EUROPEAN UNION

**EUROPEAN RESEARCH AREA
AND INNOVATION COMMITTEE**
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**– ERAC –
Secretariat**

**Brussels, 2 June 2021
(OR. en)**

ERAC 1201/21

NOTE

From:	General Secretariat of the Council
To:	Delegations
Subject:	ERAC 'Triangle Task Force' Guideline Paper on 'Research evaluation in a context of Open Science and gender equality'

Delegations will find in annex to this Note the ERAC 'Triangle Task Force' (Joint ERAC Standing Working Groups (SWGs) on Open Science and Innovation (OSI), Human Resources and Mobility (HRM) and Gender in Research and Innovation (GRI) Task Force) Guideline Paper on 'Research evaluation in a context of Open Science and gender equality', as adopted by written procedure.

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Joint ERAC Standing Working Groups[1] Task Force

on researchers' training, incentives and evaluation in Open Science and Open Innovation

('Triangle Task Force')

Guideline Paper

Research evaluation in a context of Open Science and gender equality

Executive summary

This report provides stakeholders involved in research evaluation reforms with a set of guidelines that aim at fostering both Open Science and gender equality. Both topics are key dimensions in the implementation of a new European Research Area and provide policy and decision makers, funders as well as researchers with a unique opportunity to substantially renegotiate, through evaluation, the social roles and responsibilities of publicly funded research, as well as to rethink the science system as a whole.

The report elaborates on six general principles, which are considered as being central in the development and implementation of research evaluation procedures that better support Open Science as well as gender equality: *Foster the diversity of open research ecosystems; Promote inclusiveness and collective involvement in the design of Open Science and research evaluation policies*; *Encourage a responsible attitude in research evaluation*; *Foster transparency in research evaluation and trustworthiness in the added value of Open Science and gender equality*; *Provide the right incentives through evaluation*; *Create a virtuous circle between training and evaluation*.

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[1] Standing Working Groups on Open Science and Innovation (OSI), Human Resources and Mobility (HRM) and Gender in Research and Innovation (GRI).

1. **Foster the diversity of open research and innovation ecosystems, using a diversity of evaluation methods and indicators to better recognize the diversity of research outputs and processes, as well as the diversity of researchers themselves**

Broaden research evaluation to the whole range of openly accessible research outputs and processes, considering openness to publicly funded research as a principle by default. Open Science practices should not be narrowed down to opening access to scholarly publications, and research outputs and processes should be made accessible to a broad scope of stakeholders, within as well as outside of academia, with due attention to the gendered distribution of tasks and responsibilities within teams. Furthermore, people in charge of evaluating research should reflect such diversity and gender balance, while using a diversity of methods and indicators for assessing the quality of research.

2. **Promote inclusiveness and collective involvement in the design of Open Science and research evaluation policies**

Open Science policies and research evaluation policies should be designed in an inclusive way, including the perspectives from the different stakeholders as well as from researchers from different disciplinary backgrounds, gender and at different stages of their career. Inclusiveness in policy design is also an important means for avoiding gender bias. Furthermore, changes in research evaluation aiming at fostering Open Science and gender equality should involve a collective and systemic approach, between countries as well as between institutions.

3. **Encourage a responsible attitude in research evaluation**

Principles and processes followed in research evaluation impact and orient the ways scientific knowledge is produced and disseminated, including in regard to the uptake of Open Science and gender equality. Therefore assessing research means taking shared responsibility - and whenever relevant being taken accountable - for the consequences of the choices made, which should never be taken for granted. Furthermore, policy makers, research funding and producing organizations share the responsibility to provide researchers with the Open Science infrastructures and services they need in order to engage into Open Science practices and fully benefit from open research and innovation ecosystems.

4. Foster transparency in research evaluation as well as trustworthiness in the added value of Open Science and gender equality

The extent to which Open Science and gender equality are included in research evaluation, as well as the methods and criteria used more generally in research evaluation should be communicated in a transparent and up-to-date way to researchers. Furthermore the added value of Open Science and gender equality should be communicated to all researchers - as well as to other relevant stakeholders - from the earliest stage of their career.

5. Provide the right incentives through evaluation

Research evaluation constitutes a powerful means of rewarding practices that foster Open Science and gender equality, and providing the right incentives. The full diversity of Open Science practices should be rewarded, whether they relate to research outputs or processes.

6. Create a virtuous circle between training and evaluation

As a general principle, researchers should only be assessed in regard to skills and practices for which they have been duly trained or are offered the opportunity to get trained in. Any change in research evaluation - including in regard to Open Science and gender equality - should therefore be accompanied by related reforms in the researchers' and evaluators' training schemes.

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1. Introduction

The way research evaluation is currently conducted in Europe constitutes one of the main barriers to any solid transition to Open Science and fostering of gender equality in research and innovation. Bringing the needed reforms to European research evaluation ecosystems is a shared responsibility between universities and other research performing and funding organizations and policymakers. This report provides thus policy and decision makers at European, national, regional and institutional level, but also funders and researchers themselves, with a large scope of recommendations that aim to better integrate consideration for Open Science and gender equality in research evaluation.

Research evaluation is a complex and multidimensional activity, with consideration for issues as diverse as epistemology, methodology, ethics, impact, linkage between research and other higher education missions (such as services to society or teaching and learning), diversity, equity and inclusiveness in the most holistic meaning of the term (EUA, 2020) or research integrity. In particular, it should be emphasised that within academia, most researchers are also teachers, and as such the career of most academics should not be based only on their research endeavours. Therefore Open Science and gender equality should not be considered in any way as exclusive indicators of the scientific quality of a research endeavour, and even less so as sole indicators of academic excellence. Nevertheless, those two specific issues - considered jointly in this report - provide research and innovation stakeholders with a unique opportunity to substantially renegotiate, through evaluation, the social roles and responsibilities of publicly funded research, as well as to rethink the science system as a whole. Another reason to focus on those two particular issues while considering research evaluation is that there are already very important initiatives undertaken within the European Research Area (ERA) in both areas, on which a further transformation of research evaluation can be built. Furthermore, the ERA benefits from the expertise of dedicated standing working groups (SWGs) in both matters: the SWGs Open Science and Innovation (SWG OSI) and Gender in Research and Innovation (SWG GRI), which have joined force in a "Triangle Task Force", together with the SWG on Human Resources and Mobility (SWG HRM) for the purpose of this report.

Open Science, gender equality and research evaluation as priorities of the ERA

"Open Science" and "gender equality" are two long-standing priorities of the European Research Area (ERA). Although having been promoted and fostered for at least a decade in European research and innovation policy making, both are still in need of further efforts to be fully implemented at European, national and institutional level. In particular, while Open Science plans have been put in place in several countries, the policy attention dedicated to the various dimensions of Open Science and Open Innovation varies a lot from one country to the other (SWG OSI, 2020).

Open Science already constituted one of the priorities of the ERA Communication in 2012 which promotes an "optimal circulation, access to and transfer of scientific knowledge including via digital ERA - to guarantee access to and uptake of knowledge by all." (Commission, 2012). In the recent communication of the Commission on the new ERA for research and innovation (Commission, 2020), Open Science has been confirmed as a top priority: "Open science makes the R&I systems more efficient and creative and reinforces excellence and society´s trust in science. This is because opening and sharing research results and data, making them reusable and reproducible, and having access to research infrastructures, provides the basis for peer scrutiny and quality, as well as efficiency in taking research reflections, analysis and innovation further." Several initiatives have also been launched at EU level, including the EOSC (European Open Science Cloud) or the ORE (Open Research Europe) publishing platform.

Gender equality in research and innovation is another longstanding priority of the ERA. The *Helsinki Group* on Women and Science was established in November 1999, as part of the action plan announced in the Communication of the Commission "Women and Science: mobilising women to enrich European research". Under the ERA Communication 2012 framework, the European Commission has set three objectives to work with EU countries and foster an institutional change: gender equality in scientific careers, gender balance in decision making – including in the context of scientific evaluation - and the integration of the gender dimension into the content of research and innovation. These three objectives reflect a shift in focus from "fixing women" to "fixing institutions" and "fixing knowledge", embodied in the institutional change process which is the current policy framing for fostering gender equality. Within the framework of the new ERA, this concept of gender equality in R&I has been expanded to focus on inclusiveness defined as an intersectional concept of gender equality that: reflects other axes of socio-economic, cultural and political inequality; has consideration for political differences across EU countries; takes into account inter-sectoral aspects and careers in the business enterprise research sector. Last, the new framework for gender equality in research and innovation focuses on gender based violence and sexual harassment in academia, while dedicating specific attention to eliminating gender bias which poses a major threat to excellence, meritocracy and validity and reliability of research evaluation procedures. In a context in which – despite gains in the recent years - there is still much room for improvement at the institutional and national levels to empower women in university leadership (EUA, 2021), gender equality and gender mainstreaming constitute one of the 14 actions that will shape the new European Research Area, consisting in developing concrete plans with Member States to promote gender equality, as well as diversity and inclusiveness, in science, research and innovation (Commission, 2020).

