placed on fathers [...]. Women scientists were thus implicitly excluded from imaginaries of an excellent researcher.”* (Linková 2017: 54).

Motherhood was understood as the most important barrier to a woman’s career in science and as a handicap that could not be overcome, with no possibility to make up for the career time ‘lost’ in caring for children (ibid.). Both the studies by Herschberg, Benschop and van den Brink (2016) and Linková (2017) observed that **the demand of full and uncompromised commitment to academia was seen as gender neutral while women were automatically linked to motherhood, which was understood as incompatible with academic excellence.** Mothers are believed to not be as dedicated and ambitious and their choice to be a parent is equated with not sufficiently prioritising science. **Fatherhood, however, is not interpreted as a lack of commitment or ambition.**

Respondents in the studies by Linková (2017) and Herschberg, Benschop and van den Brink (2016) placed the responsibility for women’s success in academia on women’s individual choices or at the most on a social responsibility to provide adequate childcare infrastructure: But they saw no corresponding need to transform the working conditions in academia. **Making the social and institutional responsibility to create equitable conditions for pursuing an academic career while also caring for others an individual choice and responsibility has gendered effects that contribute to pushing women out of academia** (see also sections [1.2](#) and [2.2](#)).

The norm of the ideal academic implies a completely ‘careless’ academic, without any ties or caring responsibilities that keep them from following their calling as a researcher (Lynch 2010). This ideal of an absence of social ties, which constrain the researcher is also engrained in the **norm of international mobility**, which is an important criterion for career progression in academia. This again may be a challenge for researchers with caring responsibilities. However, discrimination also arises when senior academics and policy makers alike automatically suppose that such mobility is a problem for all women, thereby ignoring women without children or partners, as well as women who go abroad without any difficulty (Herschberg, Benschop and van den Brink 2016: 23).

2.1.2. Double standards in recruitment

The authors of the GARCIA project, a cross-national analysis of recruitment and selection, found that committee members maintain that they are looking for the ideal academic when recruiting and selecting postdocs and assistant professors (Herschberg, Benschop and van den Brink 2016: 32). As shown above, **this ideal academic is, however, a gendered construct, which positions women as incompatible with the related demands.** Nevertheless, respondents held the belief that academic excellence is a gender-neutral criterion which can be applied without disadvantaging women candidates (ibid.).

In contrast to the prevalent belief that scientific excellence is the sole criterion in recruitment, the authors found that committee members prefer to hire candidates whom they already know and that excellence is often compromised by opting for low-risk and trustworthy candidates (ibid.). Social qualities are not formalised in job profiles and are considered as common-sense criteria by committee members. Yet, **the assessment of trustworthiness and low-risk are gendered.** According to the findings of van den Brink and Benschop (2012), committee members lose trust in the ‘survival chances’ of women candidates in the hierarchical academic environment if they present as ‘too nice’ or ‘too modest’. **Although insecurities are a disqualifier for candidates of all gender, men are not penalised for being nice.** Instead, such men are perceived as likeable (ibid: 515), with likeability being another implicit criterion that builds trust. Research suggests that likeability is strongly connected to the relatability of a candidate. This often means that senior committee members, who are disproportionately men, identify more easily with young men and ‘recognize themselves’ in these candidates (ibid.; see also [section 2.2](#)). Although likeability is not deemed a decisive criterion for appointment, it does give a candidate certain ‘excellence points’ and may sway a decision a certain way, thereby reproducing sameness in the institution. These informal criteria combine with the formal criteria to often disadvantage women. The formal criteria undervalue other academic skills such as teaching or management (see [section 2.2.3](#) for the gendered division of labour in academia); they fail to account for career interruptions when assessing research output or display a preference for younger candidates with comparable output; and rely heavily on networks which are often based on homosocial ties (ibid: 513f.; see also [section 2.2](#)). **Accordingly, even when women excel at the formal selection criteria, implicit criteria like trustworthiness, survival chances and likeability often entrench gendered double-standards which privilege men.**

These findings on how excellence is construed in recruitment chime with studies which challenge the purported neutrality and objectivity of excellence and the idea of a universal and gender-neutral standard of merit (Adler and Harzing, 2009; Hearn, 2004; Laudel, 2006; Nkomo, 2009; Özbilgin, 2009). Van den Brink and Benschop conclude that the **standard of excellence can be a pitfall for women, as they are expected to fulfil all criteria while men are given more leeway** or trusted to compensate a deficiency in the future:

“The problematic relationship between gender and excellence sets the bar higher for women; they must ‘have it all’. Committee members appear reluctant to let go of the ideology of excellence and to feel that doing so will lower the standards when women are involved, even though they are willing to do so with men (whether consciously or unconsciously). Men receive the benefit of the doubt: not excelling in one qualification is likely to be seen less as a problem than as an opportunity for growth and development. Similarity to evaluators helps evaluators to consider a candidate’s potential and to trust that shortcomings can be remedied in the near future.” (Van den Brink and Benschop 2012: 519)

The practice of how excellence is negotiated in the recruitment and selection of professorial candidates points to the **inherently gendered construction of the norm of excellence. This contrasts with the allegedly neutral and universal standard of merit in academia; it also reproduces gender inequalities.**

2.1.3. Reworking excellence?

Given that excellence is the dominant paradigm for research quality in our time, it is no surprise that the ERC defines its mission as promoting ‘frontier research’ for which scientific excellence is the sole and central criterion on which the competitive funding system is based. Strikingly, the EU has made considerable progress in advancing gender equality in business and politics, while it has fallen short in reaching gender equality objectives in R&I in the European Research Area (ERA) (Hoenig 2021: 44). This failure may be associated with the predominant understanding of excellence as a neutral and strictly merit-based concept which is free of political influence (ibid.).

Excellence as the dominant paradigm for efficient research governance originated in the natural sciences and is based on the assumption that scientific quality can be quantified and measured objectively. It is therefore no surprise that **competitive funding based on excellence distributes the funding resources unevenly between the natural sciences on the one hand and the social sciences and humanities on the other**. This again perpetuates gender inequalities in academia, as the social sciences and humanities tend to feature a higher participation of women academics (Hoenig 2017a and 2017b). In addition, those South and East European member states with higher participation rates of women compared to North and Central European states systematically lose out on this type of competitive elite funding, further exacerbating gender inequalities in the ERA (Guzzetti 2009; HLEG 2015). Attempts to redress this unequal allocation of funding through gender equality policies tend to evoke strong opposition and resistance, because measures to advance equal opportunities and gender equality are often perceived as political and limiting the freedom of science (Mergaert and Lombardo 2014; Verloo 2018). They may be seen as skewing the allegedly neutral and objective selection of the best research, which is thought to be based on merit alone, despite findings that this is not the case and excellence is an inherently gendered construct (Pollack and Hafner-Burton 2000; Hoenig 2020). **The competition for excellence tends to reproduce underlying inequalities between countries, disciplines, and gender** – this effect of rewarding those scientific institutions and individuals who already have a strong scientific reputation and thus exacerbating existing disparities is known in the sociology of science as the ‘Matthew effect’ (Merton 1968; see also Rossiter 2003). Nevertheless, top-level researchers uncritically hold on to what is purported to be a solely merit-based and neutral paradigm of excellence (Leslie et al. 2015; Rees 2011; Husu and de Cheveigne 2010). Hoenig (2021) notes that the strong orientation towards cognitive originality and innovation entailed by frontier research could potentially strengthen gender equality, diversity and inclusion. This is especially the case as the understanding gains traction in academia that diverse perspectives strongly promote innovation (Hoenig 2021: 53). Accordingly, Hoenig calls for **broadening the paradigm of excellence to integrate the principle of gender equality** (ibid.). It remains a debated issue whether excellence as an inherently gendered construct can be redefined to integrate gender equality as a criterion of excellence or whether the concept should be discarded altogether. What is clear though, is that holding on to excellence in its current definition results in the gendered exclusion of women.

Key issues and challenges

- The notions of excellence such as autonomy, individual performance, competitiveness, speed and primacy are values that evoke historical and cultural norms of masculinity.
- **The genius academic:** The image of research as a career for brilliant or genius individuals has gendered effects. The more success in a field is imagined to require brilliance, the more women and early-career academics feel like impostors. **Gender-stereotypical perceptions of women’s and men’s capacities and roles undermine women’s chances to succeed in academia**, as the norm of excellence values the supposedly masculine attributes of genius and brilliance and not the diligent and sustained analytical work associated with femininity.
- **The passionate academic:** The demands of an academic career surpass the expectations of normal waged labour. They require a total and absolute passion for research which **leaves no space for other significant commitments or interests**. This subsumption of the academic’s whole identity to research must be enjoyed. **Especially researchers with caring responsibilities, still overwhelmingly women, may find it hard or simply do not want to identify with this image of the academic whose whole life is solely oriented towards and centred around academia.**
- **The careless academic:** the demand that academics are fully and without any compromise committed to research is deemed gender neutral although **women are automatically linked to motherhood, which is understood as incompatible with academic excellence**. Mothers are not believed to be as dedicated and ambitious and their choice to be a parent is equated with not sufficiently prioritising research, while **fatherhood is not interpreted as a lack of commitment or ambition**. Delegating the social and institutional responsibility to create equitable conditions for pursuing an academic career while caring for others to the realm of individual choice and responsibility contributes to pushing women out of academia.

- The practice of how excellence is negotiated in the recruitment and selection of professorial candidates points to the **inherently gendered construction of the current understanding of excellence. This contrasts with the allegedly neutral and universal standard of merit in academia and reproduces gender inequalities.** Even when women excel at the formal selection criteria which are sometimes already biased against them, the implicit selection criteria often contain gendered double-standards which privilege men.
- The **competition for excellence tends to reproduce underlying inequalities between countries, disciplines, and genders.**
- While holding on to the notion of excellence in its current definition results in gendered exclusions, it remains an **open question whether excellence can be redefined and expanded to promote gender equality** or whether its gendered character requires that excellence as a concept for scientific quality is better altogether abandoned.

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2.2. The male centric academic work culture

Not only is the archetype of an academic inherently gendered and does the construction of excellence disadvantage women disproportionately, but also the work culture in academia, how researchers work and conduct research together, is a major factor in pushing women out of academia.

“In most organizations in which women’s advancement and leadership opportunities have been limited, the problem is not old-style, overt sex discrimination, but rather unrecognized features of the organizational culture that affect men and women differently. Those features tend to be so embedded in organizational life as to be invisible. They generally also bear no obvious relationship to gender. The only indication that such issues exist may be an unexplained inability of the organization to attract, retain, or promote women in sufficient numbers despite an apparent willingness to do so.” (National Academy of Sciences (US), National Academy of Engineering (US), and Institute of Medicine (US) Committee on Maximizing the Potential of Women in Academic Science and Engineering. 2007)

Although the masculinised work culture in academia is subtle and not always experienced or defined as sexist or discriminatory, everyday gendered interactions do add up to an often markedly less positive experience for women than men. Surveys repeatedly find that women report being less satisfied with their work experience in the research environment than men (Pololi et al. 2012, Osveiko et al. 2019). Qualitative research points to several reasons for this dissatisfaction, which takes its toll on mental and physical health and leads some women to leave academia altogether. The following chapter outlines four cultural characteristics of academia, which disadvantage women.

2.2.1. Uncertainty and intense competition

The **high level of uncertainty characterising an academic career** is related to the current system where grants dominate over institutional funding. Temporary contracts and low pay, especially for early career researchers, are the consequence. Individuals funded solely or for the most part from grants report the highest level of experienced uncertainty, with the proportion of women in these jobs tending to be higher (29%) compared to men (19%) (Linkovà et al. 2018: 10). These numbers point to the **gendered nature of academic uncertainty**: *“women were especially concentrated in forms of temporary work that is hourly paid or based on pro-rata and zero hours contracts while men were more likely to be on yearly or multi-year contracts”,* and in addition *“the length of time spent performing precarious academic labour is also gendered, as women are more likely to have worked in the sector longer than their male counterparts”* (O’Keefe and Courtois 2019: 469). Institutional gender equality measures though often do not extend to academics with precarious employment status and ignore the **gender inequalities in type of employment in the early career stages** (ibid.).

Researchers surveyed have noted that the quality of interpersonal relationships in research organisations is affected by increasing pressure on individual and team performance as well as competition among teams (Linkovà et al. 2018: 9). This competition concentrates on recognition for research and funding acquisition. In contrast, teaching and other tasks such as supervision and group organisation – the burden of which disproportionately befalls women (see [section 2.2.3](#)) – are far less valued for career progression. The current arrangement of the academic system incentivises competitive rather than collaborative behaviour:

“[...] within HE, career advancement protocols ensure that there is often no evident individual benefit, apart from altruism or personal/political commitments, to be gained in assisting colleagues to develop their careers, and thus usually little motivation to support others. Instead, the ruthless shedding of unwanted tasks onto others down the hierarchy is a rational choice to be made, and under such circumstances, women academics, concentrated as they are in the junior ranks, are likely to be vulnerable to open exploitation, a process that the institution tends to gain from considerably in the short term.” (Crabtree and Shiel 2019: 11)

Women not only tend to be more exposed to the exploitative passing on of pressure down the academic hierarchy, but also suffer from gendered disadvantages in this competitive environment. In a study of the hiring processes of new professors in the Netherlands, van den Brink and Benschop found that committee members were frequently worried that women candidates might be too ‘nice’ to survive

in the competitive culture of academia, whereas men were seldom disqualified for being ‘too nice’ (van den Brink and Benschop 2012: 515), thus further **reproducing the competitive culture through personnel selection and keeping women out of academic leadership positions** (see [section 2.2.4](#)).

