

# D6.1 Investigating Institutional Structures of Reward & Recognition in Open Science & RRI



## Observing and Negating Matthew Effects in Responsible Research and Innovation Transition



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There is increasing recognition that a lack of reward and recognition for Open Science and RRI practices is a barrier to uptake. This deliverable presents work undertaken to understand current policies for promotion, review and tenure, investigate how active researchers perceive them, and develop suggestions for reform to better foster OS/RRI. Through two studies – (1) a review of current institutional PRT policies in seven countries, and (2) an international survey of 200 active researchers – we show that currently OS/RRI practices are minimally rewarded while problematic practices of quantification continue to dominate, but that researchers support and value change. Based on this, we present provisional recommendations for reform (to be developed in later ON-MERRIT tasks).



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## Abbreviations

DORA - Declaration on Research Assessment

EUA - European University Association

GNI - Gross National Income

JIF - Journal Impact Factor

LMIC - Low and middle income countries

ON-MERRIT - Observing and Negating Matthew Effects in Responsible Research & Innovation Transition

OS - Open Science

PRT - Promotion, Review and Tenure

RRI - Responsible Research and Innovation

STEM - Science, Technology, Engineering and Mathematics

THE - Times Higher Education

WP - Work Package

WUR - World University Ranking

## Executive summary

This document reports on the research conducted under Task 6.1 “Investigating institutional structures or reward and recognition in Open Science & RRI”. Our work assesses the extent to which Open Science (OS) and Responsible Research and Innovation (RRI) are embedded in promotion processes at research performing institutions and analyses the disparity between what is valued by institutions and what is valued by researchers in the context of promotion processes.

The deliverable presents two original research studies contributing to a better understanding of current reward structures, incentives and practices as they are applied across geographical boundaries:

- The first study provides a systematic analysis of institutional Promotion, Review and Tenure policies (PRT) to determine the extent to which they, at this point in time, embed OS and RRI indicators. This study builds on Task 3.1 in which an initial international dataset of PRT policies was collected and annotated.
- The second study is based on an international survey of active researchers. It aims to assess their attitudes towards OS and RRI as well as their experience with the application of assessment indicators in PRT processes at their institutions. Additionally, it aims to identify promising incentives that would encourage researchers to practice OS and RRI.

Our systematic analysis of promotion, review and tenure (PRT) documents from seven countries shows that OS/RRI indicators remain rare and measures associated with quantification largely dominate (albeit with some important differences between countries). Our international survey confirmed these findings. Despite ten years of DORA, publishing in highly-regarded journals or conferences (as measured by metrics like JIF) was reported as being somewhat or very important in their institutional policies by the overwhelming majority.

Comparing this with the personal opinions of researchers as to what *should* be important, stark differences emerged. Factors relating to abstract notions of being a good research citizen, such as mentoring, collegiality, and quality in research processes (including engaging in OS/RRI) were much more highly valued here. In most of the aspects we inquired about, researchers saw them as more important than they believed did their institutions. Only aspects such as those relating to quantification (levels of research funding, number of publications) were seen as more important in the eyes of the institution than the individual. Nonetheless, researchers still clearly indicated that they themselves see these factors as important, if not to the same degree as their institutions.

Our findings hence show that researchers are ready for change. Yet as we look ahead to what those changes might be, we must be careful not merely to propagate the “tyranny of metrics” responsible for many of the ills within the current system. Simply uncritically introducing further indicators accounting for OS/RRI practices may do more harm than good. We hence close with considerations of the need to change not just indicators, but rather *norms*, and with provisional recommendations for policy-makers, institutions and researchers (to be developed in later ON-MERRIT tasks).

# 1. Introduction

Open Science<sup>1</sup> (OS, the movement to make scientific research, data and dissemination accessible to all levels of inquiring society) and Responsible Research and Innovation<sup>2</sup> (RRI, a broader concept incorporating OS along with Science Education, Public Engagement, Governance, Gender, and Ethics to align scientific outcomes with the values of society) have been adopted as key ambitions of research funding and performing organisations (Directorate-General for Research and Innovation 2016; Owen, Macnaghten, and Stilgoe 2012). However, current research assessment processes are increasingly recognised as a barrier to this goal. Potential issues include the overuse of inappropriate indicators, an overemphasis on quantity over quality, and a neglect of OS/RRI practices *per se* (Directorate-General for Research and Innovation (European Commission) et al. 2019).

Recent research, as we shall see in our review of the literature (Section 2), has begun to investigate the relationship between assessment structures and the incentivisation of OS/RRI practices. This report further contributes to this evidence-base by: (1) analysing current practices as revealed by documentation on institutional promotion, review and tenure processes in a range of countries, and (2) conducting an international survey of active researchers regarding their experiences of such processes and their attitudes towards potential reforms.