Evaluation and assessment in the context of researchers' careers development are another priority in the European Research and Innovation Area. In particular ERA priority 3 (open labour market for researchers) calls for a truly open and excellence-driven ERA in which highly skilled and qualified people can move seamlessly across borders and sectors to where their talents can be best employed. To achieve this, efforts have been made in Member States so that relevant stakeholders integrate principles of openness, transparency and merit-based recruitment, removal of legal barriers to mobility and define new ways to researcher career development. One of the key policy instruments that has been fundamental contributing to this goal has been the European Charter for Researchers and Code of Conduct for Recruitment (Commission, 2005).

Furthermore, improving research evaluation system and researchers' careers by incentivising Open Science practices is one of the 14 key actions of the new ERA framework (Commission, 2020). It intends to "deliver a toolbox of measures to support researchers' careers, through a mobility scheme, trainings and more, in order to make Europe more attractive for talent". Also highly relevant is the Open Science related key action aiming to "launch a platform of peer-reviewed open access publishing and incentivise open science practices by improving the research assessment system".

Rationale for this report

While gender equality and Open Science are both hot topics in research policy making, and reform of the research evaluation systems is high on the policy agenda, they are still most often considered as unconnected. Recent reports by the EU-funded GENDERACTION project show that most analyses and policy documents related to Open Science and to a lesser extent Open Innovation adopt a gender blind approach (Genderaction, 2018 and Genderaction, 2019). The gender impact of Open Access policies is under-analysed and sex-disaggregated data on OA practices by women and men are lacking (Genderaction, 2019).

Therefore the main rationale and *raison d'être* for this report is that, while working on the transformation of research evaluation principles and processes so that they become more supportive of Open Science, we should at the same time make sure that those principles and processes foster gender equality and tackle the inequalities that are linked to current evaluation systems and gender biased definitions of excellence (SWG GRI, 2019b; Van den Brink and Benschop, 2012). Consideration of gender issues in the development of Open Science policies and reform of research evaluation, through the provision of the right incentives and rewards, should have a positive impact on the promotion of gender equality goals and the elimination of gender biases in research. In the long run, Open Science and gender equality should be considered as the new normal in the conduct of research.

This being said it has to be noted that there is no 'one size fits all' approach with regard to making research evaluation more supportive of Open Science and gender equality. First, any type of research evaluation has its specificities. Second, there is a diversity of national and regional policies and priorities as well as research and innovation funding systems (EUA, 2020). Third, evaluation processes depend on the strategy and vision of the research performing institution concerned – taking account of the academic freedom and institutional autonomy (EUA, 2020) -, and the current stage of implementation of Open Science and gender equality policies. There are different types of research performing institutions, not all of them being or having an ambition to become world class research universities. Furthermore, there are different types of academic and scientific careers in the public sector, to say nothing of research careers in the private sector, with a diversity of balance between research, teaching and learning, impact driven activities and services to society. Hence, in some cases new processes will probably have to be developed from scratch, while in other cases, existing processes should rather be completed and broadened so that they favour rather than constrain Open Science and gender equality.

Triangle Task Force

To tackle the issue of research evaluation in a context of Open Science and gender equality a "Triangle Task Force" was constituted, bringing together delegates from the ERAC Standing Working Groups of Gender in Research and Innovation (SWG GRI), Human Resources and Mobility (SWG HRM) and Open Science and Innovation (SWG OSI). These three groups constitute the triangle task force which all offer the various complementary perspectives on the issue of researchers' assessment and evaluation.

This guideline paper constitutes one of the two deliverables from the Triangle Task Force, the other one focusing on proposals for reconsidering the Charter and Code in the light of the current state of the research and innovation ecosystems, with due consideration for Open Science and gender equality.

Definitions of the main notions

In this report, we define Open Science as an approach to the scientific process based on open cooperative work and tools, as well as new ways of diffusing knowledge. Open Science aims at making the outputs and outcomes of scientific research accessible to all, as well as enhancing citizens' participation in the co-creation of research and innovation agendas and contents. As such Open Science is not an end in itself but a way to improve the quality, efficiency, responsiveness of research and trust in science, in order to accelerate innovation – in the broadest meaning of the term -, knowledge diffusion and progress. Open Science does not challenge either IPRs or commercial exploitation of knowledge, but implies that publicly funded research should become open by default, and "as open as possible, as closed as necessary" whenever the context needs it (public-private partnerships, privacy issues, etc.)

So defined, Open Science includes practices such as:

- The early and open sharing of research, for example through preregistration, registered reports, pre-prints, or crowd-sourcing;
- The management of the research outputs so that they are accessible according to the FAIR (Findability, Accessibility, Interoperability and Reusability) principles;
- Measures to ensure that research outputs are trustworthy, reproducible and can be reused, in order to maximise reliability and productivity of research;
- Providing open access to research outputs such as publications, data, software, models, algorithms and workflows, to maximise diffusion of knowledge;
- Participation in open peer-review;
- Involving all relevant knowledge actors, including citizens, civil society representatives, public authorities, industry and end users, in the co-creation of R&I agendas and contents and whenever relevant in the evaluation of research outputs and processes.

Gender is to be understood as a social construct, gender relations being constantly (re)constructed in professional settings, among other social domains, on the basis of gender stereotypes and perceptions that are often unconscious (Genderaction, 2019)[2]. In this perspective, according to the United Nations (UN), gender equality means "equality between women and men and refers to the equal rights, responsibilities and opportunities of women and men and girls and boys". Furthermore, "equality does not mean that women and men will become the same but that women's and men's rights, responsibilities and opportunities will not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men." (https://www.un.org/womenwatch/osagi/conceptsandefinitions.htm)

Research evaluation is considered here in the broad meaning of the term, acknowledging the diversity and the specificities of the methodologies that may be used in the evaluation of individual researchers for recruitment or promotion purposes, in the evaluation of research projects to be funded as well as in the evaluation of research institutions with or without linkage to the attribution of funding.

Target audience

By default the following recommendations concern all stakeholders involved in research evaluation from policy and decision makers to funders and researchers themselves, because of the systemic character of Open Science and gender equality. If a stakeholder is specifically targeted by a certain guideline, it will be made clear in the formulation. We are well aware though that our guidelines relate first and foremost to the evaluation of research that is publicly funded and of researchers who conduct research (fundamental, strategic or applied) in an academic context or in the framework of a public research organization. Nevertheless researchers in the private sector may also benefit from adopting evaluation procedures that take Open Science, gender equality and Open Innovation better into account (on Open Innovation, see for ex. Bogers et al., 2018 and ERAC SWG OSI, 2019; on gender equality and innovation, see for ex. ERAC SWG GRI, 2019a).

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[2] Statement from <u>Poland</u>: Equality between women and men is enshrined in the treaties of the European Union as a fundamental right. Poland ensures equality between women and men within the framework of the Polish national legal system in accordance with internationally binding human rights instruments and within the framework of fundamental values and principles of the European Union. Therefore, Poland understands wording "gender" as referring to "sex" and interprets it as a equality between women and men in line with art. 8, 10, art. 19 para 1 and art. 157 para 2 and 4 of the Treaty on the Functioning of the European Union.

State of play

Broadly speaking, most of the following guidelines assume that there has been an excessive focus in research evaluation in the last decades on a certain type of research outputs - the article published in international top impact factor journals - at the expense of due consideration for other types of research outputs and outcomes, for the research as a process – i.e. consideration for the collective dimension of research, the management of scientific networks, data management, training of early career researchers, etc. - as well as more generally for the diversity of researchers' talents and the various scientific and societal roles that research performing institutions and researchers themselves do play. In particular the processual dimension of research has to be better taken into account in evaluation, if we intend to better consider Open Science as well as gender equality.

For example, according to Saenen et al. (2019), out of a EUA survey of 260 universities in 32 European countries, 75% of the responding institutions continue to use the JIF (Journal impact factor) - including for assessing individuals - which remains the most widely used bibliometric. This is confirmed by a study showing that JIF is mentioned in 40% of the review, promotion and tenure documents of the surveyed research-intensive universities in the United States and Canada (McKiernan et al., 2019). Another study shows that one third of the surveyed European funders continue to use the JIF, sometimes in complement to a range of qualitative and quantitative criteria (Fosci et al., 2019). The EUA survey also indicates that social outreach, other outputs and Open Science are deemed as the least important elements for evaluating researchers' career, which does not mean they are not important as such but that, for rewarding researchers, they are taken into account much less than bibliometrics, funding and knowledge transfer (Saenen et al., 2019). Furthermore only a small number of research funders, seven out of the 62 that were part of the study, give more weight to Open Access publications in grant evaluation (Fosci et al., 2019). Only three research funders consider publications that are Open Access, and only seven report using Open Science criteria like the Open Science Career Matrix (OS-CAM).