2.2.2. Workload and work-life balance

High working hours and workload are common in the academic profession. A 46.5 hours week on average is widespread in, for example, the Czech Republic (Linková et al. 2018: 10), while a survey at an Irish University found 40% of female and 46% of male respondents worked more than 50 hours per week (Drew and Marshall 2021: 55). Respondents in the Czech Republic felt they were expected to work too much and reported **severe levels of stress as well as mental and physical exhaustion** (Linková et al. 2018: 10). The vast majority of respondents at the Irish university (87% of men and 86% of women) reported working evenings and weekends in addition to regular work hours (Drew and Marshall 2021: 55). Reasons given included excessive work hours being necessary to get the work done; meeting deadlines; exigencies in the nature of the research; compensating for flexible working hours; and career advancement (ibid.). Results of two C-Change (culture change) surveys of 4997 faculty and staff in medical and social sciences at the University of Oxford found that *“work-life integration was seen to be hard to achieve, with the ‘need to excel’, ‘long hours culture’, and ‘sacrificing most weekends, evenings and holidays’, impacting women’s career advancement disproportionately”* (Osveiko et al. 2019: 181). **The academic work model is a career barrier mainly for academics with personal commitments.** Succeeding in the prevailing culture of high pressure and productivity can only be achieved through long hours of highly concentrated work. This makes part time and flexible work arrangements a handicap for career progression – mainly for women, who still bear most caring responsibilities in society (Crabtree and Shiel 2019: 9). While some female academics may navigate the culture of overwork successfully and some male academics may find the work culture incongruent with personal and professional values, **the overall effect is gendered.** When C-Change surveys collected open-ended comments in their survey the majority came from women (Osveiko et al. 2019). Many comments addressed the scheduling of meetings just after or around the end of normal working hours, the so-called bachelor’s hour (5–7 pm). Many references were made to the different consequences of the heavy workload, including women being advised against having more children. Childcare support was considered insufficient and the work environment was deemed unsupportive of other caring responsibilities such as caring for a sick parent or partner (Osveiko et al. 2019: 181). The voices of female academics in the focus group interviews conducted by Drew and Marshall (2019) and Crabtree and Shiel (2019) make clear what this work culture and difficulty integrating academic work and a personal life mean for the female academics concerned:

- **The male model requires staff to be ‘available all hours’:** *“We have workload allocation models, but I do think there is that ... masculine role of ... basically if you’re to get on and do well, you need to be here 9–5 Monday to Friday, plus all the evenings, plus all the weekends.”* (Drew and Marshall 2019: 59)
- **High stress and long hours:** *“I know two academics in the entire world who I would say have a good work-life balance ... everybody else is massively overworked, frequently overwhelmed, and that’s regardless of whether you’re a parent, or are caring for elderly parents, which is the other big issue, and both of those responsibilities fall disproportionately on the shoulders of women at the moment, and that’s societal. So, I think there’s just a serious workload issue which is ever increasing, and it’s not actually sustainable.”* (ibid.: 60)
- **Difficulties with part-time work:** *“I’d say a number of people in our department, and wider, would be part time, and I don’t know if that’s recognised in terms of career progression, and certainly I don’t think so in terms of workload. No-one ever says ‘You’re a 0.5, so let’s give you half the amount of teaching hours and half the amount of ... it never works like that. I think people maybe forget that you’re parttime and have the same expectations of you as a full-time person.”* (ibid.: 60)
- **Barriers to having children:** *“You could be doing excellent teaching in the time between maternity leaves ... you might be very creative, very innovative, and doing great things for the students, but because you’re not doing any research ... it would be ... extremely hard to have continuous*

research if you have one or two or three maternity leaves. So, it's almost like you're putting your entire career on hold for the time that you want to have children." (ibid.: 61)

- **Constant guilt and mental stress:** "I live in guilt. I wake up in the morning and I feel guilty. I get here at 8 am and I feel guilty I wasn't here at half seven. Or, you know, I feel guilty when I take 30 minutes to take a lunch break. . . . Yeah, there's guilt everywhere. It's got to the point where I actively try not to socialise with colleagues at the university because then that just adds to the guilt or stress, because I am in a situation where people are trying to outdo each other, with how many hours they've worked or papers they've published." (Crabtree and Shiel 2019: 10)

These accounts make tangible the obstacles **academic work culture constitutes to career progress for researchers with caring responsibilities**. The flexibility and individual choice when and where to work which academia provides may accommodate care-related needs. But this potential proves to be a trap for career progression when researchers are still measured against the prevailing standards of academic excellence, which can only be reached by working overly long hours, spilling into non-work time in the evenings and on weekends. Many of the researchers surveyed voiced **dissatisfaction with their work-life balance, whether they are carers or not**. Some participants were thus considering leaving academia for academic services or the private sector, which were viewed as more hospitable to women professionals (Crabtree and Shiel 2019: 10). Leaving academia is thus often a conscious decision against a work culture experienced as hostile, too high a workload, and precarious working conditions, which disproportionately affect women (Hüttges and Fay 2013; McKenzie 2021).

2.2.3. The gendered division of academic labour

The **gendered division of labour** is another factor that contributes to the academic culture and shapes the basic conditions under which research can be performed and by whom. Teaching, programme administration, supervision and lab management are vital for the functioning of higher education and academia but are not really valued in the assessment of an individual's performance and in the criteria for career progression. Heijstra, Steinhorsdóttir and Einarsdóttir define this academic service work within the institution (e.g. teaching, research-related activities, administration and gender equality initiatives) as 'academic housework' (2017: 765). They note that higher ranked academics are "*better equipped to regulate some of their academic housework*" than academics further down the hierarchy; furthermore, its distribution is gendered and it is disproportionately performed by marginalised groups (ibid.). Due to the socialisation and perception of women and because nurturing, care and emotional labour are attributed to them, **women tend to take on or get pushed into so-called academic housework in larger numbers** (Judson, Ross and Glassmeyer 2019; Crabtree and Shiel 2019): "*The perceived gendering of academic tasks dictates the status attached to these roles, as well as to their incumbents, with due implications for career progression. Those tasks deemed feminized relate to matters directly affecting students such as teaching, program administration, and pastoral care*" (Crabtree and Shiel 2019: 7). Although institutionally important, teaching is low in status and is often perceived as taking time away from pursuing grant application writing and conducting research, which are highly valued in academia (ibid.). Some participants in the Crabtree and Shiel study felt that **good teaching prompted increases in teaching duties**, while some senior staff performed so badly at teaching that they were removed from these duties, thereby rewarding them with even more research time (ibid.). The voices collected by Kinahan, Dunne and Cahill through a survey among all academic staff at the Dublin Institute of Technology (DIT) as a part of the Athena SWAN project reflect this gendered division of labour impacting female researchers:

"I was recently asked by my manager to tidy up a lab. I am fairly certain that he would not have asked one of my male colleagues to do this."

"I am expected to do a lot of the admin duties, organisational tasks and cleaning for the research group."

"I tend to be allocated organisation, minute-taking administration tasks along with more pastoral care type roles."

"Students in distress are passed on from male colleagues."

"The view has been expressed by leadership that older, senior male academic staff cannot be expected to undertake administrative tasks to the same extent as other staff members." (Kinahan, Dunne and Cahill 2021: 47)

Their empirical findings show that **female staff often take on additional roles and activities in line with female gender stereotypes, while these tasks are neither valued nor do they benefit career progression** (ibid.: 48). Addressing gender inequalities in academia therefore needs to take into consideration administration, service work and teaching, just as much as research: *“A transparent and fairer workload allocation model that clearly assigns activities equitably, regardless of gender, is essential”* (ibid.).

Box 12: Workload allocation models

The work allocation model (WAM), sometimes also called the workload model, is used in many UK universities to organise the allocation of staff to teaching, administration, management duties and sometimes the time spent on research. There is no one standard model for these systems, they have been developed and are operated by each institution and often by each department within an institution separately, based on their own requirements. (Athena Forum 2018: 2)

By examining the different models used in STEM departments, the Athena Forum aims to identify good practice and reveal any negative associations with WAMs so as to improve the operation of these models throughout the sector.

[Athena Forum \(2018\): Work Allocation Models.](#)

Steinþórsdóttir et al. (2021) note critically that while model designers understand workload allocation as a managerial tool to enable transparency and fairness (forms of procedural equity), the managed, especially women, experience them as opaque and unfair (forms of lived inequity). They outline a feminist approach to workload modelling and allocation.

Steinþórsdóttir, Finnborg S.; Carmichael, Fiona; Taylor, Scott (2021): ["Gendered workload allocation in universities: A feminist analysis of practices and possibilities in a European University."](#) Gender, Work & Organization. <https://doi.org/10.1111/gwao.12709>

2.2.4. Homosocial reproduction

Facing all these challenges, it comes of no surprise that those who stay in academia and who make their way up the career ladder tend to stabilise existing structures. Socialisation into academia under these conditions ties in with the phenomenon of homosocial reproduction, which is central to the persistence of the gender order in academia. **Homosocial behaviour in academia refers to the tendency of men to seek social approval primarily among other men, their preference in hiring researchers like themselves and to form bonds and networks predominantly with other men** (see Bourdieu 2007; van den Brink and Benschop 2012; Husu 2021).

In their empirical study, Van den Brink and Benschop found that committee members relied more on the opinions of colleagues within their own networks than on information contained in the formal letters of reference supplied by the candidates. This was expressed by a committee member as follows: *“If I do not know them, they are not excellent”* (van den Brink and Benschop 2012: 517). This means that those academics in power exercise a particularly formidable impact on the decision-making process. Their networks are of great importance in determining the ‘quality’ of a candidate. **Networks are gendered, and men are more likely than women to be encouraged to apply for positions by their male support networks** (Bagilhole and Goode 2001; Husu 2001; Kantola 2009; Van den Brink and Benschop 2012).

Lisa Husu uses the concept of the ‘non-event’ to bring into focus the lack of support and failure of academic work culture to provide conditions for women to thrive: *“Many non-events are linked to homosocial behaviour of academic men that may appear to them as a normal or ‘natural’, non-intentional bypassing of or ignoring women. One way of understanding academic women’s experiences of relative invisibility, lack of support or encouragement, feelings of exclusion from informal professional networks or communication is to see them as excluded by practices related to male bonding and male homosocial behaviour.”* (Husu 2021: 172f.) These **non-events, although subtle and even insignificant or not reflected upon in the moment, accumulate over time and build an atmosphere in academic everyday life which may be experienced as depressing and distressing, particularly to women.** Female academics in Husu’s research sample reported not receiving the support and advice they would have needed to develop their

careers, while observing how their male peers were willingly advised and supported at the same time (ibid.: 170). Female professors gave accounts of **numerous occasions they were not invited to social events or bypassed with important information** and a common theme mentioned was ‘forgetting’ to invite women as speakers for conferences unless specifically reminded, usually by female scholars (ibid.). Another non-event experienced by female researchers was the **failure of supervisors** to remember writing a recommendation letter before the submission deadline of grant applications, while they managed to do so for their male protégés (ibid.). The accounts of female academics also include **being sidelined from organisational decision-making, colleagues not bothering to read or comment on their work or seemingly more reluctant to initiate collaborative research with them than with their male colleagues** (ibid.) The lack of professional support from mentors and female role models is significant for female academic career progression:

“Non-events impact on how gendered academic identities, academic careers, gendered academic cultures, gendered academic organisations and gendered knowledge production are constructed in the daily interactions in academic life. This occurs despite the norms, regulations and policies underlining equal treatment and gender equality. ... Even though many non-events may seem like minor, fleeting or one-off incidents, they are most often part of longer-term patterns and processes.” (Husu 2021: 174)

Husu notes from her experience of holding workshops and talks for over two decades that the **concept of the non-event often functions as an ‘eye-opener’ for many academics. It helps them make sense of their experiences and can be used in gender equality training for management**; career training; training for doctoral supervision; research leader training; and in general awareness-raising activities to break the silence and initiate reflection on and transformation of the prevailing academic culture (ibid.).

Key issues and challenges

- The prevailing **work culture in academia is oriented towards the ideal male researcher without care responsibilities** and commitments other than academia. Although some women may be able to navigate and thrive in this cultural environment and some men too may find this work culture incompatible with their needs, this does not overturn the overall **gendered effects of the current work culture which can be understood as a channelling of pathways within academic careers**.
- The **high level of uncertainty** characterising an academic career **particularly affects women, who are more exposed to precarious working conditions and the exploitative passing on of academic ‘housework’ down the academic hierarchy**. The competitive culture is reproduced through personnel selection, which keeps women out of academic leadership positions.
- The **high working hours and workload** lead to severe levels of stress as well as mental and physical exhaustion. This work model that requires staff to be available ‘at all hours’ is a career barrier mainly for academics with other personal commitments and poses a barrier to part-time work and having a family. An **increasing dissatisfaction with norms of excellence, which lead to self-exploitation results in a loss of talent** opting out of academia. This frustration also leads to **increasing calls for a radical change of the academic system** visible in initiatives for [better science](#) or [slow science](#).
- The **division of labour** within academia is gendered. **Female staff often take on or are pushed into teaching and administrative duties in larger number, while these tasks are neither valued nor beneficial for their progression prospects**. Addressing gender inequalities in academia therefore requires gender-sensitive and fair workload allocation models and sensitising leaders for gender-equal group organisation and lab management.
- **Homosocial behaviour in academia** describes the tendency of leaders to mentor, encourage and hire researchers similar to themselves, resulting in the reproduction of current gender inequalities in academia. Networks are gendered, and **men are more likely to be encouraged to apply for positions by their male support networks**. The barriers to women’s careers are often not experienced as overt discrimination, but rather as an **absence of encouragement and support for women by mentors and peers** (so-called non-events) which accumulate over time and build an atmosphere that may be experienced as depressing and distressing, particularly to women. **Stimulating reflection and raising awareness on the gendered social patterns in academia** and their impact on women is key to **effecting lasting culture change**.

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2.3. Sexual harassment in academia

Sexual harassment is only recently being recognised as “*an epidemic throughout global higher education systems*” by decision makers in academia (Bondestam and Lundqvist 2020: 1) which impacts individuals and the scientific community in profound ways. Historically, sexual harassment was viewed as isolated incidents rather than a systemic problem, with the self-perception of academia as an enlightened and progressive field making it even harder to acknowledge the actual dimension of the problem (Holzbecher 2005, Jessup-Anger, Lopez and Koss 2018). Research on the contrary suggests that **academia and the neoliberal marketization of higher education are particularly predisposed to fostering gender-based violence due to its hierarchical structure, its strong dependence on people in power and the persistence of misogyny and patriarchy** (Atkinson and Standing 2019). But the framing of sexual harassment as singular cases accounts for the lack of comprehensive data on its prevalence and of policies addressing the issue. Nevertheless, there has been a recent surge in researchers and policy makers recognising that sexual harassment does not only constitute a human rights violation which has destructive consequences for the individual, but also prevents women and other historically marginalized groups from pursuing careers in science. This jeopardizes efforts to close the gender gap in science and has an impact on science as such. There is increasing agreement among the academic community that sexual harassment “*deters talent, destroys careers and impedes the science and engineering enterprise*” (Córdova 2020: 1430), reducing the quality of science and innovation. More and more leaders and policy makers across the scientific community are committing to taking determined action against all forms of gender-based violence in academia and calling upon others to take bold action too.

2.3.1. Prevalence of sexual harassment

In the predominant definition, gender-based violence is understood as a continuum of different forms of power exertion, domination and exploitation, which often takes on sexualized forms and ranges from bullying and sexist behaviour to sexual abuse and rape (see MacKinnon 1979; Kelly 1996; Bondestam and Lundqvist 2020). Several factors complicate monitoring the prevalence of gender-based violence and sexual harassment in academia. Out of several reasons discussed below, victims often opt not to report sexual harassment, which results in the official numbers underrepresenting the actual prevalence. Several studies suggest that **the cases reported constitute only a fraction of the sexual harassment and assault incidents experienced** (Brubaker et al. 2017; Cantalupo 2014; Schwarz, Gibson and Lewis-Arévalo 2017). The variation in legal structures, academic systems, and cultural contexts internationally as well as the varying use of definitions, methodology, and sample size in different surveys affect the outcome of the surveys and lead to **significant variation in the results on prevalence from study to study** (McDonald 2012; Henning et al. 2017).