The aim of this research is to take a high-level view of the state-of-play of current practices, both in the written words of policies as well as researchers' experiences of their actual implementation. To what extent are factors like inappropriate indicators, excessive quantification, and a lack of incentives for OS/RRI currently at play? We then seek to gauge any potential mismatch between the values revealed by this analysis and the values of researchers themselves, by asking what they themselves feel should be valued in promotion, review and tenure processes. We are particularly interested in identifying ways in which research assessment processes may contribute to an "attitude-behaviour gap" between values and practices (whereby researchers may value OS/RRI in the abstract but be reluctant to take it up in practice). We therefore also inquire into current OS/RRI practices and how these are linked to research assessment processes. This aims to produce a coherent picture of current problems regarding research assessment and to generate the evidence upon which informed decision-making for reforms can take place to create a more equitable system which incentivises OS/RRI practices.

Through this research we find that currently OS/RRI practices are minimally rewarded while problematic practices of quantification continue to dominate, but that researchers support and value change. Based on this, we present provisional recommendations for reform (to be developed in later ON-MERRIT tasks).

This work makes the following original contributions:

- Largest international review of PRT policies in terms of:
  - number of institutes analysed

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<sup>1</sup> FOSTER (2018). Open Science <https://www.fosteropenscience.eu/taxonomy/term/7>

<sup>2</sup> FOSTER (2019). Responsible Research and Innovation. <https://www.fosteropenscience.eu/taxonomy/term/255>

- number of traditional indicators considered
- Largest international survey (200 respondents from 44 countries) of active researchers:
  - providing a direct comparison between institutional practice and personal attitudes towards OS/RRI and traditional indicators
  - analysing incentives for OS/RRI based on the input from over 200 survey participants

The report is structured as follows. Section 2 contextualises and relates the work carried out in Task 6.1 with the overall objectives and activities of ON-MERRIT Work Package 6 (WP6). We then review relevant literature looking at the history and role of research assessment in academia, the application of OS/RRI in research assessment and the drivers and barriers to change. Section 3 describes the methodology of our PRT policies' analysis (study 1) and the international survey of academic researchers' views on career progression (study 2). Section 4 then details the results and findings from study 1, and Section 5 the results of study 2. Section 6 then analyses and discusses the main findings from across both lines of research. Finally, Section 7 provides concluding remarks and makes provisional recommendations for reform.

## 2. Literature Review

Academia is often termed a “prestige economy” (Blackmore and Kandiko 2011) to acknowledge that the complex motivations for academic work are better typified by socio-cultural factors related to the pursuit of recognition for intellectual leadership than other factors such as monetary gain. In the model of the “cycle of scientific credibility” suggested by Latour and Woolgar (2013), gains in prestige are translated into new resources via project grants or institutional promotion, which are then used to conduct new research, whereby more prestige (often counted via citations, or the associated relative prestige of the venue where the research was published) can be accumulated. Within this cycle, promotion and hiring procedures within institutions are a key factor in shaping success (along with others like grant evaluation processes and publication decisions). In fostering the uptake of OS, such moments of evaluation have been identified as especially useful. The barriers and drivers in making research practices more open and responsible are diverse, from building awareness to adequate access to infrastructure and training (Cox and Obloj 2015; McKiernan et al. 2016).

Nonetheless, there is a growing consensus that current practices of reward and recognition are a major obstacle to the uptake of OS/RRI, and that they require further review. Funders and publishers continue to implement new policies, mandates, requirements and guidelines on what is expected. In this light, recent research has moved to consider how promotion, tenure and review processes can best be leveraged to foster OS. In particular, it is claimed that current practices focus too much on quantitative measures over qualitative measures (Malsch 2014; Colavizza et al. 2020), with misuse of quantitative research metrics, including the journal impact factor (JIF), among the most pressing issues for equitable research assessment generally, and to foster OS in particular (Adler, Ewing, and Taylor 2009; McKiernan et al. 2016; Rice et al. 2020; Walker et al. 2010; Blankstein and Wolff-Eisenberg 2018; Vinyard and Colvin 2018; Niles et al. 2020). Therefore, recent years have seen a focus on attempts to understand how OS/RRI principles and practices are currently valued in the reward and incentive structures of research performing and funding organisations, especially by examining the promotion, review and tenure policies of the former. This deliverable seeks to build upon and extend this knowledge. To situate this contribution, in this section we therefore review the literature to date on this subject.

We structure this review of the literature as follows: (1) role of research assessment in academia, including history and main practices; (2) research assessment, OS/RRI uptake; and (3) drivers and barriers to change.

