GENDER ACTION

Gender Equality in the
ERA Community to
Innovate Policy

GENDER in OPEN SCIENCE & OPEN INNOVATION

GENDERACTION will soon release a full report on "*Strategic advice for enhancing the gender dimension of Open Science and Innovation Policy*" which reveals that most analyses and policy documents related to Open Science (OS) and/or Open Innovation (OI) adopt a gender blind approach, especially in the case of OS. The present Briefing Paper aims to highlight key gender issues for Open Science and Open Innovation and a set of recommendations that the full report has laid out. This will lead to a better promotion of gender equality in the ERA community and to innovate policy design and implementation.

The OPEN discourse and agenda

The ideas related to Open Science and Open Innovation (hereafter OS&OI) have acquired great global relevance in the last years. These ideas are related to a more general openness discourse in society including Free Software/Open Source, open access and open society. The Open movement argues to have a potential not only to enhance efficiency and effectiveness of value production but also to make social processes more democratic, foster diversity, promote civil society engagement and hence contributions from vulnerable groups. Since the Open movement deals with a vision for and role of research and innovation in society, gender issues need to constitute a matter of concern and a field of action.

The OPEN discourse has reached the EU agenda. When the Commission set in 2012 five ERA priorities, the "optimal circulation, access to and transfer of scientific knowledge" was among them. Consequently, Commissioner Moedas launched in 2015 the challenging concept of *3Os*: *Open Science, Open Innovation and Open to the World*. In 2016, the Council of the EU approved its *Conclusions* on *The transition towards an Open Science system*, and the Commission drafted the European Open Science agenda around the following lines: 1) fostering and creating incentives for OS; 2) removing barriers for OS; 3) mainstreaming and further promoting open access policies; 4) developing research infrastructures for OS; 5) embedding OS in society as a socio-economic driver.

> *"Existing policy documents and studies on OS&OI, including those by the EC, reveals zero attention to gender equality"* GENDERACTION OS&OI Report

Disconnected goals in the ERA

Both gender and openness are included among the 6 priorities of the ERA Roadmap 2015-2020 adopted by the EU Council in 2015. Particularly: 4th *Gender equality and gender mainstreaming in research*, and 5th *Optimal circulation and transfer of scientific knowledge*. The ERA roadmap also highlights that the gender priority has *clear transversal links to all other ERA priorities*.

Additionally, *Open access and Data management* as well as *Gender* are cross-cutting issues in Horizon 2020, and also key elements of Responsible Research and Innovation (RRI). In fact, this approach could be considered an antecedent of the OS&OI movement since RRI is aimed at reconfiguring the scientific process along the notions of responsibility, public participation and democratization of science.

However, one of the main findings of the upcoming GENDERACTION Report on "*Strategic advice for*

enhancing the gender dimension of Open Science and Innovation Policy" (hereafter, GENDERACTION OS&OI Report) is that most analysis and policy documents related to OS&OI adopt a gender blind approach. In other words, gender equality and OS&OI have been treated so far as independent and unrelated topics, including the ERA Progress reports and Horizon 2020. The same gender-blind approach has been found in the scientific literature related to OS&OI as well as in the national ERA roadmaps analysed by GENDERACTION.

This means that important goals of the ERA remain in fact disconnected and thus European research cannot benefit from positive synergies between the two priorities.

Gender implications of OPEN Science

The term *Open Science* (OS) entails ongoing transitions in the way research is performed, researchers collaborate, knowledge is shared and science is organized. OS is based on cooperative work and new ways of knowledge dissemination through digital technologies and new collaborative tools. It increases the number and diversity of stakeholders involved, such as researchers, policy makers, Research Funding and Research Performing Organizations (RFOs, RPOs), citizen scientists, enterprises, and publishers. OS is an umbrella term capturing a variety of practices, such as:

▪ **Open Access (OA) to Publications and Research Data**: that is, providing online access to scientific information (such as peer-reviewed scientific research articles published in scholarly journals, research data and preprints), free of charge to the end-user as well as reusable. It is aimed at generating greater efficiency, faster progress and improved transparency of the scientific process. The *gender impact of OA policies* needs to be analysed, but, due to the existing disconnection between gender and openness priorities, there is a lack sex-disaggregated data on OA practices by women and men. In addition, *OA to research data* deserves a particular focus on how *gender-blind vs. gender-sensitive* scientific methods are related to *data quality and reproducibility*. For instance, data quality and

reproducibility are negatively affected by gender biases and prejudices (such as unquestioned male default models, gender stereotypes, etc.) underlying the techniques and tools that were used to collect such data. On the contrary, sex/gender analysis methods enhance data quality and reproducibility because allow to properly identify sex/gender differences as well as to avoid over-generalization of results. OA to research data is crucial to facilitate a gender-sensitive *data reuse*, when original studies produced (good) sex/gender disaggregated data but did not (properly) report on results by sex/gender.

> *"If research claiming sex/gender differences fail the reproducibility test at a later stage, the techniques, tools and conclusions of such research should be questioned"*
> GENDERACTION OS&OI Report

▪ **Open Peer Review (OPR)**: an umbrella term as well, OPR refers to open identities in the review process, open reports, open participation, open pre-review manuscripts as well as final version commenting, and open platforms. It has been mainly used in *manuscript peer review*, rather than *grant peer review*. OPR is aimed at facilitating transparency, accountability and quality of scientific evaluations, but opponents claim that it may lead to less critical and rigorous comments. Besides the lack of consensus on OPR, it is clear that both traditional and OPR evaluation practices need to be reconsidered in order to avoid the under-representation of women among peer-reviewers, as well as (unconscious) gender biases (in peer-reviewers and peer-review procedures) that result in greater success rates for men compared to women and in extremely low percentages of publications with a gender dimension.