In a recent and comprehensive review of over 800 publications on sexual harassment, Bondestam and Lundqvist found that 20–25% of female students in the USA have experienced sexual harassment, with the numbers for female staff being slightly lower, although other studies with different survey designs reported a higher incidence (Bondestam and Lundqvist 2020: 9). Because evidence-based research on prevalence or statistical data in European countries are lacking, there is no reliable figure for the prevalence of sexual harassment in the EU higher education system (SWG GRI 2020: 16). **For Germany**, the most current large-scale data from a survey among female students of 16 universities in 2009–2011 found that **more than half of respondents (54.7%) reported experiencing sexual harassment since enrolling in their studies** (Feltes et al. 2012: 19). **For Switzerland, there is no national data or research on prevalence to date.** Only few studies collect disaggregated data on prevalence, **taking into consideration further categories of potential marginalisation such as sexuality, race, or disability** (Bondestam and Lundqvist 2020: 8). But the studies which do investigate this suggest that students, younger women, women with insecure employment conditions, queer students and researchers, and members of minoritised ethnicities are more exposed to sexual harassment than others (D’augelli 1992; Fedina, Holmes, and Backes 2018; Ong 2005; Vladutiu, Martin, and Macy 2011). There is no indication so far that the prevalence of sexual harassment has declined over time, as Fnais et al. (2014) have observed in a study on harassment among medical trainees between 1987 and 2011.

Another prominent study from the US found that **academia has the second highest incidence of sexual harassment at 58%, compared to the private sector, government and military**, the latter having the highest rate at 69% (Ilies et al. 2003). There must, therefore, be structural factors, which make the academic system particularly prone to sexual harassment and the abuse of power. The 2018 report on sexual harassment in STEM by the National Academies of Science, Engineering and Medicine lists **factors which facilitate sexual harassment in academia in particular** (NASEM, PGA, CWSEM AND CISHA 2018: 3):

- **Male-dominated workplaces have a higher incidence in sexual harassment** (USMSPB 1995; Fitzgerald, Swan and Magley 1997; Berdahl 2007; Willness, Steel and Lee 2007; Schneider, Pryor and Fitzgerald 2011). In many disciplines, academia continues to be a male-dominated environment. But even in more gender-balanced disciplines, men often take up positions of authority as deans, department chairs, principal investigators or dissertation supervisors while women are more often in early career positions with short-term contracts, creating a power imbalance that leaves them vulnerable to power abuse (NASEM, PGA, CWSEM AND CISHA 2018: 3).
- **Organisations with a very hierarchical power structure with strong dependencies on people in positions of power facilitate sexual harassment.** Students and employees tend to not report harassing behaviour out of fear of negative impact on their lives and careers if power is highly concentrated in a single person and their success depends on that person's support (NASEM, PGA, CWSEM AND CISHA 2018: 4).
- Further factors mentioned include a **mere symbolic compliance with actions against sexual harassment, insufficient or unintentional leadership and a perceived tolerance for sexual harassment in academia** (NASEM, PGA, CWSEM AND CISHA 2018: 4). Often, higher education institutions seem to be primarily preoccupied with their legal liability and reputation, leaving the impression that victims of sexual harassment are not prioritised in the handling of cases and that perpetrators are not held to account. This is often exacerbated by a lack of clear and decisive commitment by leadership to reducing sexual harassment and to making clear that harassing behaviour is unacceptable and will not under any circumstances be tolerated.

Two additional factors stressed by the SWG GRI report are:

- A **highly competitive work culture**, which pits researchers against each other and does not incentivise collaboration and high ethical standards contributes to the prevalence of sexual harassment (ERAC SWG GRI 2020: 16).
- The report also states that **international mobility** by students and researchers alike creates a higher risk for experiencing sexual harassment, with the isolation from their usual support networks making them more vulnerable. Although mobility has become such integral to an academic career, this risk factor is ignored in ongoing efforts by researchers and policy makers to reduce sexual harassment. The SWG GRI therefore calls for it to receive particular attention (ERAC SWG GRI 2020: 17).

Not only do structural factors make academia especially prone to sexual harassment; in addition, structural factors inhibit victims from reporting these incidents (see also chapter 2.3.3). These factors listed by the report of the National Academies of Science, Medicine and Engineering do not only apply to the STEM environments studied, but are relevant for academia overall:

“Four aspects of the science, engineering, and medicine academic workplace tend to silence targets of harassment as well as limit career opportunities for both targets and bystanders: (1) the dependence on advisors and mentors for career advancement; (2) the system of meritocracy that does not account for the declines in productivity and morale as a result of sexual harassment; (3) the ‘macho’ culture in some fields; and (4) the informal communications network through which rumours and accusations are spread within and across specialized programs and fields.” (NASEM, PGA, CWSEM AND CISHA 2018: 3)

2.3.2. Consequences of sexual harassment

Sexual harassment has profound consequences for both individuals and organisations. Research shows the devastating effects of experiencing sexual harassment in higher education institutions on physical and mental health and on job outcomes. Studies confirm it can lead to depression (Martin-Storey and August 2016; Selkie et al. 2015), anxiety (Richman et al. 1999; Schneider, Swan, and Fitzgerald 1997), post-traumatic stress disorder (Henning et al. 2017), impaired career opportunities (Henning et al. 2017) and reduced job motivation (Barling et al. 1996; Chan et al. 2008; Harned et al. 2002). It often leads to a rise in job-related stress, declined productivity and performance, and withdrawal from the institution, ranging from mental or physical distancing to sick leave or leaving the position altogether (NASEM, PGA, CWSEM AND CISHA 2018: 2f.). Incidents of sexual harassment also cause considerable stress for the colleagues hearing about or witnessing the harassment and lead to conflicts in work teams (McDonald 2012; Willness, Steel and Lee 2007). While there is a **need for further qualitative research on the consequences of sexual harassment on work environments and organisational culture in academia** (Bondestam and Lundqvist 2020: 9), the **organisational costs of sexual harassment are well-documented.** They include a high turnover in the workforce and thus high costs for recruitment and training of new

employees, as well as the time and resources spent on case investigations (ibid.). The report by the ERAC SWG GRI thus concludes:

“On an institutional level, the prevalence of gender-based violence has a negative impact on the effectiveness of research groups and other teams and thus on the quality of research and education. On a societal level, gender-based violence in the research and higher education sector affects efforts to recruit and retain future generations. It also impedes efforts to achieve a less sex-segregated labour market and strategies to close the gender pay gap.” (ERAC SWG GRI 2020: 18)

The 2018 NASEM, PGA, CWSEM AND CISHA report adds that “the cumulative effect of sexual harassment is a significant and costly loss of talent in academic science, engineering, and medicine, which has consequences for advancing the nation’s economic and social well-being and its overall public health.” (NASEM, PGA, CWSEM AND CISHA 2018: 3). It remains unclear how this persistent loss of talent affects the research and innovation ecosystem. The question remains **which type of researcher gets pushed out** by falling victim to harassment and what this means for knowledge production and the kind of research which is conducted by those who remain in academia because they endure a working environment that tolerates harassing behaviour. With these consequences in mind, it is evident that it is **important to have adequate processes**, which protect targets of sexual harassment from further negative consequences, which prosecute perpetrators and which take action to prevent sexual harassment in the future.

2.3.3. Intervention and case management

As mentioned, not all higher education institutions have acknowledged how widespread a problem sexual harassment is. Rather, **several studies suggest that higher education institutions occasionally tend to hide accusations out of fear for potential harm to their reputation, rather than prioritise transparency and accountability** (Whitley and Page 2015; Anitha and Lewis 2019; Zippel 2006). The 2018 NASEM, PGA, CWSEM AND CISHA report notes: “Women cope with sexual harassment in a variety of ways, most often by ignoring or appeasing the harasser and seeking social support. The least common response for women is to formally report the sexually harassing experience. For many, this is due to an accurate perception that they may experience retaliation or other negative outcomes associated with their personal and professional lives.” (NASEM, PGA, CWSEM AND CISHA 2018: 173). It is estimated that **only 5 - 30% of all cases of sexual harassment are reported formally, of which only 1% lead to any legal process** (McDonald 2012). This points to the importance of **creating a safe environment for victimised persons** to be heard. The NASEM, PGA, CWSEM AND CISHA emphasises the responsibility of higher education institutions to convey the view that reporting an incident of harassment is a courageous and honourable action (NASEM, PGA, CWSEM AND CISHA 2018: 182). It is also crucial that victims can **access support structures** (social services, counselling centres) independent from their willingness to file a formal report and that there are less formal ways of reporting the experience if the victimised person is not comfortable with pursuing the formal procedure (ibid.: 182). Together with **measures which protect the target and prevent retaliation**, this may reduce fear or reluctance to report sexual harassment (ibid.: 177). **Institutions should investigate and then hold perpetrators accountable within a reasonable timeframe**. The consequences of violating anti-harassment policies should be clear:

“Academic institutions need to develop—and readily share—clear, accessible, and consistent policies on sexual harassment and standards of behavior. They should include a range of clearly stated, appropriate, and escalating disciplinary consequences for perpetrators found to have violated sexual harassment policy and/or law. The disciplinary actions taken should correspond to the severity and frequency of the harassment. The disciplinary actions should not be something that is often considered a benefit for faculty, such as a reduction in teaching load or time away from campus service responsibilities. Decisions regarding disciplinary actions, if indicated or required, should be made in a fair and timely way following an investigative process that is fair to all sides.” (NASEM, PGA, CWSEM AND CISHA 2018: 180)

Box 13: Resources and materials on interventions to address sexual harassment in higher education

The 2018 UN Women report on campus violence prevention and response highlights practical examples from higher education institutions around the world and formulates guiding principles for responding to violence against women on campus:

UN Women/Ending Violence Against Women Section (Ed.) (2018): [Guidance Note on Campus Violence Prevention and Response](#)

A compilation by Paludi provides recommendations for responding to sexual harassment in US universities: Paludi, Michele A. (2016): [Campus Action against Sexual Assault. Needs, Policies, Procedures, and Training Programs](#). Santa Barbara, CA: Praeger

Donaldson and McCarry reviewed the handling by Scottish universities of gender-based violence and monitored the effectiveness of measures taken:

Donaldson and McCarry (2018): [Rapid Review II - Scottish Higher Education Responses to Gender-Based Violence on Campus. Equally Safe in Higher Education Project Report](#). Edited by University of Strathclyde. Glasgow.

2.3.4. Preventing sexual harassment

Though designing and putting in place clear and adequate intervention procedures does contribute to fighting sexual harassment in higher education, further preventive measures are required to address the “systems, cultures, and climates that enable sexual harassment to perpetuate“ (NASEM, PGA, CWSEM AND CISHA 2018: 176). Assessing the national policy responses in the ERA, the SWG GRI finds that **gender-based violence in academia is still widely unrecognized and understudied and that no country in the ERA has done enough to fight gender-based violence in higher education** (SWG GRI 2020: 4). Rather, they note a **prominent lack of relevant policies, legislation/regulations, responsible authorities, and up-to-date data at the national level** (ibid.). At the institutional level, the structures, organisational climate, and academic culture need to be transformed in order to effectively prevent an environment, which enables sexual harassment to continue: “*Organizational climate is, by far, the greatest predictor of the occurrence of sexual harassment, and ameliorating it can prevent people from sexually harassing others. A person more likely to engage in harassing behaviors is significantly less likely to do so in an environment that does not support harassing behaviors and/or has strong, clear, transparent consequences for these behaviors.*“ (NASEM, PGA, CWSEM AND CISHA 2018: 171) An important step is for institutions to take responsibility for the culture within their organisation and actively monitor the climate as well as the prevalence of harassment among their departments, measuring progress and holding them accountable to reducing the rates of sexual harassment (ibid.: 182). They identify **cultural and structural factors that show strong evidence in reducing the prevalence of sexual harassment:**

- While passive leadership increases employees’ risk of being sexually harassed, **active leadership which makes clear that harassment will not be tolerated has preventive effect** (Lee 2018). Although leadership is crucial for establishing and upholding institutions’ cultural norms and values, there is a dearth of leadership training which enables leaders to thoughtfully address issues of culture and climate (NASEM, PGA, CWSEM AND CISHA 2018: 176).
- **Organisational structures and systems which value and support diversity and inclusion** reduce sexual harassment (NASEM, PGA, CWSEM AND CISHA 2018: 176). **Workplaces where women and men share power and leadership** also have a preventive effect, whereas male-dominated workplaces put women at higher risk of sexual harassment (ibid.).
- **Reducing hierarchical power structures and diffusing power more broadly** can prevent sexual harassment (ibid.). Approaches may include **egalitarian leadership styles; mentoring networks or committee-based advising** that facilitate diverse pathways for advice, funding and support; providing research funding to early career researchers directly rather than making them depend entirely on their advisor or principal investigator and guaranteeing ways for their research to continue even when the principal investigator is removed from the project (ibid.: 177).

- Another factor contributing to power imbalances and thus sexual harassment is how secure or precarious researchers' employment contracts are, with **secure job contracts** lowering the risk of sexual harassment (Bondestam and Lundqvist 2020: 14).

These cultural and structural issues need to be addressed to reduce the risk of gender-based violence in academia.

Apart from such cultural change, a concrete measure sometimes adopted to sensitise the academic community to the problem is awareness training which focuses on institutions' code of conduct and policies against sexual harassment. Research on how effective such training is in reducing the prevalence of incidents is, however, still inconclusive (NASEM, PGA, CWSEM AND CISHA 2018: 178). Sexual harassment training may be useful in improving people's knowledge of policies and sexually harassing behaviour but it has not been shown to transform their attitudes or beliefs. Further evaluations are needed to determine the efficacy of training and to improve them (ibid.). Bystander training, on the other hand, aims to empower and educate the academic community on how to identify harassing behaviour in their surroundings and how to intervene. Bystander training thereby attempts to increase collective responsibility for stopping sexual harassment and shows a promising preventive effect (Cooper and Dranger 2018; Franklin, Brady and Jurek 2017).

Box 14: Resources for prevention of sexual harassment in higher education

The German [CEWS](#) (Center of Excellence Women and Science) provides a collection of tools and resources such as guidance handbooks to prevent sexual harassment in higher education.