Several surveys show ambivalent attitudes of researchers. They are eager to engage in Open Science and early stage researchers are even more enthusiastic than the previous generations to do so, but somehow they remain reluctant because of the lack of incentives. Open Access is indeed often perceived as being at odds with prestige and JIF (Blankstein and Wolff-Eisenberg, 2019; Radicev et al., 2015; Toribió-Florez et al., 2021). More generally, there is disparity in Open Science progress and uptake among different disciplines, institutions, actors and organisations, and among researchers at different career stages (OSPP, 2020).

Furthermore, empirical evidence and surveys show that researchers have sometimes difficulties in coping with Open Science policy. Some even feel policy alienation from it, considering that their professional realities are not taken enough into account. Hence, they may be less willing to engage in Open Science (and Open Innovation) practices (Lilja, 2020; Saenen et al., 2021; Working group for responsible evaluation of a researcher, 2020).

It should also be strongly underlined that progresses in the uptake of Open Science in Europe are still very dependent on the existing research and innovation gap between European countries and between Europe and other world regions (SWG OSI, 2020). Transition to Open Science implies dedicated infrastructures, services and investments that are still (partially) out of reach for some. Therefore, allocating or re-allocating resources at European, national and/or regional level to accelerate the transition to Open Science constitutes a prerequisite for any sustainable integration of Open Science into research evaluation.

As regards gender equality, it is widely recognised that intersectional gender bias (i.e. gender at intersection primarily with race/ethnicity/nationality, age and motherhood) in research evaluation compromises the quality of the evaluation practices and has negative impact on research career development. Research indicates that female researchers face biases that have to do with their parenting roles and responsibilities (hitting the maternal wall), face the double bind of likeability and competence, and are faced with structural features of evaluation systems that fail to take into account career breaks, gendered allocation of tasks and other aspects (SWG GRI, 2019b). In terms of publication practices, research shows that women tend to be less networked, which affects their rates of co-authorship, they face discrimination in review systems, their work is cited less by men compared to citations by fellow women researchers (Lariviere et al., 2013). Specifically, in the current situation of COVID-19, there is emerging evidence that the COVID-19 lockdown with attendant home schooling has affected women more adversely, with their publication rates down compared to those of men (Cui et al., 2020).

Methodology

The following guidelines are based on desk research, active participation to thematic Webinars, exchange of views with ERA stakeholders (notably EUA, CESAER, and several European University alliances) as well as a dedicated survey that has been conducted with the members of the ERAC Standing Working Groups OSI, GRI and HRM in the second half of 2020.

The guidelines relate to six general principles, which we consider as being central in the development of research evaluation procedures that support Open Science as well as gender equality:

- *Foster the diversity of open research ecosystems, using a diversity of evaluation methods and indicators to better recognize the diversity of research outputs and processes, as well as the diversity of researchers themselves*;
- *Promote inclusiveness and collective involvement in the design of Open Science and research evaluation policies*;
- *Encourage a responsible attitude in research evaluation*;
- *Foster transparency in research evaluation and trustworthiness in the added value of Open Science and gender equality*;
- *Provide the right incentives through evaluation*;
- *Create a virtuous circle between training and evaluation*.

Under each of these six principles, guidelines and Good practices are generally presented in the following order: first those that foster Open Science as well as gender equality, then those recommendations that are related more exclusively to Open Science without clear implications in terms of gender equality. The Good practices presented have been selected in order to show a maximum diversity in terms of thematic areas as well as geographical origin.

2. Main results of the survey

Delegates from SWGs OSI, GRI and HRM from 21 countries (AU, BE, BG, CH, DK, EE, ES, FI, FR, HU, IS, IT, LT, MT, NL, NO, PL, PT, SE, SI, TR) replied to the questionnaire in the second half of 2020. An in-depth analysis of the survey will be released at a later stage, together with an annexed compendium of all the good practices and examples collected at national level through the survey.

In the context of this guideline paper, answers provided to open questions have been fully analysed and used to select a diversity of examples of Good practices. Furthermore, it is worthwhile to mention the following highlights, as contextual elements to be taken into account:

- Over the last two years national (or regional) Open Science policies have been put in place in most participating countries.
- Most research funders have integrated Open Science principles and implemented concrete actions in this regard.
- Several countries mention interactions between Open Science and research evaluation (but it is not yet systematic everywhere).
- While gender equality is regularly taken into account in research evaluation, only in a few cases gender equality aspects are explicitly considered while evaluating the uptake of Open Science.
- Decisions regarding recruitments and promotions are generally taken at institutional level, which leads to divergence in the extent to which Open Science and gender equality are taken into account.
- Most cited obstacles for taking Open Science better into account while evaluating research are, according to respondents:
  o Traditional research evaluation based on impact factor (JIF) and publishing with reputable commercial publishers;
  o Disparity between quality of papers in Open Access journals vs. subscription journals when developing metrics;
  o The research community at large. High ranked researchers are not always interested in changing the research evaluation system.
  o The lack of awareness in the research community about the importance and the benefits of Open Science.
- Open Science practices that are considered as most relevant while assessing a researcher (in order to recruit or promote him/her) are:
  o Opening access to publication;
  o Managing data;
  o Engaging in FAIR Data;
  o Opening access to data.
- Policies that relate to gender, early career investigators, diversity and research integrity are considered as having to be looked at jointly while developing research evaluation policies that fully acknowledge Open Science practices.
- According to respondents, the following practices contribute the most to develop research evaluation policies that fully acknowledge Open Science and Open Innovation practices:

- o Explicitly defining quality/excellence;
- o Adopting a multidimensional definition of quality/excellence;
- o Improving transparency of the evaluation processes, forms and outcomes, including justification and publication of decisions;
- o Favouring peer review over metrics.

3. Guidelines

3.1. Foster the diversity of open research and innovation ecosystems, using a diversity of evaluation methods and indicators to better recognize the diversity of research outputs and processes, as well as the diversity of researchers themselves

Broaden research evaluation to the whole range of openly accessible research outputs and processes, considering openness to publicly funded research as a principle by default. Open Science practices should not be narrowed down to opening access to scholarly publications, and research outputs and processes should be made accessible to a broad scope of stakeholders, within as well as outside of academia, with due attention to the gendered distribution of tasks and responsibilities within teams. Furthermore, people in charge of evaluating research should reflect such diversity and gender balance, while using a diversity of methods and indicators for assessing the quality of research.

1. In the context of research evaluation, consider and valorize the whole diversity of practices, research outputs and processes that relate to Open Science and Open Innovation. Such diversity goes far beyond open access to scholarly articles. In particular, research evaluation should take into account any endeavour, at individual, collective, project, institutional or national level, to make a diversity of research outputs openly accessible like articles, books, preprints, reports, datasets, software, patents, materials, models, algorithms, workflows, peer reviews (in the context of open peer reviewing processes) as well as research based open educational resources. It should also fully integrate whenever relevant the FAIR-ification of research data and the engagement into citizen science practices. Open Science, considered in all its diversity, allows to enhance the work of a broader diversity of talents and expertise within academia, taking into consideration the diversity of academic career paths and career stages, and overcome the gender biases that may accompany a too exclusive focus on the publication of articles in top international scholarly journals[3].

Refs.: EUA, 2020; SWG GRI, 2019b; SWG OSI, 2018; Van den Brink and Benschop, 2012

Good practices:

Denmark

A committee on merits was set up by the Minister of Higher Education and Science in August 2018. The committee recommended that evaluation of excellent research, including the merit of the university staff's research efforts, should be based on a substantive peer review, which should emphasize all significant types of contributions to research results, and not primarily emphasize the amount of publications or other bibliometric indicators.

Estonia

Open Science is taken into account in the national level research assessment exercise. Among the evaluation criteria are: popularisation of research results; publicly accessible research results (publications and databases); other facts and aspects that represent societal impact.

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[3] Please see SWG GRI (2019b) for concrete recommendations allowing to avoid or limit gender bias in research evaluation. Those include notably: providing gender bias training for staff and evaluators, including gender experts and observers in evaluation panels, assuring the gender balance in evaluation panels, favouring whenever feasible double-blind review, promoting the gender mainstreaming of funding programmes (particularly in regard to eligibility rules and evaluation criteria) and the gender proofing of the language of the call texts.

Poland

Open Innovation has been integrated into research evaluation frameworks for recruitment and/or promotion of researchers. First, the procedure of doctoral degree award allows for submission of the doctoral dissertation in a form of construction, technological, implementation or artistic work. Second, the procedure of *doktor habilitowany* (habilitation) degree award and the procedure of the professor title award allow for awarding the degree or the title based on a design, construction, technological or artistic unique achievement accomplished. Third, the Ministry runs the programme of industrial doctorate. A doctoral student benefiting from the programme undergoes a doctoral training in university or any other institution entitled to run a doctoral school and at the same time works at a company to solve a determined technological problem which is the subject of a doctoral dissertation.