▪ **Rewards and Skills**: The current system of scientific rewards and skills that privileges the impact factor of publications and emphasises the individual effort has not adequately rewarded women's and men's contribution to (open) science. The OS career assessment proposes a variety of criteria such as publishing in OA journals, using FAIR data principles and open data as well as full recognition of the

contribution of others (collaborators, co-authors, citizens…). It seems that a multi-dimensional approach might better avoid indirect gender discrimination in the allocation of rewards to OS practices but research on the gender impact of different OS incentive policies is needed to inform the OS policy-making.

- **Altmetrics and New Generation Metrics:** Research evaluation has increasingly relied on (quantitative) metrics, particularly on citation rates. Concerns have been raised in relation to, *inter alia*: the lack of attention to qualitative aspects of the research career and contributions that cannot be measured, the impact on researchers' choice on publication venues, and the increasing pressures for evaluating public spending on research according to this model. The social impact of research and the views of other stakeholders in addition to scholars are considered to be part of this new research evaluation model which requires an open, transparent and linked data infrastructure. The next generation metrics group of the Open Science Policy Platform (OSPP) points to the need to assess the benefits and consequences of the introduction of new metrics on the evaluation criteria. This recommendation should be expanded to incorporate the impact of new metrics on gender equality, given the existing findings related to gender bias in evaluation and citations practices

OPEN Gendered Innovations

For the EC, Open Innovation (OI) means the opening up of the innovation process to all active players allowing knowledge to circulate more freely and be transformed into products and services. Firms increasingly rely on external sources for the development or modification of their products and services (called inbound openness). The *user-centric model* gives more relevance to external sources of knowledge and innovation in addition to the manufacturer's perspective. According to this approach, new products and services are co-developed by suppliers and consumers, university, government, private laboratories, competitors and other nations. The EC has embraced Open Innovation

2.0, highlighting the central role of users in value creation and as target of innovation.

Yet, despite the role played by women as users and consumers, they still remain dramatically under-represented in the design of products and services. There is also a gender imbalance in innovation outputs, especially in patent applications for inventions, among the inventors community. *Gender diversity* of contributors needs to be considered in the *co-creation* process. For instance, women's participation in the Open Innovation practice "*citizen science*" (including all the areas and leadership roles) will help to promote women's empowerment (UN SDG5) and women's interests and needs in the policy agenda. At the same time, gender diversity has a positive impact on innovation in manufacturing and service firms, and it is associated also with wider economic benefits and the development of a country's national system of innovation.

> *"Involving more women in the process of innovation could result in more competitive products as well as in products that do not conform to a single stereotype of the male consumer"*
> GENDERACTION OS&OI Report

Besides gender diversity, the Gendered Innovations project has played a key role by presenting an extensive number of case studies and *sex/gender analysis methods* which show how these methods lead to innovation and excellence in research. The Helsinki Group on Gender in Research and Innovation stressed, in its position paper on the European Innovation Council (EIC), the vital need for integrating the gender dimension in technological design and innovation as well as to ensure that funded innovation is not gender-blind to include the needs and interests of women, too.

Recommendations for OS&OI from a gender perspective

The following sets of recommendations refer to different stakeholders, mainly the European Commission (EC), EU Council, member states (MS), RFOs, RPOs, innovative firms as well as researchers.

1st Priority for Action - Gender mainstreaming and policy synergies between the gender equality and

OS&OI agendas in European policy-making [EC, EU Council, MS]:

- To address Priority 4 of the ERA on gender equality as a self-standing issue while mainstreaming gender to other priority areas.
- To invite gender experts to relevant OS&OI expert and advisory groups.

2nd Priority for Action - Advancing **knowledge and awareness of gender** issues in OS&OI:

- To conduct studies on gender issues in OS&OI, such as open peer review, *altmetrics*, open software and open innovation.
- To include in the *She Figures* sex-disaggregated data on the adoption of open access practices.
- To collect sex-disaggregated data on inventorship by country, sector and field.

3rd Priority for Action: Evaluation and assessment practices in RFOs and RPOs:

- To explore to what extent the use of new metrics impacts men and women researchers at different career stages and disciplines differently. [EC, Open Science Policy Platform]
- To adopt multi-dimensional evaluation criteria that enhance openness and transparency, including research outputs with a gender dimension. [RP0s, RFOs]

"A study of open source software repository GitHub showed that women software developers see their contributions of code accepted more frequently than men but only if they hide their sex"
GENDERACTION OS&OI Report

- To ensure that open innovation funded projects integrate sex/gender analysis where appropriate and that the teams respect gender diversity. [EC, MS, innovation funding agencies]

- To examine the adoption of open access practices by men and women to identify potential gender differences. [RFOs, RPOs]

4th Priority for Action - Publication practices of researchers and RPOs:

- To encourage the sharing of preprints presenting the results of research on gender and research that integrates gender as a cross-cutting issue. [RPOs]
- To adopt the FAIR management of sex and gender data. [Researchers]

5th Priority for Action - Innovative processes and firms [stakeholders engaged in setting up participatory innovation projects]:

- To develop participatory innovation projects that guarantee gender diversity
- To ensure the integration of sex/gender analysis in order to avoid gender bias and allow all segments of population benefit from innovation processes.

"Diversity overall and gender diversity specifically contribute to identifying innovative solutions"
GENDERACTION OS&OI Report

Conclusions

The analysis conducted by GENDERACTION and the resulting OS&OI Report constitutes a first exploration of the inter-linkages between gender and OS&OI and aims to contribute to increased synergies between these two ERA policy priorities. GENDERACTION strongly believes that mutually beneficial synergies can be created from the inclusion of women and gender in every dimension of the OS&OI ecosystem and the OPEN European society in which these goals are framed.

References

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