2.3.5. Research funding organisations' policies on sexual harassment

Currently only three research funding institutions have policies to tackle gender-based violence and sexual harassment: the National Science Foundation (NSF) and the National Institute of Health (NIH) in the USA, and the Wellcome Trust in the UK. Discussions on **how research funders can set up grant funding in a way that protects victims of sexual harassment and their grant money in case they want to change their supervisor or move to another institution** are receiving increasing attention also among research funders who do not have any concrete policies on sexual harassment in place yet. The NSF started addressing sexual harassment after the NASEM, PGA, CWSEM AND CISHA report had advocated urgent action, along with the #MeToo Movement creating a sustained outcry and a unique window of opportunity (Córdova 2020). **The NSF added a new term and condition directed specifically at harassment to their Proposal and Award Policies and Procedures guide, thus placing it alongside numerous other requirements that institutions already agree to when they accept NSF funding.** The new term and condition:

“[R]equires an NSF-supported institution to notify the agency within 10 days of taking any administrative action or making a final determination against a principal investigator (PI) or co-PI related to harassment, including sexual harassment or assault. After consulting with the awardee institution, NSF will determine whether it is taking appropriate action, such as requesting NSF approval to remove a PI and appoint a substitute. This determination would be based on factors that include the need to safeguard students and other researchers. If the institution's work is satisfactory, no further action from NSF is called for. If not, NSF may take action, including reducing or suspending the award.” (Córdova 2020)

The NIH too requires institutions to notify them if a principal investigator or other key personnel are under investigation or removed from the workplace due to sexual harassment concerns. It has created the [Working Group of the Advisory Council to the Director \(ACD\) on Changing the Culture to End Sexual Harassment](#) and committed itself to: demonstrating accountability and transparency; clarifying expectations for institutions and investigators to ensure a safe workplace; and listening to victims and survivors of sexual harassment and incorporating their perspectives into future actions (NIH). **The Wellcome Trust introduced a similar policy in 2018, which allows for six types of sanctions**, including removing researchers from grants; banning them from supervising Wellcome-funded PhD students; or submitting grant applications in the future (Else 2018). Institutions that fail to comply with the policy can also be temporarily banned from access to grant applications (ibid.). The SWG GRI recommends that national research funding organisations take action in the following domains to contribute to reducing gender-based violence in academia: fund research on gender-based violence in higher education and research through specific calls; progressively introduce the requirement for policies against gender-based violence as a condition for organisations to apply for research funding; pay special attention to gender-based violence connected to research mobility;

treat sexual harassment as just as important as research misconduct in terms of its detrimental effects on the integrity of research (SWG GRI 2020: 9).

2.3.6. A call to action

The 2020 SWG GRI report concludes that all actors need to acknowledge gender-based violence as an existing problem in the research and higher education sector, develop more research-based knowledge on the topic, build effective support structures for victims and take bold measures to create diverse and inclusive research and study environments (SWG GRI 2020: 7). Bondestam and Lundqvist point to the fact that efforts up to now have been neither sufficient nor effective in reducing sexual harassment and preventive measures lack research-based evaluation (Bondestam and Lundqvist 2020: 16). Also, research mostly takes a quantitative or legal approach, resulting in a lack of qualitative and intersectional perspectives. Strategic and concerted research funding is needed to correct this (ibid.). Cultural and structural change is crucial, as sexual harassment is fostered through precarious working conditions, the highly hierarchical organisation of academia, a lack of active leadership, the gender norms currently inherent in academia, and a social normalisation of gender-based violence:

“Therefore, the solutions to sexual harassment in higher education is not more of the same; it rather implies restructuring working conditions in higher education, challenging toxic academic masculine cultures, deciding on bold economic and social reforms counteracting intersectional inequalities, and not the least strong incentives in all parts of society combatting men’s violence against women.” (Bondestam and Lundqvist 2020: 16)

The NASEM, PGA, CWSEM AND CISHA report too concludes that “a systemwide change to the culture and climate in higher education is required” and “it is time to consider approaches that address the systems, cultures, and climates that enable sexual harassment to perpetuate.” (NASEM, PGA, CWSEM AND CISHA 2018: 176). UNISAFE, funded under Horizon Europe and currently ongoing, is the most comprehensive research project on sexual harassment in the European research and higher education sector so far. Over three years it promises to provide up-to-date, robust and reliable quantitative and qualitative data on gender-based violence, and to elaborate policy recommendations and a toolbox for higher education and research organisations on the basis of their research findings.

Key issues and challenges

- **Switzerland to date lacks national data or research** on the prevalence of gender-based violence and sexual harassment in academia.
- **More quantitative and qualitative research is needed** on the dimensions of gender-based violence in academia and on its consequences. It is **vital to collect intersectional data** which also includes violence against people on the basis of their sexuality or gender identity and takes into account further categories of potential marginalisation.
- **To effectively reduce gender-based violence in academia, structural change is needed** regarding factors, which increase the probability of power abuse and gender-based violence. These include: the male-dominated character of academic work environments; the highly **hierarchical organisation** within academia with strong dependencies on people in positions of power; the intensely **competitive culture** which disincentivises collaboration and high ethical working standards; and the **lack of active leadership** which takes a zero tolerance attitude to gender-based violence rather than mere symbolic compliance. Another important risk factor to consider in policy design is the vulnerability associated with **international mobility** in research careers.
- In addition to structural change concrete **preventive measures** that higher education institutions take to reduce gender-based violence include sexual harassment and bystander training. This increases awareness and educates the community to intervene where inappropriate behaviour is observed. **Robust intervention** that ensures access to support structures; protects the target and prevents retaliation; and that investigates misconduct and holds perpetrators accountable is vital.
- There is a prominent **lack of policies, legislation and regulations, responsible authorities, and up-to-date data at the national level** across Europe.
- Research funders need to develop policies to protect victims of sexual harassment and their grant money and to increase the collective responsibility for the non-tolerance of gender-based violence in academia. **Three pioneering RFOs** which have already taken action in this matter – the **NSF**, the **NIH**, and the **Wellcome Trust** – can be looked to for the design of relevant policies and procedures.

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2.4. Political responses to gender inequality: Effecting institutional change

As the problem of gender equality has proven to be of systemic nature, a great and coordinated effort is needed to fight inequality and transform the academic culture, which accounts for a loss of valuable talents and narrows knowledge production and innovation. While many individuals and institutions are taking determined action, the political framework and collective initiatives can also have an immense power of action and influence on how gender equality is being addressed in academia. Nation states can and do introduce national legislation promoting gender equality in science and innovation and are holding research performing and funding organisations accountable (see for example France and Ireland in [box 16](#) below). Transnationally, the EU can introduce legislation, adopt action plans, set priorities and create criteria for access to European research funding, thereby setting clear guidelines and targets for its 27 member states as well as associated countries. This section accordingly explores political responses to the systemic problem of gender inequalities in academia. It outlines the status quo of European gender equality policies in the research and innovation sectors, including the important instruments of National Action Plans (NAPS) and Gender Equality Plans (GEPS) as well as certification and award systems such as Athena SWAN and CASPER at the European level.

2.4.1. Gender as a European Research Area priority and part of National Action Plans

Launched in 2000, the ERA aims to strengthen excellence in European research and innovation by aligning national research policies and programmes and creating a single, borderless market for research, innovation, and technology across the EU (European Commission 2021). With the European Commission's [ERA Communication of 2012](#) and the resultant adoption of the **ERA Roadmap 2015 – 2020** (ERAC 2015), **gender equality and gender mainstreaming in research were defined as one of six priorities to strengthen excellence**. Three objectives were set for priority four on gender equality and gender mainstreaming in research: **gender equality in careers at all levels; gender equality in decision making; and the integration of the gender dimension into research and innovation content** (European Commission 2020). Member states and associated countries committed to developing **National Action Plans (NAPs) to implement the ERA Roadmap** in their jurisdictions and report the policies and measures taken for all six priorities, including priority four on gender equality.

The ERA Roadmap also provides a monitoring of progress through periodic ERA progress reports. Progress in the ERA priorities is measured by a headline indicator, which is the share of women in Grade A positions for the priority gender equality and gender mainstreaming. This is often criticised by gender equality stakeholders such as the Standing Working Group on Gender in Research and Innovation (SWG GRI) and the GENDERACTION project, as **the focus on the headline indicator and two supporting indicators (the share of women PhDs and the integration of sex and gender into R&I content) is too narrow to produce meaningful insights on the progress towards gender equality** (ERAC SWG GRI 2020; Wroblewski 2019). According to the ERA Progress Report 2018 (EC 2019), Croatia, Lithuania, Latvia and Romania belong to the best-performing countries in terms of share of women in Grade A positions, while the GENDERACTION analysis of NAP implementation, which focuses on gender equality policies rather than three quantitative indicators alone, found Austria, Belgium, Germany, the Netherlands, Slovenia, Spain and Sweden to be the most committed to effecting lasting change for gender equality in academia (Wroblewski 2019: 39).

Although the ERA Progress Report concludes that **progress on gender equality and mainstreaming is slow and uneven across the ERA** and that some countries did not address gender equality in their NAPs, it notes that most countries progressed in implementing more comprehensive strategies for gender equality in research and innovation. It also notes that some countries even developed a gender equality strategy in research and innovation for the first time due to the priority given to gender equality in the ERA (European Commission 2019a). In terms of the objectives addressed, increasing female participation is mentioned in almost all NAPs addressing gender equality, with 72% of them referring to structural change, but only 40% addressing the integration of the gender dimension in research content or teaching (Wroblewski 2019: 19).

For most ERA Roadmap indicators, Switzerland is ranked among the best performing or above average countries. However its lowest scores are in the priority area of gender equality and gender mainstreaming in research, placing it in the group of countries below or even well below average, depending on the respective indicator (European Commission 2019b). Nevertheless, the ERA Progress Report as well as the Swiss NAP refer to the measures taken to enhance gender equality and gender mainstreaming in research, accentuating the following: the inclusion of gender equality objectives in the Swiss government's mandate to the ETH and EPFL domain; the funding programme P-7 that promotes gender equality through supporting Swiss higher education institutions to develop Gender Equality Plans (GEPs) and facilitating collaboration projects across institutions; and the measures and funding vessels developed by the Swiss

National Science Foundation (SNSF) to promote gender equality (European Commission 2019b; SERI/ SBFI 2016). The P-7 programme incentivises the implementation of GEPs by higher education institutions, but there is no national requirement for GEP implementation and no consequences for bypassing them (ERAC SWG GRI 2021: 19). The only programme requiring GEPs as a criterion to access funds is the P-7 programme which itself promotes gender equality projects (ibid.).

2.4.2. Horizon Europe and Gender Equality Plans

Horizon 2020 as the financial instrument for funding excellent European research was the first Framework Programme for R&I (2014-2020) which enforced gender mainstreaming in European R&I policy. This includes gender as a cross-cutting issue and research topics which explicitly address gender in research content (GENDERACTION 2018). The mainstreaming of gender equality had two dimensions. The first comprised procedural rules to integrate sex and gender analysis in research proposals and to promote gender balance in research teams. The second was specific funding opportunities to study gender issues in research and innovation and implement gender equality policies in research institutions (ibid.). **The main novelties in Horizon Europe (2021 – 2027) contain veritable breakthrough agreements regarding gender equality policies** (European Commission 2021):

- The **integration of the gender dimension into research and innovation content** becomes a requirement by default across the whole programme; if this criterion for excellence is not applicable to a project, this needs to be justified in the proposal.
- Starting in 2022, as a new eligibility criterion to access Horizon Europe funding, the **applicants' institutions must have a GEP**. This is hoped to speed up sustainable institutional change.
- **Specific funding is available to support the implementation of gender equality plans** under the “Widening Participation and Strengthening the European Research Area” part of the Programme, and specific funding has been allocated for gender studies and intersectional research in Pillar II Cluster 2 “Culture, Creativity and Inclusive Society”.
- **Measures and activities promote gender equality in innovation under the European Innovation Council (EIC)**. This includes a target of 40% women-led companies invited to pitch their projects, 50% women in advisory structures, a prize for women innovators, and an initiative to support women-led start-ups.
- **Gender balance is the target for evaluation panels** and other relevant advisory bodies for Horizon Europe. Gender balance among applicant research projects will be strongly encouraged and will be an evaluation criterion for equally ranked proposals.

GEPs are viewed as a pioneering tool to effect structural institutional change and a key instrument for gender equality in research and innovation policy by relevant stakeholders, including the European Commission, the SWG GRI and the GENDERACTION project. The [GEAR Tool](#), developed by the European Institute for Gender Equality (EIGE), provides a **step-by-step guide to set up, implement, and monitor a GEP** and features a comprehensive collection of resources and practical advice. Under Horizon 2020, the European Union funded six projects which have produced considerable resources useful to organisations seeking to develop or improve GEPs and interested in best practices on monitoring methodology, recommendations on the recruitment and promotion process, or best practices in training.

Box 15: Resources to develop, implement and monitor GEPs

- A comprehensive 3-phase approach to GEPs and institutional changes was developed by [SAGE](#) based on the [GEAR tool](#), and summarised in the [SAGE wheel model](#) for Gender Equality Plans. This comprises: institutional self-assessment, construction and implementation of GEPs, and embedding gender knowledge in organisations. [The SAGE wheel toolkit](#) aims to assist organisations to effect and sustain change in cycles. The [SAGE Charter of principles for gender equality](#) supports structural, cultural and political change to eradicate sexism, bias and other forms of discrimination in research and higher education and was formally endorsed by the Irish Universities Association in 2019 with the intention that higher education institutions across Europe sign up to this charter.
- [GENERA](#) produced [several working papers and guidelines](#) on the implementation of GEPs in physics research organisations. The most innovative output is the [Toolbox for tailored gender equality plans \(by and for physicists\)](#). With its [Roadmap for the implementation of customised GEPs](#), GENERA also addressed the need, reported by many GEP projects, to adjust the latter to each specific institution.
- [LIBRA](#) focused more particularly on increasing the presence and representation of women in leadership positions in life sciences. Among the [project's deliverables](#), the [LIBRA Recruitment handbook](#) stands out as a valuable resource providing research institutions with tangible instruments to carry out a more inclusive, transparent and unbiased recruitment process.
- [PLOTINA](#) produced a curated repository listing potential [actions](#) that RPOs can consider to enhance gender equality, analyses of [case studies](#) as well as a [glossary](#) of gender equality-related terms. PLOTINA's main achievements are its toolkits: step-by-step guides on how to carry out a [gender audit](#), how to [design a GEP](#), how to [implement](#) it, how to [monitor](#) its progress and how to ensure its upkeep.
- The [Baltic Gender](#) consortium, formed by marine science research institutes, analysed members' performance in terms of gender equality. Apart from the good practices listed by other GEP projects, a distinctive outcome of Baltic Gender is the [Handbook of gender-sensitive indicators](#), aimed at measuring gender equality.
- One of the contributions of [EQUAL-IST](#) to GEPs has been its [Idea crowdsourcing platform](#) to facilitate the co-design of tailored GEPs. The [EQUAL-IST toolkit](#) targets research organisations with a focus on ICT. All the GEPs implemented by EQUAL-IST partners are published on the [project's website](#).

