DIVERSITY IN SCIENCE AND SCIENCE FUNDING

A mapping of the literature on diversity wrt. gender, age, career stage, nationality and field

- A collaboration between the Independent Research Fund Denmark (IRFD) and DEA, May 2021

- Diversity in science: highly polarized debate with limited/selective use of evidence
- Aim: overview of state-of-the-art knowledge about diversity in science
- A co-funded project, commissioned by IRFD and undertaken by The Think Tank DEA

DIVERSITY

GENDER

AGE AND CAREER STAGE

NATIONALITY

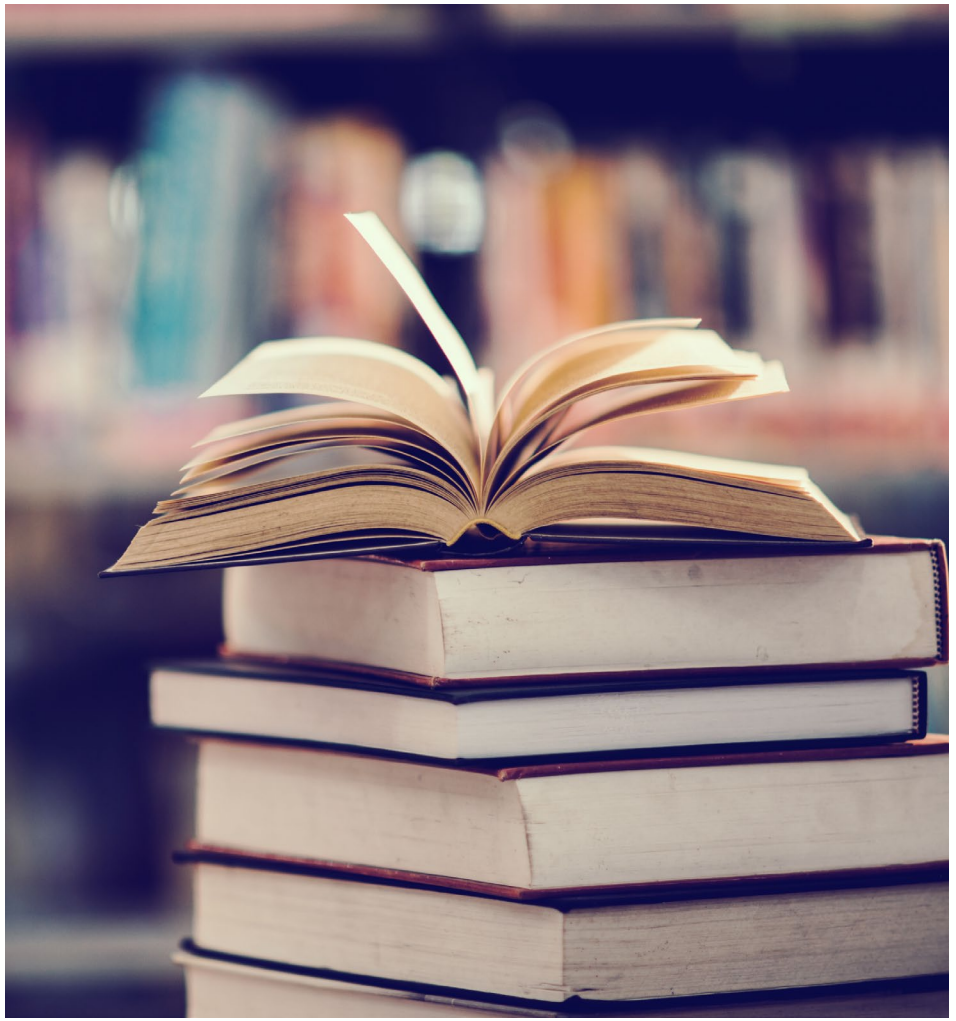
RESEARCH FIELD

Methods

- Mapping of approx. 500 scientific publications in peer reviewed journals (mostly from 2010 onwards) + feedback from two researchers
- Statistical overview of diversity in Danish science (based on accessible register data)
- Illustrative case descriptions of how selected foundations work with diversity (DK foundations; SNSF; ERC; Vetenskapsrådet; Wellcome Trust)

The literature mapping

- Majority of studies on gender diversity
- Focus on literature from North America and Europe – but similar trends and tendencies are described across countries
- Fragmented (e.g. wrt. topics, methods)
- Mixed evidence (a.o. due to large variation in methodological approaches, different/specific empirical settings etc.)
- A tentative synthesis of key findings from the literature



#1 Diversity can be associated with beneficial effects for science e.g. increased variation and relevance

Six overall arguments for why diversity is important were identified in the literature

- **Underrepresentation** of key societal groups (may undermine legitimitacy of science)
- **Loss of talent** due to higher attrition of certain groups of researchers
- **Unreasonable barriers** i.e. unequal opportunities to pursue and excel in an academic career

- **Strengthened creativity and problem solving** at moderate levels of heterogeneity
- **Increased variation** (increased likelihood of variation in topics, research questions, methods)
- **Greater relevance** (increased attention to the role of e.g. sex and gender related factors)

#2 There are significant gender differences in academic career paths, but causes are complex

The ‘leaky pipeline’

Also, female researchers..