### 2.1. Research assessment and researcher motivations

Institutional policies regarding promotion, review and tenure typically focus on three broad areas: research, teaching, and service (both to the profession and the institution). The relative importance of each varies across institutions and has also changed over time (Gardner and Veliz 2014; Youn and Price 2009). In the European context, a recent survey of researchers investigated the widely used indicators in use at EU institutions for promotion and tenure and found that the most common factors used in research assessment were (according to survey respondents): number of publications (68%), patents and securing funds (35%), teaching activities (34%), collaboration with other researchers (32%), collaboration with industry (26%), participation in scientific conferences (31%), supervision of

young researchers (25%), awards (23%) and contribution to institutional visibility (17%) (European Commission. Directorate General for Research and Innovation. 2017).

When it comes to the assessment of research contributions, reflecting the common idiom “publish or perish”, publication in peer-reviewed venues remains central. Primary publication types vary across disciplines. While journal articles dominate in Science, Technology, Engineering and Mathematics (STEM) subjects, monographs or edited collections have greater importance in the Humanities and Social Sciences (Alperin et al. 2020; Adler, Ewing, and Taylor 2009). Within Computer Science, meanwhile, publication in conference proceedings is the most important factor (McGill and Settle 2011). However, irrespective of which type of publication is favoured, according to (Gardner and Véliz, 2014) institutions tend to position *productivity* (often quantified via metrics) as a defining feature in PRT policies. The ways in which this emphasis on productivity and quantification influences academics’ focus and shapes behaviours, often in detrimental ways, is worth expanding upon in order to understand how current trends in PRT policies may be limiting OS uptake.

Institutional committees tasked with determining whether research contributions are sufficient for promotion, review or tenure, face something of a dilemma. Ideally they would be able to read each of the contributions themselves to make their own first-hand judgements on the matter. However, the mass of material created, as well as the fact that research specialisation means that even researchers in seemingly closely-related fields may not possess the required expertise to make such judgements on quality, mean that usually proxy indicators for quality are sought. Here, two factors are particularly popular: publication venue and citation counts.

*Where* research is published is of crucial importance in academia. Firstly, there is a distinction between what is and is not peer-reviewed. Peer review remains the perceived gold-standard for quality assurance in scholarly publications, and hence publication in peer-reviewed venues is a key criterion in PRT processes (Cronin and Overfelt 1995; Seipel 2003; King et al. 2006; Acord and Harley 2013). Not all peer review is perceived as equal, however. Stricter selectivity criteria at some venues in comparison to others, linked to a perception that peer review processes at these venues are hence more stringent, therefore fuels a perception that publication in some venues is more valuable than in others. Put simply: acceptance to a more selective venue is taken to imply greater research quality and potential impact. Hence, other factors concerning the perceived prestige of the publication venue are often taken into account in assessing the individual pieces of work published there (King et al. 2006; Seipel 2003; Walker et al. 2010). As a result, it has been found that publications in “high-impact” journals are correlated with greater chances of promotion (Nederhof 2008). Indeed, departments and institutions sometimes distribute lists of “whitelisted” journal titles where publication is recommended (Malsch 2014; Van Fleet, McWilliams, and Siegel 2000). This applies not only to journals, however. Within Computer Science, judgements regarding contributions to Conference Proceedings are often assessed based also on the selectivity of the conference itself (McGill and Settle 2011).

In perceptions of the prestige of academic journals, the JIF has assumed a particularly pernicious role. Created by Eugene Garfield of the Institute for Scientific Information, the JIF calculates an average of citations per article within the last two years to provide a metric of the relative use of academic literature at the journal level. Originally created to assist library decisions regarding journal

subscriptions, the JIF soon came to be used as a proxy for relative journal importance by research assessors and researchers themselves (Adler, Ewing, and Taylor 2009; Walker et al. 2010). Various criticisms have been levelled at the JIF, most prominently that relatively few outlier publications with many citations skew distributions such that most publications in that journal fall far below the mean number of citations used to calculate it, but also because differences in citation practices between (and even within) fields mean it is a poor tool for comparison, it is susceptible to gaming by questionable editorial practices, and suffers a lack of transparency and reproducibility (Fleck 2013). Nonetheless, use of the JIF as a proxy for research quality in research assessment became commonplace (Gardner and Veliz 2014; McKiernan et al. 2016). McKiernan et al. (2019) studied PRT documents and found that 40% of North American research-intensive institutions mentioned the JIF, or closely-related terms. Accordingly, a journal's Impact Factor is commonly listed as a key factor by researchers when asked what factors they take into account when deciding where to publish (Blankstein and Wolff-Eisenberg 2018; Niles et al. 2020).

Citation counts at the article level are also often used as a proxy for research quality within PRT processes (Adler, Ewing, and Taylor 2009; Brown 2014). Indeed, Alperin et al. (2019) found that such indicators were mentioned by the vast majority of institutions. However, citations have been widely criticised for being too narrow a measure of research quality (Wilsdon et al. 2015; Hicks et al. 2015; Curry 2018). The application of particularistic standards is especially perilous for early-career researchers who have yet to build their profile. By using citation metrics to evaluate research contributions, initial positive feedback leads to the self-reinforcement otherwise known as the Matthew effect (Wang 2014). Moreover, indicators such as the h-index are highly reactive (Fleck 2013) and therefore risk reifying monopolization of resources (prestige, recognition, money) in the hands of a select elite. The h-index was designed as a measurement tool to showcase the consistency of the cited researchers, but creates a disadvantage for early career researchers and neglects the diversity of citation rates across scientific disciplines (Pride and Knoth 2018).