(excerpts from: European Commission 2020: 23 – 25)

Minimum requirements for a GEP include: that it is published and is ratified by the top management; that resources and expertise are dedicated to implement it; that data is collected and that there is monitoring and annual reporting; and that students, staff and decision-makers receive training and awareness raising on gender equality (SWG GRI 2021: 6). A GEP should address and define concrete measures and targets for the following areas: work-life balance and organisational culture; gender balance in leadership and decision-making; gender equality in recruitment and career progression; integration of the gender dimension into research and teaching content; and measures against gender based-violence (ibid.).

The percentage of higher education institutions with GEPs varies widely across member states, ranging from over 90% in Sweden, Germany and the UK to under 20% in Slovakia, Bulgaria and the Czech Republic in 2016 (European Commission 2019c: 110). The SWG GRI conducted a survey among its members to assess the adoption of GEPs and proposes eleven recommendations to the identified challenges to the Commission Member States and Associated Countries (SWG GRI 2021).

The SWG GRI report notes that adopting a GEP does not automatically imply its effective implementation. **Major barriers to effectiveness are the lack of robust quality assurance, monitoring and evaluation** (ibid.: 4). The report stresses the importance for European countries, together with the European Commission, to develop a GEP monitoring and evaluation methodology which ensures the “avoidance of box-ticking approaches” and builds a common definition of a GEP for its effective implementation (ibid.: 27). The

SWG GRI maintains that a European gender equality certification scheme might facilitate effective monitoring and evaluation (ibid.: 4).

To achieve substantive change in coming years, the report proposes **linking gender equality to funding** also at national level, as the GEP eligibility criterion for Horizon Europe funding already does at the European level (SWG GRI 2020: 7). Prioritising gender equality should be an important marker of excellence in funding decisions (ibid: 7). The SWG GRI strongly encourages member states and associated countries to adopt such an approach at the national level, as France and Ireland have already done.

Box 16: Linking gender equality to financial incentives: France and Ireland

Linking financial incentives to gender equality activities has become a strategy increasingly pursued by national governments and research funding organisations in order to speed up change and foster gender equality, where progress has often been slow and voluntary commitment has not always resulted in consistent action. France and Ireland are two examples, which have linked gender equality activities with funding incentives or sanctions at the national level.

“In France, a new Act on the Transformation of Public Services was passed in 2019 that also includes higher education institutions. It contains numerous measures on equality and the fight against gender-based violence and harassment. One of the most important requirements placed on French higher education institutions is the creation and implementation of an action plan dedicated to equality. These action plans must include several issues on equality and imply that each public employer needs to collect gender-based data and make them available. If they do not comply with this requirement by the end of 2020, they will have to pay a fine.

Ireland, too, has linked funding to working for gender equality. The three largest Research Funding Organisations in Ireland require Higher Education Institutions to have Athena SWAN Gender Equality Accreditation to be eligible for research funding.” (excerpt from SWG GRI 2020: 11-12)

The [EFFORTI](#) project offers a broader analysis of national frameworks for gender equality in research and innovation. It examines the structure and performance of the R&I system and existing policies of gender equality in [Austria](#), [Germany](#), [Denmark](#), [Spain](#), [Hungary](#), [France](#) and [Sweden](#) and contrasts the respective conditions in a [Comparative report](#).

2.4.3. Certification and award systems: Athena SWAN and CASPER

With the need for dedicated action against gender inequalities in academia, certification and award schemes (CAS) are gaining increasing traction. They provide a framework for institutions to self-evaluate their status quo, set gender equality targets, design appropriate measures to reach those targets, and monitor the progress made.

Athena SWAN especially is increasingly widespread and promising in its potential effectiveness in supporting higher education institutions to do relevant gender equality work. The Athena SWAN charter evolved from the work of the Athena Project and the Scientific Women’s Academic Network (SWAN) and was originally established in 2005 to advance gender equality in higher education and research in the UK (see Barnard 2017; Tzanakou et al. 2020). The Athena SWAN charter is currently owned and managed by Advance HE. While it initially focused on the advancement of gender equality in STEM disciplines, it has since expanded to include a wide range of disciplines and other geographic contexts. The Athena SWAN charter includes **ten principles to which institutions commit**.

Box 17: The ten principles of the Athena SWAN charter

1. We acknowledge that academia cannot reach its full potential unless it can benefit from the talents of all
2. We commit to advancing gender equality in academia, in particular, addressing the loss of women across the career pipeline and the absence of women from senior academic, professional and support roles
3. We commit to addressing unequal gender representation across academic disciplines and professional and support functions. In this, we recognize disciplinary differences including:
 - a. the relative underrepresentation of women in senior roles in arts, humanities, social sciences, business and law (AHSSBL)
 - b. the particularly high loss rate of women in science, technology, engineering, mathematics and medicine (STEMM)
4. We commit to tackling the gender pay gap
5. We commit to removing the obstacles faced by women, in particular, at major points of career development and progression, including the transition from PhD into a sustainable academic career
6. We commit to addressing the negative consequences of using short-term contracts for the retention and progression of staff in academia, particularly women
7. We commit to tackling the discriminatory treatment often experienced by trans people
8. We acknowledge that advancing gender equality demands commitment and action from all levels of the organization and, in particular, active leadership from those in senior roles
9. We commit to making and mainstreaming sustainable structural and cultural changes to advance gender equality, recognizing that initiatives and actions that support individuals alone will not sufficiently advance equality
10. All individuals have identities shaped by several different factors. We commit to considering the intersection of gender and other factors wherever possible

Athena SWAN institutions establish self-assessment teams to collect and analyse data and to identify priorities. In addition they develop action plans to address recruitment and promotion, career development, work-life balance, support for academics with family duties as well as the organisational culture, which includes workload distribution or gender representation on committees (see Barnard 2017; Tzanakou et al. 2020). The charter can be adopted by institutions and departments alike. While institutions focus on institutional structures and policies, departments work at improving hiring, retention and promotion, as well as workplace culture and practices. Applications and action plans are then peer-reviewed by panels of academics, experts, and Athena SWAN professionals from other participating institutions using their own self-assessments and known good practices as benchmarks. Athena SWAN then provides constructive feedback and applicants receive an award according to their progress on gender equality, ranging from bronze to silver and gold. Applications for awards increased sharply after **2011 when the UK National Institute for Health Research (NIHR) linked research funding to engagement with gender equality initiatives. Concretely, this meant that only institutions with an Athena SWAN silver award would be shortlisted for research funding** (Barnard 2017: 155). Although this requirement was lifted again in 2020, partly to reduce the administrative burden during the Covid-19 pandemic, **linking NIHR funding to Athena SWAN awards has been associated with a rise in the number of women in mid-level leadership positions and a higher proportion of funding allocated to women** (Osveiko et al. 2020). The Athena SWAN scheme was also adopted by Ireland (Geoghegan-Quinn et al. 2016), where three RFOs (Science Foundation Ireland, the Irish Research Council, and the Health Research Board) made an Athena SWAN award a prerequisite to access research funding (Bencivenga and Drew 2021: 34). The reputation of the Athena SWAN scheme in the UK has also led Australia to endorse a slightly modified form of the scheme (Science in Australia Gender Equity SAGE) (Tzanakou et al. 2020: 10).

Gender equality stakeholders identify the following **strengths of the Athena SWAN scheme: it is evidence-based and data-driven; it includes robust self-assessment; it supports institutions through a structured process to develop tailored gender equality plans and monitor progress** (Tzanakou et al. 2020: 11). Although Athena SWAN takes a standardised approach, it can be adjusted to local contexts and allows for a progressive path, meeting institutions where they are currently at (ibid.).

While Athena SWAN is clearly a gender equality initiative, institutions do recognise **the broader impact and benefit of evaluating and revising organisational policies and practices and the workplace culture as a whole** (Barnard 2017: 156). Case studies of Gold Award departments indicate that their achievements were attained by fully incorporating and mainstreaming gender equality into normal business; by responding with tailored and innovative initiatives to issues raised by the analysis of the collected data; and by a strong leadership driving the gender equality work (Barnard 2017: 166). Research on the results of Athena SWAN suggest that **the scheme can initiate important structural and cultural changes** (Munir et al. 2014; Ovseiko et al. 2017; 2020; Rosser. 2019), a finding supported by testimonials from professionals involved in the institutional Athena SWAN accreditation process (McKinnon 2020).

On the other hand, Athena SWAN is **criticised because it is resource-intensive and women are disproportionately responsible for the self-assessment and implementation, thereby potentially hindering their career progression** (Tzanakou et al. 2020; Tzanakou and Pearce 2019; Caffrey et al. 2016). Another limitation of the Athena SWAN scheme is its **lack of attention to the integration of gender into research and teaching content** (Schmidt et al. 2020: 15). There are concerns that the focus on training and supporting women and on family duties may reproduce stereotypes about feminine difference, and that equality work may be reduced to mere box-ticking in order to satisfy external requirements (Garforth and Kerr 2009).

While there is agreement on the need for further longitudinal qualitative and quantitative assessment of the impact of Athena SWAN on gender equality (Barnard 2017; Caffrey et al. 2016; Munir et al. 2014), it is evident that the Athena SWAN charter has been successful in increasing commitment to gender equality in participating institutions. It has provided a practicable and well-accepted procedure to collect data and establish gender equality action plans and has contributed to the increasing awareness of gender equality as an urgent priority for the higher education sector.

In line with the EU's support for institutional change in research and innovation, Horizon 2020 funded the Certification-Award Systems to Promote Gender Equality in Research (CASPER) project. CASPER is based on the premise that certification and award schemes can drive cultural and structural change and contribute to the success of GEPs. **The CASPER project examines the feasibility of a European award or certification system for gender equality in research organisations** (European Commission 2020: 28). As a first step, the CASPER project mapped and assessed existing award and certification systems for gender equality and identified existing needs for such a system at the European level (see Nason and Sangiuliano 2020; Tzanakou et al. 2020). As next steps, the CASPER project will design three different award/certification scenarios and assess their feasibility, along with a no-action scenario, and propose policy recommendations for a successful roll-out of a European award/certification scheme. The reports (Deliverable 6.1 and 6.2) are expected at the end of 2021.

Key issues and challenges

- **Gender equality and gender mainstreaming in research is one of six top priorities to strengthen excellence** in the ERA. Member states and associated countries develop **National Action Plans (NAPs) to implement the ERA Roadmap at national level** and indicate the policies and measures taken, including for priority four on gender equality.
- Progress on the priority on gender equality is slow and uneven across the ERA. **Switzerland ranks among the best-performing countries or the group of countries above average for most ERA Roadmap indicators. However, its lowest scores are in priority four on gender equality and gender mainstreaming in research.**
- Novelties in **Horizon Europe (2021 – 2027)** contain veritable breakthrough agreements with regard to gender equality policies, among them the default **requirement to integrate the gender dimension into research and innovation content and the need for applicants' institutions to have a Gender Equality Plan (GEP).**
- **In Switzerland**, the P-7 programme incentivises the implementation of GEPs by universities, but **there is no national requirement to implement GEPs and no consequences for bypassing them.** The only programme requiring GEPs as a criterion to access funds is the P-7 programme itself, which promotes gender equality projects only.
- **Athena SWAN** is increasingly widespread and deemed promising for its effective support to higher education institutions who pursue gender equality.
 - Linking NIHR funding to Athena SWAN awards has been **associated with a rise in the number of women in mid-level leadership positions and a higher proportion of funding going to women**

- Strengths of the Athena SWAN scheme are that it is **evidence-based and data-driven**, includes robust self-assessment, and provides a structured process to institutions to develop tailored gender equality plans and monitor progress
- The **broader impact and benefit of evaluating and revising organisational policies and practices and the workplace culture as a whole** is recognised by many institutions and its potential to initiate important structural and cultural changes is valued
- Criticism of Athena SWAN includes that it is resource-intensive, that women are disproportionately responsible for the work in the self-assessment and implementation, thereby potentially hindering their career progression, and that it does not consider the integration of gender into research and teaching content.
- The **CASPER project** examines the feasibility of a European award or certification system for gender equality in research organisations, as **the EU recognises the potential of certification and award schemes to drive cultural and structural change** and contribute to the success of GEPs.

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3. Integrate sex and gender into research content

Gender equality in research and innovation does not stop at equal opportunities and participation for female or non-binary researchers. It also extends to the following fundamental questions: **What and who is actually being considered by the research that is being conducted? How is knowledge constructed and what kind of knowledge is being constructed? And whose needs are considered and addressed by innovations resulting from cutting edge research?** Scholars working on the intersections of gender, science and technology have dissected the dominant research agendas and modi of knowledge production in academia since the 1980s. They have shown **how gender bias, prevalent in society as well as in research, influences the way research is conducted and how dominant conceptions of science are gendered in themselves thereby impacting the research that is carried out** (Keller 1985; Haraway 1988; Harding 1991; Spanier 1995). Current analyses still show how a significant share of study designs fall short at integrating a gender perspective. The consequences of this range from missing opportunities for novel insights, to depriving women of the health care they need, and even sometimes risking their lives due to the lack of sex analyses in medical research. **Gender bias in research limits the potential benefit of science to society** (Schiebinger 2011). This insight has led to a growing agreement on the **importance of integrating sex and gender analyses into research at all stages and across disciplines** and a number of initiatives have already achieved significant progress in this matter. Gender mainstreaming, initially focused on systems, institutions and policies, is now extended to research practices by gender experts in a range of disciplines and sex and gender analyses are employed to foster excellent and socially responsive science (Schiebinger 2011: 21). This section includes an exploration of the relevance of gender in research content ([section 3.1](#)) and a discussion of the resulting implications for research methodology ([section 3.2](#)). It provides an overview of the collective measures taken by or recommended to research funders ([3.3.1](#)), and editors and publishers ([3.3.2](#)). And it offers a brief glimpse at the integration of gender in teaching content ([3.3.3](#)), as well as the challenges related to gender in innovation ([3.3.4](#)).

While considering the gender dimension in all research content in the social sciences and humanities still remains a challenge, there are theories and methodologies for gender analyses which are widely recognised as well as functioning mechanisms of self-critique within the disciplines.⁶ The recent debate on sex and gender analysis has a strong focus on the natural and life sciences, as well as engineering and computing, as these disciplines have mostly failed to integrate sex and gender analyses into research content so far. This is reflected in the literature discussed below.

3.1. Relevance of sex and gender to research content

Integrating sex and gender analyses into research and innovation is necessary to understand when, why and how female-male differences influence results. Sex and gender are differently relevant to different disciplines and especially important in research where humans are involved. Especially in medicine and Artificial Intelligence, the need for a sex and gender dimension in research has become apparent. While the particles making up matter and radiation have no sex or gender, sex differences do matter in the correct calculation of the dosage for the safe use of ionizing radiation in cancer diagnosis and therapy (Olson 2017). Research has demonstrated how sex and gender need to be considered when research involves humans, human cells or animal cells as models for human physiology or when research results in products for human use (LIBRA Consortium: n.d.). Accounts of how non-consideration of sex and gender can harm the outcome of research and have potentially damaging effects are numerous.