Open Innovation is also integrated into research evaluation frameworks at the level of institution assessment. In collaboration with stakeholders, the Ministry of Education and Science is elaborating a Knowledge and Technology Transfer Evaluation. The policy instrument will serve evaluation of key types of entities composing Polish system of science and higher education (incl. universities) in terms of cooperation with socio-economic environment.

2. While avoiding predatory publishers, focus on the quality of the content itself of scholarly papers and books rather than on the sole prestige of the journal or publisher in which they have been published. This guideline is particularly relevant for the evaluation of individuals, in regard to which journal level metrics (like JIF) should be considered with extreme caution.

Ref.: CNRS, 2019; Guédon et al., 2019 (p. 46)

Good practices:

Ireland

HRB (Health Research Board) has never asked for JIF and now explicitly guides their peer reviewers at Panels not to consider it. They are also introducing public reviews (PPI) into their Funding Panels decision-making (https://www.hrb.ie/funding/funding-schemes/public-and-patient-involvement-in-research/).

3. For recruitment and career promotion in higher education, consider academic career in an encompassing way (including teaching, impact driven activities and services to society). In this perspective, the use of "academic evaluation" should be preferred whenever relevant to the more focused "research evaluation". For each of the components of the academic profession, have due consideration for the extent to which Open Science principles - and whenever relevant Open Innovation - have been followed.

Refs.: EUA, 2019a; Saenen et al., 2021; VSNU, 2019

Good practices:

Belgium

At KULeuven University, Belgium (Flanders), they have introduced the narrative approach of biosketch in hiring and promotion processes. The biosketch is not intended to replace existing application files but to enhance the quality of researcher evaluation procedures by giving researchers the opportunity to stress what they think is relevant within the three core tasks of senior academic staff (research, education and service/engagement) in relation to the evaluation procedure and give background to the choices they have made in their careers. It includes:
- a list of 5 achievements (at national or international level, relating to research, education and service/engagement);
- an explanation about the ambitions for the future in regard to one's research agenda, but also teaching and service provision;
- indication of demonstrated leadership - both scientific leadership and guidance of colleagues and staff;
- Any efforts made to promote Open Science.

Furthermore applicants can describe how specific and/or personal circumstances had an impact on their achievements and ambitions and what they did to overcome specific difficulties or grasp specific opportunities.

4. To better consider the diversity of Open Science practices, encourage a diversity of methods and approaches in research evaluation. Strive for the right balance of quantitative and qualitative methods, traditional and alternative metrics, indicators and expert judgement, taking the context into account while effectively avoiding gender bias that may be linked to quantitative as well as qualitative indicators. We cannot completely discard metrics and numbers, but should rather use them in the right context – taking notably into account if the evaluation concerns an individual or an institution -, with responsibility, not overweighting bibliometrics in the general evaluation balance. Furthermore next generation metrics should consist in a mix of new metrics, underpinned by an open and transparent data infrastructure as well as a better, accurate and responsible use of existing ones.

Ref.: Genderaction, 2019; Helmer et al., 2017; Ross, 2017; SWG GRI, 2019b; Wilsdon, 2016

5. Experiment with new CV templates that allow for more compliance with the diversity of Open Science principles and practices (like data sharing, impact creation, etc.) and make the evaluated part of the evaluation process, while at the same time being gender proofed in order to prevent gendered outcomes (recognising for example the gendered approaches to self-presentation and presentation of one's own achievements) and counter gender bias in evaluation. Such CV templates may adopt narrative features and/or include self-evaluation modalities as well as a selection of the most relevant productions, irrespective of the type of research output or the individual or collaborative nature of the work. They should also mention career breaks and services to the community.

Ref.: SWG GRI, 2019b

Good practices:

Netherlands

All research groups in the Netherlands are required to write a self-evaluation in preparation for an evaluation in the context of the national research assessment exercise (Strategy Evaluation Protocol: vsnu.nl/files/documenten/Domeinen/Onderzoek/SEP_2021-2027.pdf).

Furthermore the NWO (Dutch Research Council) narrative CV is to be introduced in the upcoming Vici round – granting individual creative researchers -, so that CVs are assessed more on their quality and (sustainable) impact than on their quantity and prestige. The use of a uniform CV is presented as having several advantages: no differences between domains, compatibility with the DORA declaration (which NWO signed). Narrative CVs also allow to take better into account the stage of the researcher's career and give visibility to different kinds of talents. Since narratives are difficult to compare though, indicators may be used in a complementary way. (nwo.nl/en/funding/our-funding-instruments/nwo/innovational-research-incentives-scheme/vici/index.html)

Switzerland

The Swiss National Science Foundation (SNSF) has introduced the pilot project SciCV. The aim is to allow researchers to present their most important contributions to science in brief narratives, rather than as lists of publications. This approach will help make other academic output, beyond publications, more visible and more valued and promote equal opportunities. SciCV will also introduce a uniform way of calculating the academic age of applicants, which indicates how long they have been active researchers as opposed to their biological age. The new format will no longer include any journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles. Rather, the actual content of articles and their citation impact will be considered. (Further information: http://www.snf.ch/en/researchinFocus/newsroom/Pages/news-200131-scicv-snsf-tests-new-cv-format-in-biology-and-medicine.aspx)

UK

Loughborough University includes an opportunity for researchers to self-evaluate as part of their annual review. In recruitment they ask applicants to list their three 'best' papers which are read.

6. Make sure that committees in charge of evaluating researchers and research projects are balanced and diverse in terms of gender, geography, ethnic and cultural background, career stage, as well as in disciplinary terms (in case of interdisciplinary projects).

Ref: Guédon et al., 2019: 44; Lendák-Kabók and Ochsner, 2020

Good practices:

Belgium

F.R.S.-FNRS, the funding agency of the Wallonia-Brussels Federation, Belgium, includes diverse profiles in the reviewer pools, panels, and boards: experts from the private sector and the civil society are present in juries whenever the scope of the support schemes require their expertise (https://www.frs-fnrs.be/docs/Reglement-et-documents/FRS-FNRS_Guide_Jurys_FRIA_FR.pdf). In addition, over the last years, efforts have been made to increase the proportion of women participating in different evaluation processes (among Step 1 experts, scientific commissions' members (Step 2), panels of juries, etc.). (https://www.frs-fnrs.be/docs/FRS-FNRS_Rapport_etat_egalite_genre_2019.pdf)

France

The remit of the High Council for Evaluation of Research and Higher Education (HCERES) (https://www.hceres.fr/) is defined by the Law of 22 July 2013. Its core values are independence, transparency and fairness. Its methods are based on a commitment to the evaluated institutions, a commitment to accompany them and to be a partner in their progress. HCERES intends to improve evaluation practices, notably by supporting the San Francisco Declaration on Research Assessment (DORA) and the Leiden Manifesto.

In order to foster parity, HCERES takes care to:
- Balance numbers of women and men serving on all its ruling bodies and committees, including panels of experts. This charter lays down a set of general rules on how evaluations are to be carried out;
- Ensure parity between men and women in positions of responsibility within the research unit: management, deputy management, team responsibility, member of the laboratory council.
  (https://www.hceres.fr/en/file/research-assessment-criteria-and-indicators)

Germany

The German Research Council, an organisation responsible for evaluating research facilities, also for the federal government and the Länder, states in its evaluation guidelines, that the selection of evaluators should be diverse (e.g., in terms of competencies, disciplines, institution of origin, age, career stage, nationality, gender).

7. Consider disciplinary specificities and the diversity of their ways of implementing Open Science. In particular there is a need to develop Open Science in the SSH (Social sciences and Humanities) and the arts, together with researchers and scholarly associations from those fields. STEM solutions do not always work for them, and publication as well as peer reviewing patterns – like in regard to monographs – may be (partly) different.

Ref.: Ochsner et al., 2020

3.2. Promote inclusiveness and collective involvement in the design of Open Science and research evaluation policies

Open Science policies and research evaluation policies should be designed in an inclusive way, including the perspectives from the different stakeholders as well as from researchers from different disciplinary backgrounds, gender and at different stages of their career. Inclusiveness in policy design is also an important means for avoiding gender bias. Furthermore, changes in research evaluation aiming at fostering Open Science and gender equality should involve a collective and systemic approach, between countries as well as between institutions.

1. Within universities, bring changes to the research evaluation procedures and make them more supportive of Open Science and gender equality at institutional level by fostering coalition-building in order to gain the bottom-up support necessary for change, involving academics, libraries, HR departments, Research Council of the university, etc. The top-down support of authorities - academic leadership as well as government - is also needed to warrant the implementation and the uptake of the principles and initiatives.