Reliance on such metrics as proxies for quality is, as we have said, on the one hand a matter of pragmatism - assessors cannot themselves read every piece of research generated by the researcher being assessed. Such metrics also, though, seemingly lend objectivity to processes. Two people may disagree over whether a work is good or not, but citation counts can be (seemingly) easily ranked. Of course, for the reasons we have stated, this is often not the case. Yet, as we examine later, overreliance on metrics for their easy availability and seeming objectivity has come to be seen as a core problem in research assessment.

Before moving on to that discussion, it is worth noting that in addition to research quality, another key factor influencing career decisions is the amount of research funding obtained (Nunez-Wolff 2007; Liner and Sewell 2009; King, Acord, and Earl-Novell 2010). There, the bulk of extant research is from an anglo-american context, even though funding acquisition and patenting are also important indicators for promotion within European research institutions (European Commission. Directorate General for Research and Innovation. 2017). Research into the funding criterion is descriptive for the most part (e.g. in Liner and Sewell 2010). Even while e.g. Rice et al. (2020) find that what they labelled as "traditional" promotion criteria (such as citations, authorship order, and funding acquisition) are more common than "non-traditional" (i.e. OS) criteria, there is scant research into the relative

importance of funding acquisition versus other indicators that goes beyond comparing the prevalence of these factors within promotion and tenure policies.

## 2.2. Research assessment and Open Science/RRI

Recently, new initiatives have emerged that promote reform in research assessment and discuss the introduction of new, more holistic methods (including responsible use of research metrics). The Declaration on Research Assessment<sup>3</sup> (DORA) for example tries to weaken the use and reliance on traditional bibliometrics, such as the JIF, and promotes alternative methods for assessing research quality in its recommendations to institutions, funders, researchers and publishers. Similarly, the Leiden Manifesto for Research Metrics (Hicks et al. 2015) with its ten principles directs researchers away from practices that are considered problematic, e.g. supporting publications in journals with a high JIF or financially supporting an author's high h-index. The Leiden Manifesto promotes research independence, open practices and transparency in research by advocating for a set of open principles. As a result, research assessment becomes inclusive, transparent and does not benefit only a small percentage of researchers (Hicks et al. 2015).

This trend has coincided with the rise of OS/RRI as key policy agendas amongst funders and research institutions. OS has been defined as "transparent and accessible knowledge that is shared and developed through collaborative networks" (Vicente-Saez and Martinez-Fuentes 2018). It is a varied movement to reform research through more transparent and participatory practices including OA to publications, research data sharing, opening research methods and processes, new means of transparent research evaluation, and the re-orientation of research to be more inclusive of and responsive to the needs of society and industry (Pontika et al. 2015). RRI, meanwhile, is a science policy movement, especially prominent in Europe, which seeks to better integrate science with society through an increased focus on governance, science communication, ethics, (gender-) equity, as well as OS (Owen, Macnaghten, and Stilgoe 2012; von Schomberg 2019).

However, uptake of OS/RRI practices is often hindered by concerns for how they may affect career outcomes. There are, for example, concerns that they impede researchers' career progress (Wilsdon et al. 2015), and a lack of incentives and an absence of institutional support (Peter et al. 2018). This can be seen in uptake of the EU's Open Data Research Pilot in Horizon2020, where a large number of academics opted out of the pilot reporting that there was little encouragement from their affiliated institutions to invest their time and effort (European Commission. Directorate General for Research and Innovation. 2017). Previous research (Adler, Ewing, and Taylor 2009; Migheli and Ramello 2014; Rodriguez 2014; Peekhaus and Proferes 2015) has attributed this outcome to academic fear. It has been found that researchers do not believe that publishing OA will help their career, especially as there is a strong belief that "traditional" publication practices, e.g. JIF, bibliometrics, etc., are more highly valued than the alternatives, e.g. OA journals. Continuing this point, Niles et al. (2020) found that even though respondents publish in open access (OA) journals, they also think that their peers see more value in journal prestige (e.g. as measured by JIF) and bibliometrics. Attitudes towards members of promotion review committees are similar; the latter are believed to value publications in prestigious venues over OA publications. This disconnect between what individuals value and their

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<sup>3</sup> San Francisco Declaration of Research Assessment <https://sfdora.org/>

perceptions of what is valued by others has been posited as one reason for the so-called “attitude-behaviour gap” between the words and actions of researchers when it comes to actually implementing OS (Köster et al. 2021)

Within the European context, many formal working groups have considered the dimensions of OS in relation to research assessment, including the Open Science Policy Platform (Directorate-General for Research and Innovation (European Commission), Lawrence, and Mendez 2020), the Working Group on Rewards under Open Science (European Commission. Directorate General for Research and Innovation. 2017), and the Expert Group on Indicators for Researchers’ Engagement with Open Science (Directorate-General for Research and Innovation (European Commission) et al. 2019). The latter recommended a “suite of career-oriented qualitative and quantitative indicators, based on the principles of responsible metrics as formulated by the Metric Tide, the Leiden Manifesto for Research Metrics, and the DORA declaration.”