Sex and gender in medicine

In medicine particularly it has become increasingly apparent how sex and gender have been neglected in the past. The integration of sex and gender analyses has generated novel insights and pivotal results in the understanding of diseases and therapies. The neglect of a sex and gender dimension in medicine is rooted in the androcentric premises of the field, which is based on the model of the male body as the default human. **This male norm ignores sex and gender differences, but also neglects variations among men and women and intersectional factors shaping human health.** There are sex differences in every tissue and

⁶ Many disciplines in the social sciences and humanities have a long history of particularly women scholars pointing at the exclusions and distortions of the questions explored and subjects covered in their fields. Female historians for example have started researching women as historical subjects, contributing to a more accurate and comprehensive history and analysing gender as a historical category since the 1970s, while female anthropologists developed a feminist critique of ethnographic methodology and writing which transformed the discipline in the late 1980s and early 1990s.

organ of human physiology (Marts and Keitt 2004) and diseases vary in prevalence, course of the disease and severity in men and women (Karp et al. 2017). Sex differences, for example, account for different metabolic profiles for women and men, which has significant consequences for diagnosing diseases linked to metabolic disorders like diabetes and Alzheimer's disease (Siegert 2012). Similarly, the differential role of sex hormones like estrogen has been found to affect the clinical course and treatment of schizophrenia (da Silva and Ravinandran 2015). Implants⁷, vaccines (Klein and Pekosz 2014) and drugs (Schiebinger 2003) need to be designed and dosed differently for men and women. Many drugs are prescribed in gender neutral doses, risking overdoses in women and some substances have shown to work differently or not at all in women (Criado-Perez (2019) has compiled an abundance of cases). Nonetheless, women are still often neglected in research design (Institute of Medicine 2010; Klinge 2010) and not included in a sufficient number in clinical trials (Beery and Zucker 2011; Curno et al. 2016; Dusenbery 2019; Kong et al. 2016; Sugimoto et al. 2019; Yoon et al. 2014). The most well-known example is a 1980s study on whether a daily dose of aspirin reduces cardiovascular mortality, where all 22'071 subjects were male (Steering Committee of the Physicians' Health Study Research Group 1989). Even with diseases overproportionally affecting women, they are not consistently included in sufficient numbers into study designs and clinical trials (Yoon et al. 2014). As a result, medical treatments for women are less evidence-based than for men (Buitendijk et al. 2010; GenSET 2014).

Woitowich, Beery and Woodruff (2020) conducted a study to assess the impact of a 2016 policy by the US NIH requiring that investigators consider sex as a biological variable in response to the overrepresentation of male subjects in biomedical research. While they found a significant increase in the proportion of studies that included both sexes as participants, there was almost no change in the proportion of studies that included data analysed by sex. Most studies failed to offer a rationale for single-sex studies or the lack of sex-based analyses. Those studies which did offer a rationale based it on misconceptions surrounding the hormonal variability of females (Woitowich, Beery and Woodruff 2020). The beliefs that female animals increase experimental variability due to cyclical fluctuating hormones and that using only male research subjects was in order because there were no major sex differences outside of reproductive functions, has proven to be wrong (Institute of Medicine 2001). It nevertheless persists and informs male bias in both basic science and clinical research (Geller et al. 2018; Mansukhani et al. 2016; Prakash et al. 2018; Scott et al. 2018). A gender-blind approach can cost lives and money and cause human suffering (Nielsen, Bloch and Schiebinger 2018); between 1997 and 2000, ten drugs were withdrawn from the US market because of life-threatening health effects, eight of which posed greater health risks for women than for men (US General Accounting Office 2001).

Another major issue is **the allocation of research funding relative to diseases, which is heavily male-biased** towards diseases prevalent in men (Mirin 2021). Mirin used statistical regression to compare funding of diseases by the NIH relative to disease burden to determine which diseases were relatively under or over funded. Results show that in nearly three-quarters of the cases where a disease afflicts primarily one gender, the funding pattern favours males: either the disease affects more women and is underfunded with respect to burden, or the disease affects more men and is overfunded. This means that the NIH devotes a disproportionate share of its resources to diseases that affect primarily men at the expense of those that affect primarily women (Mirin 2021). **Cultural stigma and bias may have contributed to the underfunding and neglect of diseases, which are more common in women:** endometriosis, one of the most underfunded female-dominant diseases, was long stereotyped as brought on by women's life choices (Dusenbery 2019: 223). Similarly, ME/CFS, also one of the most underfunded female-dominant diseases, was incorrectly deemed psychogenic and stigmatised for decades (ibid.: 254). Multiple sclerosis, predominantly affecting women, was viewed into the twentieth century as the result of hysteria (ibid.: 141) and is still today underfunded relative to disease burden (Mirin 2021).

Sex and gender in engineering and product design

Gender-blind research often results in male biased research – even if this is not intended. When researchers are not sensitised to sex and gender differences and they are not appropriately trained the social standard that equates men with the universal human being, is perpetuated. This becomes especially apparent in the numerous cases of engineering and product design that fail to consider anatomical and physiological characteristics associated with sex differences and that neglect gender. Many devices and machines have been designed to fit male bodies; for example, NASA had to cancel a space-walk by a woman astronaut in 2019, since the available spacesuits had been modelled for men and were

⁷ The newly developed artificial Carmat heart is about three times heavier than a human heart, which will limit its compatibility to 86% of men and 20% of women. 'The World's First True Artificial Heart Now Beats Inside a 75-Year-Old Patient' (2013), Smithsonian Magazine, <https://www.smithsonianmag.com/innovation/the-worlds-first-true-artificial-heart-now-beats-inside-a-75-year-old-patient-180948280/> [23/11/2021]

too large to be used safely by the woman astronaut (Cantor 2019). Crash test dummies are also based on male anatomy; while small dummies are now used to represent women, they do not take physiological differences such as neck strength into account (Linder and Svedberg 2019). Office building thermostats are based on male metabolic rates and set temperatures too low for many women (van Hoof 2015). Workplace safety gear (e.g. police vests or safety gloves in craftwork or construction) often does not fit women or small men (Schiebinger et al. 2011-2020a). **It is also important to understand differences within groups of women, men and gender diverse people** (European Commission 2020).

In artificial intelligence too, gender is receiving growing attention. Algorithms and machine learning increasingly inform human decision making, as in medical diagnosis (Larrazabal et al. 2020), recruitment (Raghavan et al. 2020), credit scoring (Onay and Öztürk 2018), policing (Bennett Moses and Chan 2018) and criminal justice (Završnik 2021) to name only a few. **Algorithms and machine-based decision making are often associated with neutrality and objectivity, but growing research shows that they actually perpetuate existing biases or even amplify these** (Douglas 2017; Mitchell et al. 2021). Buolamwini and Gebru (2018) measured the accuracy of commercial facial recognition systems and found that these systems performed better on men's than women's faces and better on lighter-skin than darker-skin. This was because of the data set on which the systems had been trained (Buolamwini and Gebru 2018). Similarly, an analysis of Google Translate has shown that the underlying machine learning algorithms default to masculine pronouns "him", "he", "his", "himself" because such masculine pronouns occur more frequently in the historical text corpus used to train the translation algorithms (Prates, Avelar and Lamb 2020; Gendered Innovations case study on machine translation⁸). The auto-complete functions of search engines seem to be gender biased too (Roy and Ayalon 2020), as are the automatic speech captions for videos (Tatman 2017) or abusive language detection algorithms (Park, Shin and Fung 2018). There are also indications that search engines more often channel men to high-income job ads than they do women (Datta, Tschantz and Datta 2015), and a STEM job advertisement purposefully constructed as gender neutral was shown to be served to more men than women (Lambrecht and Tucker 2019). Reaching billions of users a day, **AI mirrors or even exacerbates existing social inequalities if an intersectional sex and gender perspective is not integrated into the algorithm design or training data**. As such, it may have a considerable detrimental effect on the pursuit of gender equality (Müller and Pollitzer 2021).

Case studies demonstrate the benefits of sex and gender analyses

Numerous other case studies illustrate the benefits of a sex and/or gender perspective in various fields. This includes: basic biomedical research discussed by the LIBRA Consortium (n.d.); fifteen case studies by the expert group on Gendered Innovations 2 in the fields of health, climate change, energy and agriculture, urban planning and transport, artificial intelligence and machine learning, finance, taxation and economics as well as an ad hoc case study on the coronavirus (European Commission 2020); and the numerous case studies compiled by the Gendered Innovations project in the fields of science, health and medicine, engineering, and environment (Schiebinger et al. 2011 – 2020b). These brief accounts of how sex and gender influence health and medicine, artificial intelligence as well as the development of innovation and technologies along with the additional case studies demonstrate the importance of a sex, gender and intersectional perspective in research, which is a crucial component contributing to world-class science and technology (Tannenbaum et al. 2019). The European Commission has summarized the benefits as follows:

Box 18: Benefits of sex and gender analyses in research and innovation

"Integrating sex and/or gender analyses into research and innovation:

- adds value to research in terms of excellence, creativity and business opportunities;
- helps researchers and innovators question gender norms and stereotypes, and rethink standards and reference models;
- leads to an in-depth understanding of diverse gender needs, behaviours and attitudes;
- addresses the diverse needs of citizens of the European Union and thereby enhances the societal relevance of the knowledge, technologies and innovations produced;
- contributes to the production of goods and services better suited to new markets."

Excerpt from the report "Gendered Innovations 2" (European Commission 2020: 8)

⁸ See <http://genderedinnovations.stanford.edu/case-studies/nlp.html>

In order to eliminate sex and gender bias, improve scholarly quality and open up new lines of research and innovation, researchers need to collaborate to integrate the concepts of sex, gender and intersectionality into their work (Young Håkansson and Sand 2021). **This requires the expertise of gender studies scholars in interdisciplinary collaborations; it also requires training for academics across disciplines in basic sex and gender analysis methodology relevant to their field – a skill still lacking in much graduate and academic training** (Schiebinger 2021).

3.2. Relevance of sex and gender to research methodology

In research content, the term *sex* refers to the biological attributes which distinguish male, female and intersex and includes chromosomal make-up, germ cells and morphology (European Commission 2020). Female and male sex often serve as statistically distinct categories in the life sciences and medicine. It should be considered however that recent research has shown that sex is not to be conceived as strictly binary, but rather a fluid and wider spectrum than ‘male’ and ‘female’ (Ainsworth 2015). Gender is employed to broaden the analysis from quantitative variables to structures and norms and examine social consequences of this categorisation (Young Håkansson and Sand 2021: 13). Gender analyses help to understand how social processes are gendered and how cultural norms of masculinity and femininity play out. Also, gender as a concept makes it possible to analyse social power dynamics and inequalities such as access to resources, decision making positions and political power. Intersectionality is a concept popularised by law scholar Kimberlé Crenshaw (1989) to capture the interplay of different categories of discrimination. It aims at understanding the experience of black women which cannot be subsumed as being discriminated against as women and as people of colour, but result in a distinct experience of discrimination. An intersectional approach can be used as a theoretical point of departure and methodological aid within research to understand how categories such as gender, race, sexuality, functionality and class interact with each other (Young Håkansson and Sand 2021: 13). Intersectional identities such as ‘immigrant woman’ or ‘working class woman’ point to the need to analyse multiple social structures in order to understand how they shape people’s experiences and opportunities in life (ibid.).

Sex, gender and intersectionality can influence all stages of research and innovation, “from making decisions about priorities for research spending; through deciding on the research focus, methodology and data collection; to analysing and reporting on data; and even disseminating and applying the results” (LERU 2015: 10). **Integrating sex and gender perspectives into research is important right from the beginning of the research cycle in decisions on how funds – which are limited by definition – are allocated across research fields and projects** (LERU 2015: 10). Mirin’s (2021) statistical analysis has demonstrated how, compared with the disease burden, NIH funding privileges male-dominant diseases while underfunding female-dominant ones. While funding priorities depend on complex societal, academic and political processes, socially entrenched gender bias evidently also influences what is collectively deemed important and relevant in research. **It is therefore imperative to analyse how funding priorities differently affect men and women to ensure that research responds equally to the social and medical problems of all people and does not disadvantage one gender.** Framing research questions as gender-neutral or wrongly assuming from the outstart that no sex differences are at play may limit the validity of conclusions, overlook opportunities for innovation, disadvantage one gender, or even be potentially dangerous, as the case studies in [section 3.1](#) have demonstrated. Researchers should thus be sensitised to potential gender and sex differences in their specific field, be trained in relevant analytic methods involving sex and gender in their field⁹, consult widely, and encourage participation and inclusion of different perspectives in research design (LERU 2015: 11).

In the analysis phase of a study, sex should be considered as a variable in most biomedical research (fundamental and applied, animal and human) and in product and systems design (ibid.). It is not enough to include both sexes in a study if data is not sex-disaggregated in the analysis phase to determine whether sex is or is not a relevant variable. Gender analyses are required when cultural norms, needs and behaviours may impact on study outcomes (ibid.). Often, sex and gender interact, potentially involving other structural categories such as race, class or functionality, which may diminish or amplify sex or gender differences. This can demand complex analyses and requires researchers to consider relevant factors (ibid.). Finally, in the reporting phase of the study, the results with regard to sex and gender and their potential interrelation should be described and sex- and gender-disaggregated data published, where applicable (ibid.). Where there are no differential outcomes, this must be clearly mentioned, as no mention of potential sex or gender differences makes it unclear whether they do not exist or have simply not been studied (ibid.).

⁹ An increasing body of literature develops field specific state-of-the-art methods for Gender and Sex Analysis, the best known being the Gendered Innovations Project (<http://genderedinnovations.stanford.edu/>)

While it is agreed that diversity in content and methods contributes to research quality and excellence, it remains unclear what the secondary effects of such a diversification research in content are for gender equality and diversity in the academic workforce. According to Nielsen, Bloch and Schiebinger (2018), diversity in research teams may lead to innovation in itself. But the recruiting and retaining of women and underrepresented groups in research will not succeed until the deeper issues in the organisation of institutions and production of knowledge are understood and transformed. To achieve this, it is necessary that all researchers acquire basic skills in sex and gender analyses and that this task is not delegated to women or newcomers alone (Schiebinger 2021: 5).

3.3. Collective efforts

To integrate sex and gender into research, collective efforts are needed. Various stakeholders need to evolve policies and guidelines and offer training and workshops. Research funders and editors thus play an important role, as do higher education institutions with the integration of gender in teaching curricula, and actors in the innovation system.

3.3.1. Research funders and policies

The Swedish Secretariat for Gender Research identifies a steadily growing interest over recent decades in gender in research in politics, policy and practice (Young Håkansson and Sand 2021: 5). **Gender as a perspective in research is largely integrated today into global research policies, the ERA and Horizon Europe frameworks, numerous national action plans and strategic priorities of research funding organisations** (ibid.).