- .. have slower career progression
- .. tend to spend more time on teaching and ‘academic/faculty service’
- .. on average have fewer publications
- .. are less likely to be listed as first or last author
- .. are more likely to publish in journals with lower prestige
- .. are less geographically (especially internationally) mobile
- .. engage in lower degrees of collaboration with researchers, especially internationally
- .. on average hold fewer grants and receive smaller total amounts of funding

– some of these differences are however significantly reduced in studies that take into account the fact that women are more likely to exit academia, and that there are fewer female senior faculty

What can explain observed gender differences?

- Even small differences (e.g. in productivity) can accumulate over time
- Not a question of cognitive skills, nor of women being less cited
- Gender differences in the choice of field and subfield
- Family matters (but how (much)? e.g. mixed evidence re. the relationship with productivity)
- Gender differences in time spent on teaching and (especially low-prestige) academic service
- Mixed evidence re. the existence of gender bias – but bias cannot be ruled out
- Environments and norms in academia (and self-reinforcing feedback mechanisms)
- A complex interplay between many factors that affect/reinforce each other
- Cumulative advantages and disadvantages
- ‘Fix the system, not the women'

#3 Vague excellence criteria may constitute a barrier to diversity in science

Does rewarding ‘safe bets’ hinder diversity?

- Focus on excellence may contribute to or reinforce gender differences in science
- ‘Excellence’: a flexible concept with no objective or transparent criteria, which is often invoked in e.g. grants and recruitment decisions
- Said to favor researchers who e.g. work in data-driven science and have a continuous flow of publications within established research areas with good opportunities to publish in high-prestige journals (”safe bets”)
- Women researchers are e.g. more likely to have gaps in their publication list, work with exploratory and qualitative methods, engage in problem-oriented research, and work ni (sub)fields with a lower overall likelihood of publishing in high-prestige journals
- Men are more likely than women to be associated with e.g. ’excellence’, ‘raw talent’ or ‘genius’
- May also hinder risk-taking and field-related diversity in science, cf. prior IRFD/DEA review

#4 Challenges experienced by early career and foreign-born researchers can hamper diversity in science

Is academia sufficiently attractive for a broad range of talents?

- The start of an academic career is associated with great uncertainty (high degree of competition; increased use of time-limited and ‘soft money’ positions)
- Work conditions (fx employment uncertainty, rigid mobility demands) may increase the risk that certain groups of researchers (e.g. with small children) are more likely to exit academia
- No clear determinants of success – but success is associated with e.g. place of training; whether they have co-published with a top researcher; how large a proportion of their work time is spent on e.g. teaching and ’academic service’; luck and chance (N.B. direction of causality unclear)
- Foreign-born researchers can experience a number of challenges in their country of residence e.g. lower job satisfaction, lower pay, a lacking network etc.
- Are work conditions attractive (enough) to retain a varied group of talents?

#5 Diversity wrt. research fields can yield better solutions to complex problems, drive the development of fields, and increase variety in research

Are the incentives for novel research good enough?

- Diversity wrt. research fields may refer to variation within a portfolio of research activities or grants (though this has not been a focus area in the literature mapping)
- May also refer to field-level diversity within the work of a single scientist or (usually) a group of scientists (i.e. closely related to trans-, multi- and interdisciplinarity)
- Diversity wrt. research fields can contribute to science in at least three ways: (1) more effective scientific problem solving; (2) the development of new research areas and specializations in science; (3) increased variation in research questions and approaches
- Interdisciplinary and novel paths offer a risky path forward, particularly for younger researchers (see DFF & DEA 2019)
- Mixed evidence regarding whether researchers who pursue cognitively diverse research strategies meet bias in assessment processes in connection with e.g. positions and grants

#6 Gender diversity often overshadows other aspects of diversity – but broadening the scope only increases the difficulty of efforts to support diversity

#7 There are no ’quick fixes’ and no ’one size fits all’-solutions – supporting diversity calls for a long-lasting and varied effort

Working with diversity in practice

- Premise: Heterogeneity among researchers may contribute to increased variation in science, strengthening the basis for novelty & relevance in science
- This calls for supporting diversity in a broad sense of the term
- Focus on gender – a.o. due to the well-established ‘leaky pipeline’
- But other aspects of diversity are also salient – how many and which factors to focus on?
- At the same time: remain attentive to barriers to other aspects of diversity
- No ‘quick fixes’ or ‘magic wands’ – but a need for a long-lasting and varied effort

Some of the possible levers

GENERALLY SPEAKING

- Political focus (*but* local flexibility)
- Critical mass
- Transparency and accountability (data)
- Responsible use of bibliometrics
- Bias training – combined with tools

RESEARCH INSTITUTIONS

- Clear, transparent criteria for advancement
- Family-friendly policies; flexibility (e.g. wrt. parental leave; international stays)
- Diversity in assessment committees and the like (but mixed evidence; unintended effects)
- Rethinking excellence
- Mentor programs
- Cultural change
- Internal funding for cross-field research

RESEARCH FUNDERS

- Earmarked funds (but risk of backlash)
- Initiatives to reduce bias (training, anonymization, use of language etc.)
- Gender and sex related factors as a parameter in studies (where relevant)

Thank you for your attention

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