In 2018, the European University Association approved a report detailing its plan for action in relation to research assessment indicators for Open Science (‘EUA Roadmap on Research Assessment in the Transition to Open Science’ 2018) which identified priority actions including information-gathering and sharing, dialogue with universities and other stakeholders, and policy and good practice recommendations. Among the latter, the EUA noted the need for “flexible, transparent, responsible and robust approaches” which accounted for differences in disciplines and career-stages. In 2019, EUA published the results of a survey of its member institutions which found that:

“[P]ublishing research outcomes and attracting external research funding are the most important academic activities when it comes to building a university research career. A range of other activities such as research impact and knowledge transfer are also commonly, albeit to a lesser extent, acknowledged by respondents. Open Science and Access activities are the lowest ranked category and are only ‘(very) important’ at just over a third of universities, which is roughly on a par with the number of institutions who give little or even no importance to this category when evaluating researchers.” (Saenen et al. 2019)

These general findings are in line with work conducted in the North American context (Schimanski and Alperin 2018; Morales et al. 2021). As part of this work, Alperin et al. (2019) found, for example, that only 6% of PRT (promotion, review, tenure) policies mention “Open Access”, and that some of these mentions were actually negative (encouraging assessors to be cautious of the quality of OA journals). Hence, we can say that at present it seems elements of OS/RRI are not well-represented in research assessment processes within institutions. In our final section for this review of the literature, we will look at potential obstacles to reform in this regard.

### 2.3. Barriers to change

The EUA’s survey highlights several barriers to change in research assessment from the institutional point-of-view. Primary amongst these is the sheer complexity of the issue, which (as already stated) must account for differences in disciplines and career-stage, but also the various levels at which rewards and incentives can be structured, such as the level of research groups, departments, faculties, institutions, as well as (cross-)national actors like governments and research funders (Saenen et al.

2019). In addition, the fact that different countries and institutions are at different stages of OS uptake means that actions must be tailored to specific situations - it would be unfair to penalise researchers for not taking up open practices if they have thus far not had the support (in terms of training, infrastructure, etc.) to do so (Ross-Hellauer et al. 2021). Other factors identified by the EUA survey include lack of capacity, need to align policies with national or international agendas, resistance to reform from researchers or management, worries about increased costs, and lack of evidence on benefits (Saenen et al. 2019).

Nonetheless, vanguard institutions are already experimenting with reforms in research assessment for OS/RRI. Utrecht University in the Netherlands, for example, recently publicly banned use of the JIF in any of its research assessment processes and will instead emphasise indicators related to OS/RRI including publishing OA, making data openly available, and engaging in teamwork. Encouragement can be taken from the fact that this change was at least partly driven by grass-roots rejection of the JIF and quantitative indicators by researchers (Woolston 2021).

## 2.4. Summary

The prospects for the wide-spread adoption of OS/RRI practices depend, among other things, upon the degree to which researchers are incentivized to practice OS/RRI by their institutions. For most research institutions, promotion and tenure criteria provide the relevant set of guidelines in this regard. Therefore, in this section, we reviewed literature studying OS/RRI practices within research assessment criteria, identifying drivers and barriers to change.

We found that the prevalence of what have been labeled as “traditional” research PRT criteria (authorship, citations, funding) provides a major obstacle to the adoption of OS practices in research assessment criteria. Traditional criteria are predominantly quantitative, with all the well-known implications (e.g. quantitative indicators tend to be highly reactive and are easily gamed). Large parts of the research into assessment criteria is descriptive, with scant work studying the relative importance of traditional versus non-traditional research assessment criteria, a question that would involve moving beyond quantifying relative proportions of the two in promotion policies in favour of quantifying their relative impact upon concrete promotion decisions. This certainly constitutes a major gap in the literature reviewed here. With the reviewed literature concentrating predominantly on American and European academic contexts, we were able to identify another major research gap with respect to introducing OS/RRI criteria in other contexts. As of 2021, there is scant evidence available with respect to the role of research assessment criteria in incentivizing OS/RRI practices. The research presented in what follows sought to close these gaps by surveying research institutions based in Europe with respect to their promotion and tenure criteria to further our understanding of the potential for PRT criteria to foster OS/RRI practices.