The GENDER-NET deliverable report D3.9 compiles results collected through a 2014 survey of national and regional organisations across Europe, the United States and Canada on the integration of gender into research contents and provides a compendium of existing initiatives (Pépin, Zemborain and Forson 2015). It features survey responses by the Swiss National Science Foundation (SNSF), the Rectors' Conference of Swiss universities (CRUS/swissuniversities) and the State Secretariat for Education, Research and Innovation (WBF-SERI) in Switzerland. A recent report of the Swedish Secretariat for Gender Research analyses several RFOs' sex and gender analysis policies gathered by the Gendered Innovation project¹⁰ (Young Håkansson and Sand 2021). Their analysis shows a wide range in the extent to which RFOs incorporate sex and gender analyses into research. Some organisations require applicants to indicate whether there is a sex and gender dimension in their project and if so, how a sex and gender dimension will be integrated¹¹ (ibid.: 45). Some organisations provide guidance and training for reviewers and applicants¹², some do so only for potential applicants¹³, while some do so only for reviewers¹⁴ and others again only for external reviewers¹⁵ (ibid.: 45). Challenges identified include the need for clearer guidance as well as more training for applicants and reviewers in sex and gender methodology to improve gender expertise among applicants and review boards alike (ibid.: 49). The RFOs which constitute the Global Research Council (GRC) emphasise the importance of integrating gender into research design and the analysis of research outcomes. They have published a report, which aggregates trends, practices and experiences of GRC-participating organisations regarding gender in research and outlines the catalytic role of these actions (Global Research Council 2021). According to Schiebinger (2021), **public funding agencies can lead the way regarding gender in research by asking applicants to explain how sex, gender and intersectional analysis is relevant to their proposed research or to explain that it is not**. Recommendations and requirements which introduce sex and gender analyses as a quality criterion when evaluating proposals are key to mainstreaming sex and gender in research content and methods (Nielsen, Bloch and Schiebinger 2018: 732). **Also important for RFOs to consider is the setting of funding priorities and allocation of funding**. Studies on the Scandinavian countries found that policies that prioritise large research grants – as in 'centres of excellence' – accentuate gender inequalities as these prestigious mega-projects are likely to

¹⁰ Sex and Gender Analysis Policies of Major Granting Agencies compiled by the Gendered Innovations project available at: <http://genderedinnovations.stanford.edu/sex-and-gender-analysis-policies-major-granting-agencies.html>

¹¹ These are: Irish Research Council; Canadian Institutes of Health Research; Dutch Ministry of Health, Wellbeing, and Sports; European Commission Directorate-General for Research and Innovation; French National Research Agenda, Austrian Research Promotion Agency, Austrian Science Fund

¹² Irish Research Council

¹³ Canadian Institutes of Health Research

¹⁴ French National Research Agenda

¹⁵ UK Research and Innovation

include only a small participation of women (Aksnes et al. 2012; Sandström et al. 2010). To foster the benefits of diversity, Nielsen and colleagues (2021: 732) call on RFOs to distribute their resources across numerous projects and focus areas rather than concentrating them on few large-scale grants (Nielsen, Bloch and Schiebinger 2018: 732). A closer look at selected RFOs illustrates the current state of integration of gender in research. The European Commission is a global leader in integrating sex and gender into research content. Nationally, the Canadian Institutes of Health and the National Institute of Health in the USA were the first RFOs to implement sex and gender policies for research content.

The European Commission and Horizon Europe

In the last decade, European research policy has increased its emphasis and efforts on integrating gender into research and is committed to being a global leader in the design and implementation of these policies (European Commission 2020). Since 2012, integrating gender into research content has been an ERA priority, and under the Horizon 2020 framework programme applicants have been asked to integrate sex and gender analyses into research content where relevant (ibid.: 7). The proportion of gender-flagged topics (i.e. topics which explicitly require sex and/or gender analysis in funded projects) has increased in every successive work programme, growing from 16.1% in 2014 – 2015 to 36.4% in 2020 (ibid.: 36). However, this implementation did not meet the expectations, as the interim evaluation of Horizon 2020 found that fewer proposals successfully incorporated sex and gender analysis than desired (Directorate-General for Research and Innovation 2019). This was linked to a lack of knowledge and skills on how to effectively integrate a gender dimension into research as well as to the lack of adequate training on gender issues (Directorate General for Research and Innovation 2017: 26). In response, the European Commission convened an expert group to support the integration of gender into European research. It also updated the first report entitled *Gendered Innovations* (2013) and released the expanded work in the *Gendered Innovations 2* report in 2020. The expert group recommended that for Horizon Europe work programmes, all topics should require sex- and gender-based analysis by default and only topics not requiring a gender dimension should be flagged, reversing the burden of proof (European Commission 2020: 37). **Within the Horizon Europe framework, the integration of the gender dimension into research and innovation content did indeed become a requirement by default across the whole programme; where this criterion for excellence does not apply to a project, it needs to be justified in the proposal** (see [section 2.4.2](#)).

Canadian Institutes of Health and National Institute of Health (USA)

The Canadian Institutes of Health were global leaders in 2010 when they were the first to introduce policies requiring that applicants report how sex, gender or intersectionality are relevant to their research or to justify their exclusion (Schiebinger 2021: 12). The European Commission has introduced such policies across all disciplines since 2014 and the US National Institute of Health has required all public-funded grants to include sex as a biological variable since 2016, without yet requiring gender analyses (ibid.). Initially the Canadian Institutes of Health only requested explanations from applicants who had declared that sex and/or gender were relevant to their project. They changed this after one funding cycle, also making it requisite to explain negative responses (Young Håkansson and Sand 2021: 22). All applicants were given access to a short research guide on sex and gender and an FAQ document in the online application system (ibid.). **In the first funding competition in December 2010, 26% indicated a sex and/or gender dimension relevant to their research, while the percentage grew to 48% already in December 2011** (Johnson et al. 2014). **This offers clear evidence of the key role RFOs play in the uptake of sex and gender aspects in health research.** The US National Institute of Health implemented a policy requiring investigators to consider sex as a biological variable in 2016 (Woitowich, Beery and Woodruff 2020: 1). The intent is to ensure equal representation of males and females in vertebrate research studies unless there is sufficient justification to legitimise the use of a single sex (ibid.).

Swiss National Science Foundation

The Swiss National Science Foundation (SNSF) mission statement on gender equality states that, with all research applications, the SNSF takes note of the inclusion of a gender dimension to the extent that it seems appropriate or indispensable to the research topic or object and that the SNSF also supports research in Gender Studies¹⁶. Applicants for funding are, however, not required to specify whether their research design considers sex and/or gender. But where gender is relevant, the evaluation form does allow external

¹⁶ The SNSF mission statement on gender equality can be accessed here: http://www.snf.ch/SiteCollectionDocuments/wom_leitbild_gleichstellung_e.pdf

referees¹⁷ to comment if the proposed study neglects to consider it sufficiently (Pépin, Zemborain and Forson 2015: 152). There are also no guidelines or training, neither for applicants nor reviewers (ibid.). SPIRIT – the SNSF funding instrument aimed at strengthening research collaboration with countries receiving Swiss development assistance – requires applicants to demonstrate how they considered gender and sex in their project or explain why it is not relevant and/or show how they made an effort to recruit a balanced team (Young Håkansson and Sand 2021: 32). There is a designated gender expert in the evaluation committee of the funding instrument, and gender equality and/or the inclusion of a gender dimension in the proposed research will function as a quality criterion in the evaluation as well as being a deciding criterion for equally ranked projects (ibid.).

3.3.2. Editors and publishers

Even though editors enter the research process late after research has been conducted and data has been analysed, they can play an important role in promoting effective and transparent sex and gender reporting (Heidari et al. 2016: 2) The gap in representation of women in studies on human subjects is also reflected in publications. A review of 258 cardiovascular treatment trials in Cochrane Reviews revealed that only 27% of total trial participants were women (Kim and Menon 2009). Among trials recruiting both men and women, only a third conducted sex-based analyses (Johnson, Greaves and Repta 2009). Only 4% of animal studies published in *Pain* over a 10-year period studied sex differences, while 79% included male subjects only (Greenspan et al. 2007). Adequate inclusion of sufficient numbers of women and men and other population groups in research as well as sex and gender analyses require a concerted effort among funders, researchers, reviewers and editors. Since 2012, Gendered Innovations has maintained a list of journals with such policies and the links to these policies¹⁸. The International Committee of Medical Journal Editors (ICMJE), for instance, has published robust guidance on sex and gender reporting and recommends that researchers include representative populations in all study types, provide sex-aggregated data and analyse it appropriately (ICMJE 2014). Importantly, the European Association of Science Editors put forward their now widely adopted **Sex and Gender Equity in Research (SAGER) guidelines, which stipulate procedures for reporting sex and gender in study design, data analyses, and interpretation of findings** (Heidari et al. 2016).

¹⁷ Member of the SNSF National Research Council which evaluates application in a second step after the assessment by external reviewers

¹⁸ <http://genderedinnovations.stanford.edu/sex-and-gender-analysis-policies-peer-reviewed-journals.html>.

Box 19: Sex and Gender Equity in Research (SAGER) guidelines

“General principles

- Authors should use the terms *sex* and *gender* carefully in order to avoid confusing both terms.
- Where the subjects of research comprise organisms capable of differentiation by sex, the research should be designed and conducted in a way that can reveal sex-related differences in the results, even if these were not initially expected.
- Where subjects can also be differentiated by gender (shaped by social and cultural circumstances), the research should be conducted similarly at this additional level of distinction.

Title and abstract: If only one sex is included in the study, or if the results of the study are to be applied to only one sex or gender, the title and the abstract should specify the sex of animals or any cells, tissues and other material derived from these and the sex and gender of human participants.

Introduction: Authors should report, where relevant, whether sex and/or gender differences may be expected.

Methods: Authors should report how sex and gender were taken into account in the design of the study, whether they ensured adequate representation of males and females, and justify the reasons for any exclusion of males or females.

Results: Where appropriate, data should be routinely presented disaggregated by sex and gender. Sex- and gender-based analyses should be reported regardless of positive or negative outcome. In clinical trials, data on withdrawals and dropouts should also be reported disaggregated by sex.

Discussion: The potential implications of sex and gender on the study results and analyses should be discussed. If a sex and gender analysis was not conducted, the rationale should be given. Authors should further discuss the implications of the lack of such analysis on the interpretation of the results.”

(Heidari et al. 2016: 5)

The European Association of Science Editors recommends that journal editors endorse the SAGER guidelines and adapt them to the needs of their journals and fields of science by including examples of good practice (Heidari et al. 2016: 7). Editors should also distribute the SAGER guidelines to their reviewers and encourage reviewers to use these guidelines when evaluating manuscripts by making sure that peer-review assessment forms include space for commentary on the implementation of sex and gender analyses (ibid.). Training on the importance of sex and gender-sensitive reporting for editorial staff should be included in regular training on ethical conduct and editorial practices (ibid.). The League of European Research Universities LERU too recommends that peer-reviewed journals set standards and develop guidelines on how to include sex and gender analyses in research reporting (LERU 2015: 4). According to Schiebinger (2021), health and medical journals have taken swift action to adopt such guidelines, but engineering and computer science journals have so far been tardy. She reports, however, a movement among large artificial intelligence/machine learning conferences to review papers for ethics, which encompasses potential bias related to gender and ethnicity (ibid.: 13).

3.3.3. Gender in teaching

Even if funding agencies and journals have policies on the gender dimension in research, implementation has been lagging (European Commission 2019). This is commonly associated with the lack of gender expertise and competences among researchers and evaluators alike (Directorate-General for Research and Innovation 2017: 26). Higher education institutions therefore play a crucial role in educating and preparing the workforce for the future. The League of European Research Universities recommends dual measures in this regard: **firstly, universities should provide tools for researchers to understand and apply analytic methods pertaining to gender and sex in their research fields through training, workshops, seminars or showcasing good examples; secondly, universities should incorporate the sex and gender dimensions in research into the teaching curriculum** (LERU 2015: 4). While numerous higher education institutions offer gender analyses in the humanities and social sciences, gender and sex analysis are still rarely a part of the core curriculum in science, engineering, and medical education (Nielsen, Bloch and Schiebinger 2021: 732). Examples of a thorough integration of a sex and gender dimension in teaching curricula are still limited. The Charité – Universitätsmedizin Berlin in Germany has successfully integrated sex and gender analyses across its medical curriculum, involving support from the dean and intensive work by well-respected faculty

members to assist professors at integrating state of the art findings about sex and gender into their courses (Ludwig et al. 2015). In response to student demand, Harvard University has pioneered an Embedded Ethics course which integrates ethical reasoning – including the sex and gender dimension – into the entire computer science curriculum (Grosz et al. 2019). The contributions at the intersection of computer science and gender studies made by the "Kompetenzforum Genderforschung in Informatik und Naturwissenschaften" (gin) at the University of Freiburg, Germany, have been incorporated into the computer science curriculum¹⁹. The Carnegie Mellon University was infamously able to increase its share of female students from 7% to almost 45% within 7 years (1995 – 2002), which involved a strong emphasis on culture change and curricula reforms – emphasis was put on the fact that this did not mean a “pinkification” of curricula to meet the often supposed stereotypical interests of women (Fisher and Margolis 2002; Frieze 2015). The KTH Royal Institute of Technology Stockholm has been integrating a gender equality perspective and gender dimension into teaching curricula across study programmes for several years (Wahl 2020; 2021). The programme director chooses an appropriate form of integration. Together with experts and lecturers they produce teaching material which connects gender to their own discipline (ibid.). This has a double benefit in integrating sex and gender into teaching on the one hand, and in raising awareness and building sex and gender analysis skills among teachers and researchers on the other hand.

On a national level, the Austrian Federal Ministry of Education, Science and Research included goals concerning the integration of a gender dimension in teaching into its performance agreements with public universities for the period of 2016 – 2018 (Palmén et al. 2020: 4). The requirement attempts to scale-up activities already taking place at some Austrian institutions to the whole higher education sector (ibid.). The successful implementation of this goal was, however, hampered by the absence of supplementary funding to integrate the gender dimension, as institutions only receive lump sum funding to fulfil their overall duties stipulated in the performance agreements (ibid.: 5). These challenges notwithstanding, the outcomes linked to the Performance Agreements regarding gender in teaching contents were positive. Awareness and interest in gender increased at all levels of the universities’ hierarchies and among students. And there was an increase in gender competence and commitment to gender teaching and research (ibid.: 7). The University of Klagenfurt was regarded as particularly successful in transferring knowledge from gender studies to the teaching of other disciplines: in addition to developing and promoting gender-critical teaching in all degree programmes, including a mandatory course for all students, the Centre for Women and Gender Studies organises optional modules in “feminist science-gender studies”, as well as an extension curriculum in gender studies for the equivalent of 24 ECTS, which are both accessible to students of all disciplines (ibid.: 6).