   In particular, integrate in such coalition-building and co-design of Open Science assessment principles and processes researchers and academic stakeholders with a diversity of gender, disciplinary and cultural backgrounds and at different stages of their career, including early career investigators.

   Ref.: Lilja, 2020; Saenen et al., 2021; Working group for responsible evaluation of a researcher, 2020

Good practices:

Finland

The Working group for responsible evaluation of researchers from the Finnish Committee for Public Information (TJNK) has joined forces with the Federation of Finnish Learned Societies (TSV) and published together a joint report about Good Practises in Researcher Evaluation in Finland. Although many national entities were involved in developing the Recommendation, the approach is considered "bottom-up" and there was broad and enthusiastic buy-in of the principles behind the recommendation among Finnish academic stakeholders. For example, the Academy of Finland, the main national funder for basic research, confirmed support for responsible evaluation of researchers. An initial challenge was to gain a consensus of opinion across all fields and a broad range of stakeholders, which was ultimately addressed through public consultation and discussion. In 2020, the task force completed its work, and a steering committee was subsequently formed to implement the recommendation and develop impact measures.

The report emphasises notably that research evaluation should provide researchers with the opportunity "to express an understanding of the objectives, significance and effectiveness of their work" through self-evaluation, and that "the work they have done for the purpose of the evaluation and/or the feedback they have received should enable them to improve their own work." (Working group for responsible evaluation of a researcher, 2020: 8)

2. Universities, representative organisations, research institutes, research funders and policymakers should work together in an inclusive and collective way to develop and implement more accurate, transparent, and responsible approaches to research evaluation that foster Open Science and gender equality. Networks of universities, like the European University alliances, may play a particular role in regard to the experimentation of innovative forms of institutional coalition-building.

Ref.: Saenen et al., 2021

Good practices:

Germany

In Germany, the Alliance of Science Organisations has set up a national open access contact point (OA2020 DE). The project aims to provide guidelines to implement open access, but also further negotiation strategies when working with publishers, support each institution by analysing publication costs as well as establishing a central point of contact in order to connect all people and organisations involved. This project could prove to be also helpful in opening up more publishing opportunities for women scientists.

Switzerland

Within the national 'Equal Opportunities and University Development Programme', 'The Better Science Initiative' was created as a cooperation project between swissuniversities, the umbrella organisation of the Swiss universities, and the Leading House, University of Berne, in collaboration with other higher education institutions. The initiative "Better Science - Academic Culture in the 21st Century" calls for a rethinking of the current paradigm of quantifiable academic work in favour of more sustainability, diversity, inclusion, and equal opportunities in the academy. At university level, the initiative demands quality in a holistic sense rather than quantity and speed. Better Science aims to break with current trends in academia and establish a new culture. This goal can only be achieved if all university members engage with the issues at hand, network, and exchange ideas. (Further information: https://betterscience.ch/en/mehr-erfahren/#/)

European University Alliances

The CHARM (CHallenge-driven, Accessible, Research-based, Mobile)-EU European University alliance intends to work together to design and develop realistic Open Science-compatible models for the evaluation of research and researchers (among other criteria for evaluation of research and researchers related to the Horizon 2020 funded TORCH project). The concept is that the models developed will support the partner universities' capacity to reward Open Science practices, promote Open Access publication, sharing research data and communicate the results of research to citizens, while considering gender equality in a systematic manner. Gender is looked at both in terms of gendered innovation but also as a lens for each of the transformational modules that are the focus of TORCH, including Open Science.

3. Put Open Science and gender equality policies in the global perspective of the promotion of inclusiveness in research and innovation. Open Science and gender equality should constitute levers, through research evaluation, for promoting a more inclusive academic culture, that also recognizes the added value of people from various cultural and ethnic backgrounds, among them generations of migrants and refugees.

Good practice:

Netherlands

Even though not explicitly linked to Open Science, diversity and inclusion in higher education and research are a priority and an integral part of science and research policy in the Netherlands, as laid down e.g. in the following policy documents:

- National action plan for greater diversity and inclusion in higher education and research (Sept. 2020)
(https://www.nwo.nl/binaries/content/documents/nwo-en/common/documentation/application/nwo/national-action-plan-for-greater-diversity-and-inclusion-in-higher-education-and-research/20357%2BNationaal%2Bactieplan%2Bboekje_engels_01PM-pdf.pdf)

- Policy paper `Curious and Committed - the value of science' (https://www.government.nl/documents/policy-notes/2019/01/28/curious-and-committed---the-value-of-science)

3.3. Encourage a responsible attitude in research evaluation

Principles and processes followed in research evaluation impact and orient the ways scientific knowledge is produced and disseminated, including in regard to the uptake of Open Science and gender equality. Therefore assessing research means taking shared responsibility - and whenever relevant being taken accountable - for the consequences of the choices made, which should never be taken for granted. Furthermore, policy makers, research funding and producing organizations share the responsibility to provide researchers with the Open Science infrastructures and services they need in order to engage into Open Science practices and fully benefit from open research and innovation ecosystems.

1. Align practices of funding and evaluating research with policy principles at European, national and institutional level. For example the Horizon Europe Grant Agreement should reflect the principles of Open Science and gender equality, as well as research integrity (including the social, ethical and legal implications). Institutions that apply for the Human Resources Excellence in Research Award should demonstrate explicitly how the Good practices in Open Science and gender equality are integrated into their HR processes and strategies.

Ref.: Leonelli, 2017; OSPP, 2018

Good practices:

Belgium

A paragraph on Open Science has been included in the Flemish government agreement 2019-2024, stating that the "Flemish Government fully draws the map of Open Science in the European context, and we make our knowledge institutions responsible for implementing a policy in this area. This applies both to access to publications as well as for access to the underlying research data." In addition, the Flemish Government has included in its Decree of the Flemish Government concerning the financing of the Special Research Funds at the universities in the Flemish Community, as well as in its Decree on the Industrial Research Funds, specific regulations on the obligation to report datasets to the Flanders Research Information Space (FRIS), according to the FAIR principles, which makes these accessible to EOSC.

France

The French National Centre for Scientific Research, the CNRS, produced the «CNRS ROADMAP FOR OPEN SCIENCE» (https://www.science-ouverte.cnrs.fr). One of the axes thereof is dedicated to the Individual evaluation of researchers and Open Science, in order to "reconsider the individual evaluation of researchers by using an approach that is compatible with the objectives of Open Science and by taking into account in his/her evaluation the contribution of a researcher to Open Science."

Furthermore the CNRS signed the DORA declaration on July 14, 2018, therefore endorsing principles such as having consideration in the evaluation for the results themselves, and not the prestige of the journal, recognizing the value of different types of research products and supporting the accessibility of the research outputs cited in the evaluation files through the national open archive HAL (or another open archive).

Hungary

Open Science is taken into account by the National Research, Development and Innovation Office through the open access requirements that are integrated in the research grants. For example, 2.5% - 5% of the research budget has to be spent on open science goals like publishing the research paper open access or making the research data publicly available.

Italy

Since 2013 Italy has a specific law article on Open Access publications based on public funded research. Public institutions that are responsible for funding and managing research, must take the necessary measures to promote open access to publications that result from research projects funded to at least 50% with public funds. It supports both publishing in an Open Access journal, and republishing the contribution and depositing it into institutional or disciplinary repositories within 18-24 months after the first publication.

Netherlands

In the Netherlands some institutions have already changed their promotion and tenure systems, among them Utrecht University Medical Center. Other universities changed their code of conduct to include Open Science practices.

In the Netherlands, Utrecht University is a frontrunner in integrating Open Science principles and practices into research evaluation for recruitment and/or promotion at institutional level. Utrecht University prioritizes and implements evaluation criteria that value Open Science practices, making them part of conditions for grants and hiring, tenure and promotion policies, and allocating resources accordingly.

Norway

The University of Tromsø – Norway's Arctic University takes into account Open Science principles and practices into research evaluation for recruitment and/or promotion at institutional level. They signed DORA in June 2016. By 2018 they had revised all relevant policies and guidelines and made a plan for implementation. Main areas are recruitment to new positions, advancement to professorship, evaluation of doctoral dissertations, allocation of local grant money, sabbaticals and awards.

Portugal

Open Science is taken into account in the national Research Evaluation policies. The Assessment Guidelines (R&D Projects, 2014) are explicit. The dissemination strategy of research outputs of the projects, including considerations for Open Access, shall be taken into account in the evaluation. Nevertheless a stronger embedment of Open Science concerns is still expected, since a deep revision of the Evaluation conceptual framework, and procedures is on the way, as well as integrity documents that also consider non-discrimination on gender as part of excellence in science.