## 3. Methodology

In this section, we describe the methodology used to collect and analyse data for this study, which relates to two distinct strands of research:

1. A qualitative analysis of promotion, review and tenure policy documents (PRT) from academic institutions in seven countries (Austria, Brazil, Germany, India, Portugal, UK and US)
2. An international survey targeting researchers which seeks to gauge attitudes and experience related to indicators for research activities used to assess researchers in promotion processes at academic institutions

### 3.1. Methods for analysis of institutional promotion, review and tenure policy documents

We here described the methods used to assemble and analyse PRT policy documents from academic institutions internationally. The aims of this research were to:

- Discover the most common performance indicators in institutions' PRT documents
- Examine how institutions incentivise their researchers through the use of research assessment indicators for career progression
- Identify to what extent such policies currently foster and support practices related to OS/RRI

#### 3.1.1. Sampling

To construct our sample of institutional PRT policies, we first identified seven target countries. ON-MERRIT's focus on Europe and our team's familiarity with the policy landscapes of the countries of our partner organisations meant that Austria, Germany, Portugal, and the UK were included. In addition, we included the USA as a representative of a leading research country. Including the US also allowed for a comparison with a previous related study on North American Institutions (Alperin et al. 2019). Finally, we included two large countries to be representatives of "low and middle income countries" (LMICs) based on gross national income (GNI) per capita as published by the World Bank<sup>4</sup>, namely India and Brazil. These two countries were included for their size and growing role in world research, as well as to broaden our scope to include Asia and South America. An additional factor here was the language competences of our research team.

To ensure inclusion of a representative number of institutions of high and low prestige within the selected countries, we used the Times Higher Education World University Rankings (THE WUR) 2020. Here, we grouped all institutions per selected country and sorted them based on their relative performances in the THE WUR in accordance with two categories, "Research" and "Citations". We then divided each category into three equally sized subcategories, defining them as "High-", "Medium-" and "Low-" performing institutions. Next, we calculated the median of each subcategory and selected a maximum 25% of institutions that were closest to the median (which fulfilled our minimum indicators) as representatives of this category. We included both the "Research" and "Citations" fields

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<sup>4</sup> World Bank <https://www.worldbank.org/en/home>

from the WUR since both of these are research-related indicators. However, to have a broader variety of policies, we excluded duplicate entries of the same institution appearing in both categories by replacing an institution that was already selected in the “Research” category with the next available institution from the “Citations” category.

While we are aware that the THE WUR and other similar ranking tools have been criticised on various grounds (Fauzi et al. 2020), our methodology follows the principles of quasi-random sampling, which assumes that a systematic sample including every entry from a list will be equivalent for most practical purposes to a random sample. Moreover, as our human resources only allowed reviewing a limited number of policies, this approach provides assurances that a full spectrum of institutions based on their research-intensity and perceived levels of “prestige” is included in our sample.

This resulted in a sample of 143 PRT policy documents from 7 countries and from 107 institutions (Table 1).

\* Total number of institutions sampled relative to the number of institutions listed per country in THE WUR

Country	# of institutions	# of policies	total % by institution*
Austria	6	15	54.5%
Brazil	12	13	26.1%
Germany	12	15	25.0%
India	12	12	21.4%
Portugal	6	7	46.2%
UK	24	43	24.0%
USA	35	40	20.9%

Table 1. Number of institutions per country.

### 3.1.2. Data Collection

Policy documents were collected using a shared search protocol. First, for the institutional perspective, the data collectors used the Google web search engine to search for the institution name along with various constellations of keywords. Table 2 shows the set of keywords identified and used for the policies identification in the three languages: English, German and Portuguese.

English	German	Portuguese
Policy	Satzung, Richtlinie, Verfahren	Política, Regulamento
Review	Qualifikationsprüfung, Review, Beurteilung, Leistungsevaluation, Regelung, Richtlinie, Strategie	revisão
Academic, Researcher, Professor	wissenschaftliche Mitarbeiter, (Junior-) Professor	académico, universitário, investigador, professor

Promotion	Beförderung, Promotion, Berufung	promoção
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Table 2. Search key terms in English, German and Portuguese to retrieve related PRT policies.

To ensure uniformity, strict inclusion/exclusion indicators were applied. Institutions often have both institution-wide and departmental-specific PRT policies. Due to difficulties in identifying specific departmental policies in the UK and USA (not all institutions had policies online), we collected only institution-level policies. To ensure a consistent set of policies, we defined the following exclusion rules:

1. We did not collect advertisements for job descriptions even though these could include some insightful requirements applicable to the PRT policies
2. We included PRT policies only and not other policies such as Ethics, Diversity, OA where similar concepts could appear

Policies could apply to any post-PhD researcher career stage. The collected policies evaluated various research-related positions. For example, in the UK, some institutions have separate policies for 1) associate professors, 2) full professors, and 3) readers. In the USA, there are separate policies for 1) tenured and 2) non-tenured staff. In Austria, there are policies for 1) habilitation (qualification for teaching, needed for promotion to professor) and 2) qualification agreements for tenure track (associate professors), while no promotion to full professors exists. In India, we could often not find specific policies, but rather the evaluation forms that researchers use to apply for promotion. In these cases, we therefore analyse the evaluation forms instead.