3.3.4. Gender in innovation

As a gender perspective is rarely integrated into innovation processes, the neglect of the gender dimension in innovation policy has significant detrimental effects. Why diversity matters in innovation, and how businesses gain a competitive edge by integrating a gender perspective into their innovation work is discussed in the report stemming from the collaboration between three public agencies: Innovation Norway, Tillväxtverket – the Swedish Agency for Economic and Regional Growth, and Vinnova – the Swedish Governmental Agency for Innovation Systems (Danilda and Thorslund 2011). A policy brief by the ERAC Standing Working Group on Gender in Research and Innovation presents a short overview of the key factors and trends in the participation of women in innovation and the integration of a gender dimension into innovation processes (ERAC SWG GRI 2019). It delivers recommendations to policy makers, research funders, and innovators on how to ensure that innovation benefits women and men equally. The policy brief argues that **gender affects how innovation is perceived, designed, developed, implemented and used** (ibid.: 6). Further research shows that: venture capital only fragmentarily takes up women’s innovative ideas compared to men’s (Foss, Woll and Moilanen 2013; Criado Perez 2019: chapter 9); that gender bias results in women being perceived less as innovators than men (Lindholm and Politis 2013, Marlow and McAdam 2013); and how innovation is still shaped by masculine discourses and values (Blake and Hanson 2016; Criado Perez 2019; Marlow and McAdam 2013; Nählinder, Tillmar and Wigren-Kristoffersson 2012), also in open innovation (Remneland and Knights 2013). The user is often implicitly imagined as male or gender-neutral (Alsos et al. 2016; Criado Perez 2019) and the gender dimension of innovation is not considered or if, this consists of simply ‘pinking’ solutions that do not adequately consider women’s needs (Schroeder 2010; European Commission 2013; Schroeder Sánchez de Madariaga and Lyhne 2016; Quinlan and VanderBrug 2017). **Women are also heavily underrepresented as inventors and innovators, with a low share of women participating in patenting and other forms of applied research and innovation outputs** (ERAC SWG GRI 2019: 8). The *She Figures 2018* report indicates only slight growth in the share of women for all technology domains (European Commission 2019: chapter 7). The SWG GRI identifies several issues that innovation policy should address: The share of women among entrepreneurs and founders should be

¹⁹ <http://mod.iig.uni-freiburg.de/cms/index1a6a.html?id=75#50>

increased. There should be policy support and funding opportunities for areas with high innovation potential that address social challenges and typically feature a higher share of women – this applies particularly to care and to service industries; special attention should be paid to the needs of women as users, also including them as producers in co-creation processes and open innovation (ERAC SWG GRI 2019: 8).

Box 20: Resources on the sex and gender dimensions in research content

[Gendered Innovations project](#)

The Stanford University project ‘Gendered Innovations’ led by Prof. Londa Schiebinger and supported by the European Commission and the US National Science Foundation suggests practical methods of sex and gender analyses for scientists and engineers, and provides case studies as concrete illustrations of how sex and gender analysis lead to innovation. It also features field-specific checklists for research procedures, policy recommendations for RFOs, higher education institutions, journals and industry and provides videos on a range of issues.

[Gender in Research Toolkit](#)

The European Commission’s Research Directorate General developed a gender toolkit and training activities. These provide the research community with practical guidance on how to integrate gender into research. The project was concluded at the end of 2012, but [training sessions](#) can still be arranged.

[GENDER-NET Manuals with guidelines on the integration of sex and gender analyses into research contents, recommendations for curricula development and indicators](#)

The GENDER-NET ERA-NET report, funded by the European Commission, aims to assist national/regional research funding and performing organisations with the know-how to integrate sex and gender considerations into policies, programmes, plans and strategies.

[Gendered Innovations 2](#)

The policy report produced by the [EU-funded H2020 expert group on ‘Gendered Innovations’](#) provides researchers and innovators with methodological tools for sex, gender and intersectional analyses. It also presents concrete case studies, showcasing projects funded under [Horizon 2020](#) and addressing key research and innovation areas for [Horizon Europe](#) clusters, missions and partnerships.

[League of European Research Universities Advice Paper on Gendered Research and Innovation](#)

The Advice Paper includes a comprehensive list of recommendations for research universities, governments, funding agencies and journals.

Key issues and challenges

- **Gender-blind research often results in male biased research – even if not intended.** Not being sensitized to sex and gender differences and trained appropriately means that the social standard of men as the universal human is perpetuated. It is also important to understand differences within groups of women, men and gender diverse people.
- **Mainstreaming sex and gender into research content is key in order to eliminate sex and gender bias, improve scholarly quality, and open up new lines of research.** On the one hand, this requires integrating the expertise of gender studies scholars in interdisciplinary collaborations; on the other hand, this requires training for academics across discipline in basic sex and gender analysis methodology relevant to their field.
- **Integrating a sex and gender perspective into research is important right from the beginning of the research cycle in decisions on how funds are allocated across research fields and projects.** Gender bias leads to the disproportional allocation of research funding for diseases affecting one gender, with female-dominant diseases presently being underfunded relative to disease burden and vice versa. **It is therefore important to analyse how funding priorities affect men and women differently** to ensure that research responds equally to the social and medical problems of everyone and does not disadvantage one gender.
- **Research funders:** Gender as a perspective in research is largely integrated today into global research policies, the ERA and Horizon Europe frameworks, numerous national action plans and strategic priorities of research funding organisations. **Public funding agencies can lead the way regarding gender in research by asking applicants to explain how sex, gender and intersectional analysis is relevant to their proposed research or to explain that it is not.**

- Even though **editors** enter the research process late after research has been conducted and data has been analysed, **they can play an important role in promoting effective and transparent sex and gender reporting**. The European Association of Science Editors put forward their now widely adopted **Sex and Gender Equity in Reporting (SAGER) guidelines**, which stipulate procedures for reporting sex and gender in study design, data analysis, and interpretation of findings.
- The League of European Research Universities recommends dual measures in this regard: **firstly, universities should provide tools for researchers to understand and apply analytic methods pertaining to gender and sex analysis in their research fields through training, workshops, seminars or showcasing good examples; secondly, universities should incorporate the sex and gender dimensions in research into the teaching curriculum**. Especially promising is the approach of the KTH Royal Institute of Technology Stockholm, which requires teaching staff to develop course material that integrates sex and gender into their curricula, thereby building sex and gender analysis skills among both students and researchers at the same time.
- **Gender affects how innovation is perceived, designed, developed, implemented and used. Gender perspectives are rarely integrated into innovation processes. The neglect of the gender dimension in innovation policy has significant detrimental effects**. Women are also heavily underrepresented as inventors and innovators, with a low share of women participating in patenting and other forms of applied research and innovation outputs.

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Summary of key issues and challenges

Numerous barriers to women's careers in academia remain intact. Efforts to improve access and empower women academics are important to promote gender equality in academia ([section 1](#)).

- Studies have revealed a **gender bias** ([1.1.1](#)) in research evaluation procedures and criteria, affecting recruitment, promotion and funding ([1.1.2](#)). The gendered division of labour and the unequal distribution of care work mean that women often find having a family incompatible with the demands of an academic career, which are based on the norm of the careless academic ([1.1.3](#)). This conflict may be further aggravated by a **lack of supportive national family policies and institutional settings hostile to the needs of caring academic staff**.
 - The persistence of gender biases speaks in favour of **bias interventions and training**.
 - **Redefining evaluation criteria and redesigning evaluation procedures are both vital**. This includes monitoring gender gaps in funding success and amounts of funding received, generating more research applications from female academics by screening calls for gendered effects and possibly purposefully encouraging female researchers to apply, and diversity training for personnel involved in recruitment.
 - **Institutional working culture and HR policies should be responsive to the needs of researchers with caring responsibilities**. Suitable measures include: grant extensions in the case of maternity or paternity, adoption, or other periods of absence; additional funding to subsidise childcare costs or facilitate the reduction of a researcher's working hours; or additional funding to hire a substitute while the researcher is absent to ensure the successful continuation of a project.

[Box 1](#): Selected introductions, training materials and resources on unconscious bias

[Box 2](#): Ten ways to improve academic CVs for fairer research assessment

[Box 3](#): Selected promising examples of national research funding policies

[Box 4](#): Recommendations for gender equality measures for funding agencies

[Box 5](#): GenPORT policy briefs on encouraging the recruitment and promotion of woman researchers

[Box 6](#): Resources for gender equality in professorial appointment procedures

[Box 7](#): Gender equality measures in tenure procedures: Stop the clock

- The objective of substantial equality legitimises the differential treatment of social groups, which have been subjected to persistent historical discrimination, like women and People of Colour ([1.2](#)). This can include dedicated funding lines and prizes aimed at women academics ([1.2.3](#)) as well as quotas ([1.2.4](#)). Although sometimes criticised as attempting to 'fix the women', **mentoring, coaching and training** ([1.2.1](#)) **help individual women to better navigate the male dominated system and partially compensate for the greater barriers they encounter** as women pursuing an academic career.
 - Suitable measures include protected time and career return programmes ([1.2.2](#)), specific grants aimed at women researchers, support grants or administrative assistance to prepare applications for prestigious grants, and quotas.

[Box 8](#): A selection of current mentoring, coaching and training projects

[Box 9](#): A selection of current examples of protected time and career return programmes

[Box 10](#): A selection of funding lines and prizes dedicated to women

[Box 11](#): Examples of quotas for women in R&I

Measures to improve access and empower women researchers cannot stand alone. They must be combined with the structural transformation of the inherently gendered norms and culture of academia in order to create an environment which allows a diversity of people to thrive ([section 2](#)).

- The **notions of excellence** ([2.1](#)) such as autonomy, individual performance, competitiveness, speed and primacy are values that evoke historical and cultural norms of masculinity. The norms of the genius, passionate and carefree academic are especially harmful to women scientists. The **inherently gendered construction of excellence**, which research on recruitment practices makes visible, contrasts with the allegedly neutral and universal standard of merit in academia. It also reproduces gender inequalities.

- This calls for **debate on how excellence could be redefined** and expanded for it to promote gender equality; **or how its gendered character may rather require the abandonment of excellence** as a concept for quality in research altogether.
- The current **work culture – centred on the norm of the ideal male academic – can be understood as a gendered channelling of pathways within academic careers (2.2)**. Factors which contribute to the gendered effects of the work culture include the uncertainty and intense competition, workload and work-life balance, the gendered division of academic labour, and the prevailing homosocial reproduction.
 - A **profound culture change is needed** to create an environment for a diverse population of academics to thrive and unfold their talent.

[Box 12](#): Workload allocation models

- The steep hierarchies and relations of dependence within higher education institutions make academia especially prone to **abuses of power and forms of gender-based violence, such as sexual harassment (2.3)**. This has severe consequences for the individuals and the academic system as a whole, requiring determined action by the academic community.
 - There is a need for **more quantitative and qualitative research** on the consequences of gender-based violence for academia, also in the national context of Switzerland.
 - **Structural change** is necessary to tackle the highly hierarchical organisation, competitive culture and lack of active leadership.
 - Measures to be taken include robust **policies and interventions** at the institutional, national and research funder levels to ensure the protection of victims and create accountability through clear consequences for perpetrators.

[Box 13](#): Resources and materials on interventions to address sexual harassment in higher education

[Box 14](#): Resources for prevention of sexual harassment in higher education

- **Political responses** that tackle the structural barriers to gender equality are a powerful tool to initiate lasting change (2.4).
 - The Horizon Europe (2021 – 2027) framework contains veritable breakthrough agreements regarding gender equality, among them the default requirement to integrate the gender dimension into research and innovation content and the need for applicants' institutions to have a gender equality plan (GEP).
 - In **Switzerland**, the P-7 programme incentivises the implementation of GEPs by universities, but there is **no national guideline that requires GEPs** and no consequences for bypassing them. The only programme requiring GEPs as a criterion to access funds is the P-7 programme itself, which promotes gender equality projects only.
 - **Certification and awards systems are promising drivers for cultural and structural change**. The EU's CASPER project is therefore currently examining the feasibility of a European certification and award system. Athena SWAN is increasingly widespread and seems effective at supporting higher education institutions in doing relevant gender equality work, with a number of few research funders making **holding an Athena SWAN award a prerequisite to accessing funding**.

[Box 15](#): Resources to develop, implement and monitor GEPs

[Box 16](#): Linking gender equality to financial incentives: France and Ireland

[Box 17](#): The 10 principles of the Athena SWAN charter

In order to eliminate sex and gender bias, improve scholarly quality and open up new lines of research, mainstreaming sex and gender into research content is key ([section 3](#)).

- This requires including the **expertise of gender studies scholars in interdisciplinary collaborations**, as well as **training for academics across discipline in basic sex and gender analysis methodology** relevant to their field ([3.2](#)).

- **Public funding agencies can lead the way** regarding the integration of the gender dimension in research by **asking applicants to explain how sex, gender and intersectional analysis is relevant to their proposed research** or to explain that it is not (3.3.1). It is also important to monitor how funds are allocated and **analyse how funding priorities affect men and women differently**.
- **Editors and publishers** can play an important role in promoting effective and transparent sex and gender reporting by setting standards or implementing the Sex and Gender Equity in Reporting (SAGER) guidelines (3.3.2).
- **Higher education institutions** should firstly provide tools for researchers to understand and apply methods of sex and gender analyses in their research fields through **training, workshops, seminars** or showcasing good examples; higher education institutions should, secondly, **incorporate the sex and gender dimension in research into the teaching curriculum** (3.3.3)
- Gender affects how innovation is perceived, designed, developed, implemented and used (3.3.4). Even though a **gender perspective is rarely integrated into innovation processes**, the gender dimension often continues to be neglected but **needs to be considered in innovation policy**.

[Box 18](#): Benefits of sex and gender analyses in research and innovation
[Box 19](#): Sex and Gender Equity in Research (SAGER) guidelines
[Box 20](#): Resources on the sex and gender dimensions in research content

The pressing challenges for gender equality in higher education in Switzerland and possible responses to them include:

- Creating institutional cultures and HR policies which are responsive to the needs of researchers with care responsibilities and compensate for the lack of national family support policies and childcare infrastructure
- Stimulating a debate on how the gendered concept of excellence can be redefined, or how the conception of academic quality must be rethought
- Conducting quantitative and qualitative research on the prevalence and consequences of gender-based violence in the Swiss academic system as a precondition to designing adequate responses
- Exploring possibilities to link gender equality efforts to funding access, as Horizon Europe does with its requirement that applicants' institutions must have a GEP
- Considering ways to promote the integration of sex and gender into research content through methodological training to researchers; integrating sex and gender into teaching curricula; and requesting that applicants for research funding consider the sex and gender dimensions to their research projects.