Switzerland

The criteria for recruitment or promotion are slowly aligning themselves to the DORA declaration in several institutions (almost all Swiss Higher Education Institutions have signed the DORA declaration). The national Open Science programme 2021-2024 has established an incentive for those alignments within the "Research Assessment" action line.

2. Translate the already available models and schemes that relate to Open Science and gender equality into concrete evaluation procedures. In particular the content and feasibility of the OS-Career Assessment Matrix (CAM) in researcher evaluation should be validated at European, national, regional and organisational level, while taking into account the wide spectrum of disciplines, research funding and research performing organisations.

Ref.: EU Commission, 2017

Good practice:

Norway

Norwegian universities experimentations with OSCAM.

A version of the OSCAM matrix is in development in Norway, probably developing into a generic framework for evaluating academic careers, in light of Open Science, but also in regard to the need to take into consideration the full breath of competencies needed at an academic institution. A NOR-CAM matrix will then be suggested as a tool to be used as a framework at the institutional level. (https://www.openaccess.no/rammeverk-for-endret-vurdering-av-forskere.html)

3. Duly consider in research evaluation the extent to which Open Science and gender equality practices contribute to reinforce research integrity.

Ref.: Science Europe Study, 2020: 22

Good practice:

Switzerland

Since 2018, a group of experts, including the public institutions Swiss Academies of Arts and Sciences, swissuniversities, the umbrella organisation of the Swiss universities, and the Swiss National Science Foundation (SNSF), works on renewing the principles and procedures in the field of Scientific Integrity, taking into account the ALLEA Code of Conduct (2017), in order to create common standards in Switzerland. The codex takes into account open science and social media and is foreseen to be published on 11th May 2021. (Further information: https://akademien-schweiz.ch/en/uber-uns/kommissionen-und-arbeitsgruppen/wissenschaftliche-integritat/)

4. Eminent research performing and funding organizations and organizations that play a role in research policy making, like scholarly societies, university representative associations and academies, should work as role models and support the integration of Open Science and gender equality in the evaluation of researchers and research projects.

Good practice:

ERC has a provision regarding extension for maternity / paternity, as well as the ways gender bias has been addressed, including the templates, gender bias training etc.

5. Given the increasing adoption of Open Science practices, research producing and funding organizations are encouraged to examine how these are taken up by men and women and how these practices can contribute in mitigating gender bias in research evaluation and evaluation procedures

Ref.: SWG GRI 2019b: 8, 22

Good practices:

FRANCE

The French funding organisation ANR (National Research Agency) was founded in 2005 to promote French project-based research and to stimulate innovation by supporting the emergence of collaborative multidisciplinary projects and encouraging collaboration between the public and private sectors. The ANR Open Science policy - https://anr.fr/en/anrs-role-in-research/values-and-commitments/open-science/ - introduced in 2013, fully aligns with the National Plan for Open Science launched by the Minister of Higher Education, Research and Innovation, in July 2018 (https://www.ouvrirlascience.fr/the-national-plan-for-open-science/). It intends to promote open access to publications, contribute to open research data wherever possible and coordinate efforts at the national, European and international levels.

Furthermore, the ANR is contributing to the development of a policy that aims to reduce gender inequality in higher education and research. It seeks and encourages parity in scientific evaluation panels. It also encourages scientific communities to systematically consider sex and/or gender aspects in research projects in all fields and in review processes, according to two axes: reinforcing parity and avoiding gender bias in review processes, and highlighting the presence and role of women in science. ANR is a member of the national working group on "Obstacles to Women's Careers in Higher Education and Research" alongside institutional research stakeholders. As a member of the Science Europe association, the ANR takes part in the "Gender and Diversity" working group and has contributed to the development of a guide designed to improve gender equality in the world of research. The ANR is also a partner of the GENDER-NET Plus ERA-NET (http://gender-net-plus.eu/) and of the H2020 Gender-Smart project 2019-2022 (https://www.gendersmart.eu/) alongside eight European partners which aim to implement a gender action plan in research organizations and their funding partners, and develop awareness-raising tools for research institutions.

6. Evaluation of research and researchers should not only consider individuals (and individual scientific prestige), but also teams and consortia, and evaluate to what extent gender equality and Open Science have been integrated. Indeed scientific knowledge often results from a collective endeavour, and Open Science contributes to make science more collaborative. Hence competences in leadership, thesis and grant mentoring, creation of teams or institute management should be rewarded properly. Furthermore collective works and publications should not by principle be devalued in comparison to individual achievements.

Ref.: VSNU, 2019

Good practice:

UK

University of Glasgow takes collegiality into account for promotion and evaluation (https://www.timeshighereducation.com/news/glasgow-rate-collegiality-professorial-promotions)

7. Provide researchers with the Open Science infrastructures and services they need in order to fully benefit from open research and innovation ecosystems. Such responsibility is shared by policy makers, research funding and producing organizations.

Good practices:

Germany

Germany provides several Open Access funding opportunities, for example through the DFG, German Research Foundation, and its programmes "Open Access publication costs" and "Infrastructures for scientific publishing" or by other research organisations implementing open access into their funding policies, i.e. the Helmholtz Association, where open infrastructures and the option of covering potential open access publication fees are provided. This could also offer more opportunities to get published to women scientists.

Switzerland

As part of a collaboration with four other research-funding institutions, the Swiss National Science Foundation (SNSF) is involved in the project FAIRware that seeks to develop a software that will support researchers in implementing the FAIR principles and assess the level of FAIRness of datasets and repositories. (Further information: https://researchonresearch.org/projects#!/tab/273951116-3)

3.4. Foster transparency in research evaluation as well as trustworthiness in the added value of Open Science and gender equality

The extent to which Open Science and gender equality are included in research evaluation, as well as the methods and criteria used more generally in research evaluation should be communicated in a transparent and up-to-date way to researchers. Furthermore the added value of Open Science and gender equality should be communicated to all researchers - as well as to other relevant stakeholders - from the earliest stage of their career.

1. Provide transparency and raise awareness about the evaluation process. Make the criteria - including those that relate to Open Science and gender equality -, evaluation guidelines and where relevant the type(s) of indicators and bibliometrics that are used publicly available, for the evaluators as well as for the evaluated ones, in job descriptions, performance appraisals and promotion. Avoid the risk of being over-prescriptive, over-prescription favouring gaming, or too vague, which may lead to inequality.

Ref.: LERU 2018: 17; Science Europe Study, 2020: 10; Saenen et al., 2021; Šinkūnienė and Vanholsbeeck, 2020

Good practices:

Belgium

On the side of the Flemish Community research funder (FWO), the evaluation procedure is openly available for all applicants, including detailed scoring grids which are used by the external referees and by the evaluation panels. Additionally, the names of the panel members are published online (subject to agreement by the panel members in question) and much attention is spent in providing detailed feedback to the applicants. The procedures for selecting research projects of fundamental research at universities via BOF-funding and research valorisation projects at universities and universities of applied sciences via IOF-funding is described in the BOF-policy of each university and the IOF-policy of each association. The panel members and the policies are published on the website and accessible to all researchers.

On the side of the Wallonia-Brussels Federation, F.R.S.-FNRS (funding agency) publishes accessible guides for reviewers to all the processes that they follow when performing assessments. FNRS researchers' recruitment procedures are clearly described, transparent, easily accessible and apply to all applicants in the same way. FNRS call regulations present all the necessary requirements for the available positions as well as the eligibility criteria for applying and the evaluation criteria for the assessment. Furthermore FNRS carries out post calls analysis to detect any potential bias in the evaluation processes (cf. Beck, R. & Halloin, V. (2017). Gender and research funding success: Case of the Belgian F.R.S.-FNRS. *Research Evaluation*, 26 (2), 115-23).

2. Define explicitly the notions of research quality and excellence in function of the mission(s) of the institution or in the context of a specific research project, research related service or infrastructure. Favour in any case a composite definition of excellence that does not focus on a single type of research output or activity, which supports Open Science and which is not gender biased.

Ref.: Science Europe, 2020: 22; SWG GRI, 2019b; Van den Brink and Benschop (2012)

Good practice:

Germany

In Germany, the Digital Initiative for network information (DINI) created a certificate for "Open Access Repositories and Publishing Services", which functions as a mark of quality and openly communicates its criteria. The wording of the certificate has to be gender inclusive since 2019.

3. Advocacy programmes should be implemented by universities and other research institutions, identifying the benefits of Open Science and gender equality while being realistic about the challenges. Reforming research evaluation - whether it is in a radical way or by complementing it with new measures that support Open Science and gender equality - supposes to adopt a communication strategy which keeps pace with the latest evolutions of the research and innovation landscape and answers to the concerns raised by the staff.