Some institutions have separate policies for all researcher categories, (i.e., separate policies for lecturers, assistant professors, associate professors, professors, and so on), while others have a uniform policy covering all positions. Hence, our number of institutions is smaller than the total number of policies collected (Table 1). Where more than one policy was identified for an institution, we assessed the indicators separately for each policy.

In line with the protocol described above, we were sometimes unable to obtain policy documents for target institutions. Specifically, where an institution did not have a public PRT policy available on their websites, or where access was restricted to members of the institution, data collectors would email the institution's human resources department to ask for a copy of the policy. If no response was received within ten days, data collectors would record this information and sample the next institution from the list for that country and strata until a sufficient number of policies was obtained. Table 3 below shows the institutions that did not have a public policy per country.

Country	# of institutions with no policy	total # of institutions checked
Austria	4	10
Brazil	8	20
Germany	5	17
India	28	30
Portugal	0	6
UK	32	56
USA	6	41

Table 3. Total number of institutions we checked with no policy.

An initial round of document collection occurred during the period November 2019 to March 2020. The sample was then further extended between March and April 2021. More policies were added during that second period in an effort to make our sample and the collected data more robust.

All policy pdfs were downloaded and stored in a secure, shared cloud folder using a standardised naming structure.

### 3.1.3. Data charting

Data was extracted from the policies using a standard data-charting form. The data collectors iteratively extended to include all relevant indicators the data-charting form in the early stages of research. The team identified key indicators for inclusion from various sources including the MoRRI indicators (MoRRI, 2018), a group of studies performed in the North American context by Alperin et al. (2019), as well others identified as important from the surveyed literature (see Section 2). As a result, we collected and examined 18 different indicators (Table 4). These include "traditional" assessment indicators relating to quantification and quality of publications, and a set of "alternative" indicators relating to OS/RRI, and related issues such as gender equality and Citizen Science.

Traditional	Definition	Alternative	Definition
Impact	societal or economic impact in general	Gender equality	gender equality (or equivalent process)
Impact within industry	interactions with industry	Gender reviewers	gender of reviewers considered
Software	contributions to scientific software	Gender balance reviewers	gender balance for reviewers/committees
Journal metrics	journal based metrics, e.g. impact factor, journal ranking quartiles	Citizen science	citizen science activities
Citations	citations (person-based metrics: h-index, number of citations etc)	Impact in public engagement	impact in public engagement

Number of publications	number of publications and/or publication list (quantity)		Impact with policy makers	impact in interactions with policy makers
Publication quality	an attempt to review quality instead of quantity of publications, i.e. a request for key publications, writing samples, etc.		Open access	open access publishing
Peer review	peer review and editor activities		Open data	data publication and/or sharing
Pastoral work	conference organisation, participation in PhD committees or other community services			
Patents	patenting discoveries/inventions			

Table 4. Indicators examined from the collected PRT policies.

Data collectors then applied this data-charting form to each policy document. In total, five team-members were involved in data collection: two from Austria, one from Germany, one from Portugal and one from the UK.<sup>5</sup> Policies were assigned based on language competences. The task leader hosted initial meetings with each researcher to provide them with in-depth instructions on how to collect the data (Annex A). Through these and regular intercoder meetings, coders achieved consensus understanding on how to apply numerical indications for the presence or absence of each indicator in each policy (1 for present, 0 for absent), as well as what text should be extracted into the quotation field to support that indication. Where an indicator was not present, the respective field was left blank.

One coder collected data from each document. Therefore, once data-collection was complete, a quality-assurance process was undertaken to assess intercoder reliability. Here, a team member<sup>6</sup> who had not been involved in the initial coding process, performed a reviewer audit of a random sample of ten percent of the overall total number of institutions. Comparing this second round of review to the first responses revealed a high intercoder-reliability of 96.78%.

### 3.2. Qualitative and quantitative academic survey

We next present the methods used to conduct our second strand of research, an international survey of active researchers. The aim of the survey was to study researchers' understanding of their institutions' current PRT policies and to compare this with their own perceived priorities in research assessment.

<sup>5</sup> Austria: Hannah Metzler and Thomas Klebel, Germany: Helene Brinken, Portugal and Brazil: Antonia Correia, UK, USA and India: Nancy Pontika

<sup>6</sup> Tony Ross-Hellauer

### 3.2.1. Sample construction

Our target audience was active researchers across research domains (i.e. those who published a research paper within 2014 - 2020) internationally, including those associated with the institutions of the seven countries analysed in the PRT document analysis.