Ref.: LERU, 2018: 2

Good practice:

Belgium

University of Mons (Wallonia-Brussels Federation, Belgium) promotes Open Science through a You Tube video: https://www.youtube.com/watch?v=X_SDCzX4HQY&list=PLY8sQREyCRyMw_1X9aqYKrv 2emskAXl2q (in French). This video has been sent to all researchers in the university, is part of some courses (Master students) and will be given to all research assistants in their training to teach from September 2021.

4. Share at national and international level good practices in terms of research evaluation that foster Open Science and gender equality.

Good practice:

European collaborative platform on academic reward system (Research Assessment Registry)

An academic career structure that fosters outputs, practices and behaviours to maximise contributions to a shared research knowledge system is highly relevant. To this end, in discussion with the OSPP (Open Science Policy Platform), the Research Data Alliance has committed to spearhead a new collaborative platform (www.openscienceregistry.org) to share both the intention and outcomes of pilots and other initiatives taken by different actors that specifically address the academic reward system. All Member States will have the opportunity to contribute to this so that everyone can benefit from the innovation of others by sharing what works and what doesn't in different contexts.

5. Encourage the development of transparent Open Science indicators. If possible centralize the data collection that evidence base those indicators (like open citations, OpenAIRE's usage data, and DataCite's 'Make Data Count' system). Whenever relevant, use e-infrastructures that are openly accessible (like institutional or national repositories, or the EOSC at European level) in research evaluation.

6. Value, support and encourage the citation of a full range of valuable research outputs and FAIR Digital objects, including data, code and models. Check if citations are following the Joint Data Citation Principles and comment findings appropriately. Adjust accordingly open research data policies so that they better support research data sharing by citation.

   Ref.: Turning FAIR into reality, European Commission Expert Group on FAIR data, 2018.

7. For assessing Open Science practices, generalize the use of persistent identifiers for individuals and digital objects like ORCID (for researchers) and like DOI (for all types of research outputs).

8. Consider in research evaluation the extent to which the principles of Open Science and Open Innovation are taken into account in IPR management and knowledge valorization.

Ref.: European Commission (2021)

Assessment of national or regional research systems

The two following guidelines do not directly concern the evaluation of research conducted by individuals, teams or institutions, or the evaluation of research projects, but relate to the monitoring of national or regional research systems. At this level too, transparency and trustworthiness should prevail.

9. Use well defined Key Performance Indicators (KPIs) while assessing the uptake of Open Science and gender equality in national or regional research systems.

Good practices:

Belgium

Flemish Open Science KPI Strategy

A dedicated taskforce of the Flemish Open Science Board co-created a KPI strategy with the Flemish Policy level on Open Science. The general principles identified were that KPI's concerned all research that was fully or partially funded by the Flemish Government, both through the Flemish research funding organization, directly or through other existing funding mechanisms. KPI's are measured on the level of each implicated research funding organization, but are also viewed holistically, in order to have useful policy information, allowing the Flemish Government to do the necessary fine-tuning. It was explicitly mentioned that the set of KPI's would also take into account the insights and evolutions on the European level, since many concepts and methodologies involved are still being discussed, and most probably will be discussed, for example in the EOSC Association. The idea is to take into account "lessons learnt" and insights from the Commission and other Member States.

The existing Flanders Research Information Space (FRIS) portal will be used as the monitoring tool for the KPI's. In the Flemish region, the Flanders Research Information Space (FRIS) is the regional digital platform containing information on 82 353 researchers and their research (39 021 projects and 419 216 outputs, dated 14-05-2020), funded via public Flemish funds since 2008. All information from the FRIS platform is displayed on a portal website. FRIS has been established as close cooperation between the Department of Economics, Science and Innovation of the Flemish Government and the knowledge institutions in Flanders, i.e. Flemish universities, higher education colleges, strategic research centres, and other scientific institutions.

A set of operational KPI's was identified by the Taskforce in co-creation with the Flemish Department of Economy, Science and Innovation and the FRIS-team: KPI zero: ORCID iD, KPI 1: Data Management Plans, KPI 2: FAIR Data, KPI 3: Open Access to Publications, KPI 4: Open Data.

A so called "zero measurement" is planned in 2021, in order to define "categories of readiness" within the broader field of stakeholders. The idea being that differentiated "growth paths" can be implemented, with various incremental speeds, culminating in a joint target post 2024. This means in practice that the incremented percentages of the target will not be same for each RPO in the first years of the monitoring.

Italy

Every two years ANVUR produces a report on the status of Universities and the research system which is submitted to the Minister of Research and to the Prime Minister. The 2021 report will include, amongst the indicators adopted to assess the impact of the supported actions, specific indications and a section dedicated to a gender analysis and data of the overall system and a focus on gender opportunities and gender policies developed by the single organisations.

10. Plan a gender sensitive monitoring of the uptake of Open Science and Open Science training notably through the production and analysis of gender-disaggregated data on Open Science. In a context of lack of empirical evidence, conduct studies on gender issues in Open Science and Open Innovation, such as open peer review, altmetrics, open software and open innovation. In particular, examine the extent to which the use of new metrics impacts differently men and women researchers at different career stages and within different disciplines.

Ref.: Genderaction, 2019

Good practice:

Spain

The analysis of participation and success rate of the most important calls for funding projects, grants for researchers, and six-year research career evaluation are published on the Web and other social media. These analyses include participation data differentiated by gender.

3.5. Provide the right incentives through evaluation

Research evaluation constitutes a powerful means of rewarding practices that foster Open Science and gender equality, and providing the right incentives. The full diversity of Open Science practices should be rewarded, whether they relate to research outputs or processes.

1. Open Science and Open Innovation related skills should be duly recorded and acknowledged (e.g. through credits, certificates of attendances, etc.) in career development, appraisals and promotions.

Ref.: LERU 2018: 16

Good practice:

Belgium

The University of Mons, in the Wallonia-Brussels Federation, Belgium, organizes seminars on Research Integrity and Ethics for PhD students, Postdocs and professors. Several people for Administration Support and Technology Transfer have been trained and certified by the VIRT2UE European Project: Embassy of Good Science (https://embassy.science/wiki/Main_Page). The main output of these seminars is to make researchers more responsible of their research and to have solutions to deal with research dilemmas in order to keep the research as FAIR as possible.

2. Through research evaluation, provide the right incentives to reward Open Science practices that go beyond opening access to articles in international top journals, and open access to a diversity of research outputs and processes, with due consideration for 'FAIR-ification' of research data, engagement in citizen science and Open Innovation.

Good practices:

Austria

Measures 6 and measure 7 of the Open Innovation Strategy for Austria (2016) relate to: "Build up research competence for the application of open innovation in science" and "Establish incentive mechanisms for research partnerships with non-traditional players in research funding to strengthen open innovation". Furthermore the LBG Open Innovation in Science Center (https://ois.lbg.ac.at/) inter alia offers training for researchers in Open Innovation.

Spain

Open Science is taken into account in the national level research assessment exercise. The National Agency for Quality Evaluation and Accreditation (ANECA) is responsible for the evaluation of research activity at the individual level. Evaluations are made on a six-year period base. Researchers with a positive evaluation obtain a significant economic reward. In 2018, a pilot project to evaluate knowledge transfer and innovation in researchers' curricula was set up for the first time. This was a first step towards a more Open Science based incentives and rewards system at the National level.

3. Trial systems that connect open access archives with evaluation of researchers. Such connections provide a strong incentive for researchers to deposit all their results in an Open Access repository, while also contributing to reduce the administrative burden on researchers by providing them with one single system in which to list their outputs. It also makes it possible to consider other types of research outputs than scholarly articles, if the repository allows. For such a system to work successfully, a strong support of the decision makers and academic authorities is needed.

Ref: Leonelli, 2017

Good practices:

Belgium

In Wallonia-Brussels Federation, Belgium, a Decree from 2018 mandates that bibliographic lists used in the evaluation of researchers and research projects in universities and at the level of the funding agency are exclusively taken from Open Access institutional archives. A similar system has been adopted by the federal Belgian funder (BELSPO): non-deposited publications are excluded from the official bibliography of the researcher.

Lithuania

Part of Lithuanian universities and research centres have institutional policies/regulations on the Open Access to Scientific Publications and Data. Minimum qualification requirements, workload, attestations, granting of pedagogical titles are based on publications available on the Institutional Repositories or Lithuanian Academic Electronic Library eLABa.

Norway

In Norway, the national database CRIStin acts as evidence for the performance-based funding system.

4. Periodically monitor and update the rewards and incentives linked to Open Science, Open Innovation and gender equality so that they remain relevant and keep pace with the developments in those fields as well as with the evolution of the research and innovation landscape.

   Ref.: ERAC SWG GRI, 2019b; LERU, 2018: 18

3.6. Create a virtuous circle between training and evaluation

As a general principle, researchers should only be assessed in regard to skills and practices for which they have been duly trained or are offered the opportunity to get trained in. Any change in research evaluation - including in regard to Open Science and gender equality - should therefore be accompanied by related reforms in the researchers' and evaluators' training schemes.

1. Provide adequate training in Open Science - including in citizen science -, research integrity, gender equality and elimination of gender bias specifically for all types of staff and for all stages of the career, taking into account the disciplinary specificities. Proper guidance or training should also be targeted at those who are involved in staff recruitment, appraisal and promotion in the university. In particular research administrators and academics should receive guidance on good and bad practice in the responsible use of traditional bibliometrics and in the development of new metrics.

   Ref.: LERU, 2018: 17, 19; OSPP, 2020; SWG GRI, 2019b

   Good practices:

Estonia

DataCite Estonia is a consortium of Estonian R&D institutions (incl. universities), and is a platform of co-operation regarding Open Science skills and infrastructure. The University of Tartu is most advanced in providing their researchers with modern support in Open Science related skills and services, but other institutions are putting more and more effort into doing the same.

Part of the future national Open Science Framework is to establish an Open Science Competence Centre that would act a hub for infrastructure and skill-sharing services.

Finland

Skill and practice (https://mooc.helsinki.fi/course/info.php?id=33) is an open introductory course into the practices of Open Science that explains how to make the most of the existing outputs of open research. This course is suitable for anyone interested in Open Science. The university faculty are encouraged to use these course materials in their lessons.

Malta

The UM (University of Malta) Library is responsible to train UM academics and researchers on the various aspects of Open Science (OS). Moreover, the Library is an active advocate of Open Science. Subsequently, the Library provides ongoing training sessions and workshops whereby academics are given an overview of the benefits and advantages of OS. Moreover, academics are given hands-on training on how to upload their research content on the UM Institutional Repository – OAR@UM.

Netherlands

The Data Stewardship training programme that Dutch National funders are supporting across universities in the Netherlands could provide a possible model.
https://www.go-fair.org/wp-content/uploads/2019/12/06_goTRAIN_DataStewardshipNL_V3_191125.pdf)

Slovenia

Trainings in Open Science and Open Innovation are organised e.g. by the national contact points of OpenAire, RDA and NI4OS. Central Technological Library - CTK of the University of Ljubljana (http://www.ctk.uni-lj.si/mreza-odprte-znanosti/), Data repositories e.g. ADP (https://www.adp.fdv.uni-lj.si/eng/) and Slovenian node ELIXIR-SI (https://elixir-slovenia.org/) are occasionally organizing trainings related to open science and research data.

Turkey

A research data management portal is created for training researchers on RDM Good practices. Also, periodic webinars are held for research data training.

European university alliances

Several European university alliances provide ambitious and coordinated training options in Open Science and innovation:

The DIOSI (Developing and Implementing hands-on Training on Open Science and Open Innovation for Doctoral Candidates) project of the YUFE (Young Universities for the Future of Europe) alliance proposes a full cycle concept on doctoral education, from the development of a new joint doctoral educational programme, through the provision of training on Open Science and Open Innovation & Entrepreneurship for doctoral candidates and early career researchers (DCs and ECRs), to developing a framework for impact of such training. The project includes specific training for Open Science trainers at the partner institutions, in order to build capacity and expertise, and to take the existing offers to the next level. Each newly formed trainer will run a pilot session at the home institution. There will be a follow-up session after that initial training. By building an international and interdisciplinary network for qualified trainers experiences and new developments can be shared beyond the DIOSI project duration.

The CHARM-EU European University Alliance intends through its TORCH project to follow a step wise process in the upskilling of their researchers and changing policies (adopting Good practice) within the Universities and across the alliance. During the pilot year, TORCH will design a training and education module on Open Science skills (including Research Integrity values). The module will target researchers at all stages of the career, university leaders, PhD students and business and civil society collaborators from the Alliance, to ensure mainstreaming the best open science practices selected from the partner institutions. This module is of crucial importance not only with regard to its content but also in its open and innovative methodology which includes different formats (online, face-to-face and blended) and will consider all aspects of Open Science.

The EDUC (European Digital UniverCity) alliance also integrates due consideration for training in Open Science. Specifically, a Common Open Science Strategy will enable EDUC to address Open Science in its full diversity, from Open Access to data, publications and infrastructure, through Open Peer-Review, to public outreach, Citizen Science, City Science and other emerging concepts. In order to implement the Open Science Strategy, an action plan will foresee pilot activities, on the basis of the identified training needs.

2. Evaluators should receive guidelines and be trained on how to integrate Open Science and gender equality in research evaluation. Training should relate to the evaluation of the quality and impact of research outputs and processes beyond bibliometrics, taking into account the whole portfolio of researchers' activities and contributions and reducing the risk of unconscious bias in evaluation panels.

Ref.: CESAER inputs to Triangle Task Force; ERAC SWG GRI, 2019b; ERAC SWG HRM, 2015

Switzerland

The members of evaluation bodies of the Swiss National Science Foundation (SNSF) receive special training from the SNSF regarding the implementation of the DORA declaration, for instance in workshops with international experts. (Further information: http://www.snf.ch/en/theSNSF/research-policies/dora-declaration/Pages/default.aspx)

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Title of the publication	**SWGs GRI, HRM and OSI joint guideline paper** **Research evaluation in a context of Open Science and gender equality**
Writer(s)	Members of the Triangle Task Force Goal 1 (joint taskforce between SWGs GRI, HRM and OSI): Vanholsbeeck Marc, Alvarezdelara Monica, Buraczewska Izabela-Ewa, Cabello Valdés Cecilia, Degand Martin, Duda Gerhard, Dumolyn Bart, Eekhout Chicharro Xavier Ronald, Gourova Elissaveta Vassileva, Haesaert Els, Jerolimov Cetina Lana, Kundermann Julia, Lacunza Aguirrebengoa Izaskun, Linkova Marcela, Lizée Marie-Pascale, Skubic Ivan, Sorcan Stojan and Voegeli Stephanie
Publisher (i.e ERAC)	ERAC
Date	
Coordination responsibility	Marc Vanholsbeeck (Chair of SWG OSI) and Marie-Pascale Lizée (Vice-Chair of SWG OSI)
Type of document (working paper/discussion paper/recommendation/other specify)	Guideline paper with recommendations and examples of good practices
ISBN PDF	
URN link	
Pages	
Language	English

Key words	Research evaluation, Open Science, gender equality, European Research Area
ERA related policy documents	ERAC SWG GRI (2019). ERAC SWG GRI policy brief on Gender and Innovation. ERAC SWG GRI (2019). Tackling gender bias in research evaluation: Recommendations for action for EU Member States - Policy brief. ERAC SWG HRM (2015). REPORT of the WORKING GROUP of the STEERING GROUP OF HUMAN RESOURCES MANAGEMENT under the EUROPEAN RESEARCH AREA on Open, Transparent and Merit-based Recruitment of Researchers. ERAC SWG OSI (2018). Recommendations by ERAC Standing Working Group on Open Science and Innovation (SWG OSI) on open science and innovation. ERAC SWG OSI (2019). ERAC SWG OSI Opinion on Open Innovation. ERAC SWG OSI (2020). Opinion of the ERAC Standing Working Group on Open Science and Innovation (SWG OSI) on future Open Science and Open Innovation priorities in the European Research Area (2020-2030) European Commission (2011). Principles of innovative doctoral training. European Commission (2012). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A Reinforced European Research Area Partnership for Excellence and Growth. European Commission (2017). European Commission

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Coordination with other ERA related groups	The Triangle Task Force is a joint taskforce with delegates from SWGs GRI, HRM and OSI.

This report has also benefitted from exchanges of views with CESAER and the EUA, as well as with the Charm-EU, |

	EDUC and YUFE alliances of European Universities.
How to cite	ERAC SWGs GRI, HRM and OSI (2021). SWGs GRI, HRM and OSI joint guideline paper. Research evaluation in a context of Open Science and gender equality.

Abstract

There is an urgent need to work on the transformation of research evaluation principles and processes so that they become more supportive of Open Science. At the same time we should make sure that those principles and processes foster gender equality and tackle the inequalities that are linked to current evaluation systems and gender biased definitions of excellence.

Accordingly this report provides all stakeholders involved in research evaluation with guidelines and concrete good practices – most of them collected through a specifically designed survey - that will help to reform research evaluation procedures so that they better support Open Science as well as gender equality. The guidelines and good practices relate to the six following principles:

- Foster the diversity of open research ecosystems, using a diversity of evaluation methods and indicators to better recognize the diversity of research outputs and processes, as well as the diversity of researchers themselves;
- Promote inclusiveness and collective involvement in the design of Open Science and research evaluation policies;
- Encourage a responsible attitude in research evaluation;
- Foster transparency in research evaluation and trustworthiness in the added value of Open Science and gender equality;
- Provide the right incentives through evaluation;
- Create a virtuous circle between training and evaluation.