The survey sample was constructed using the CORE dataset<sup>7</sup>. CORE is a worldwide aggregator of OA content from repositories and journals. We used the CORE dataset to extract email addresses of first authors who published research papers in the period from 2014 to 2020 from research manuscripts. A total of 16,500 email addresses were collected, which formed the survey sample.

### 3.2.2. Survey instrument

The survey was divided into eight discrete sections:

1. **Participant information sheet and consent:** informed the participants about the survey and the conditions under which they would be filling in the survey (see section 3.2.4.)
2. **Current research status:** contained one “stop” question: “Are you conducting research as part of a contract at a higher education institution?” Only those who answered “yes” to this question were invited to continue with the survey. Those who answered “no” were thanked for their time and excluded from the survey
3. **Institutional context:** with a combination of 6 open-ended and closed-ended questions, this section aimed to understand participants' institutional context as well as their familiarity with their employers' promotion policies in relation to research
4. **Organisational policies:** targeted the organisation's research assessment policies that apply to the participants' current career stage
5. **Attitudes to research assessment and promotion decisions:** asked what participants felt should be valued in research assessment in the context of promotion decisions
6. **Practices:** questions designed to understand participants' personal practices with regards to Open Science/RRI activities which could be taken into account in assessing research contributions
7. **Demographics:** sought basic demographic information
8. **Final question:** open-ended question inviting participants to add any further thoughts relating to the survey

The survey was in English and included 15 closed-ended and 16 open-ended questions, out of which three were follow up questions. To discover the estimated completion time for the survey, we used a method that was described in the Vesta Research Newsletter<sup>8</sup>. According to it, each question in a grid should take 1 point, an open-ended question three points, and every short and simple question one point. The sum should then be divided by eight. In our case, the total estimated time was 10.46 minutes. To account for some variation between participants, the estimated completion time for the

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<sup>7</sup> CORE Dataset <https://core.ac.uk/services/dataset>

<sup>8</sup> How to estimate the length of a survey - Versta Research Newsletter, 2011.  
<https://verstaresearch.com/newsletters/how-to-estimate-the-length-of-a-survey/>

survey was 10 and 15 minutes. All participants filled in the survey via an individualised token url, which ensured the anonymity of the data.

### 3.2.3. Ethics and informed consent

The survey participants read an introductory text informing them about the survey goals and providing background to the ON-MERRIT project. Following this, participants were asked for their Immediately informed consent. This included the following points:

1. Participation in the study was voluntary.
2. Participants were free to withdraw at any time.
3. Anonymised data would be used to create public research articles, books, reports, presentations and other forms of research dissemination.
4. Obtained explicit participant consent to participate in the survey.
5. Contact details (email address) of the survey lead for any questions or feedback.

### 3.2.4. Pre-testing of the survey

Pre-testing of the survey took place in May/June 2021. Feedback was received from a total of eleven people; eight provided their feedback via the project's Google form. One professor, external to the project, provided feedback via email. Cognitive interviews were conducted with two further doctoral students. Based on this feedback, revisions were then made to streamline the survey and make it more understandable.

### 3.2.5. Process and timeline

The survey was imported into the LimeSurvey tool hosted by the Know-Center, in accordance with the ON-MERRIT Data Management Plan<sup>9</sup>. All survey participants received an email invitation via MailChimp with an individualised token to ensure participant anonymity (Limesurvey would match a participants' name with a token behind the scenes, thus the name would never be used by the researchers). The survey was sent out on Tuesday 29th June 2021. Three periodic reminders were then sent on 6th, 13th and 20th of July to those who had not yet completed the survey. The survey was then closed on Friday 30th July.

The survey was originally sent out to 16,500 email addresses, of which 2,536 emails were returned as undelivered. This was expected, as many authors likely moved to new jobs and changed their email address. From the remaining 13,964 emails, 2501 email recipients were unsubscribed from receiving emails. In the end, the survey email reached 11,463 participants and the total response rate was 2.81% (n=323). Of these, 40 respondents indicated they were not active researchers and were excluded, while 83 responses were left incomplete. We hence consider 200 complete responses for our analysis.

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<sup>9</sup> ON-MERRIT Data Management Plan <https://zenodo.org/record/3733238#.YVLdDEbMLGI>

## 4. Results (1): Analysis of institutional promotion, review and tenure documents in seven countries

We first present the findings of our review of 143 promotion, review and tenure (PRT) documents from 107 research institutions in seven countries (Austria, Brazil, Germany, India, Portugal, UK and US) for a range of (traditional and non-traditional) indicators.

Looking first at the big-picture, Figure 1 shows wide variation in overall levels of frequency of each indicator across all institutions in our sample. The most frequent indicator is the service to the professional community (71% of all institutions), followed by the number of publications (49%), and indicators referring to the broader concept of impact (46%). Interestingly, publication quality was strongly mentioned (42%).

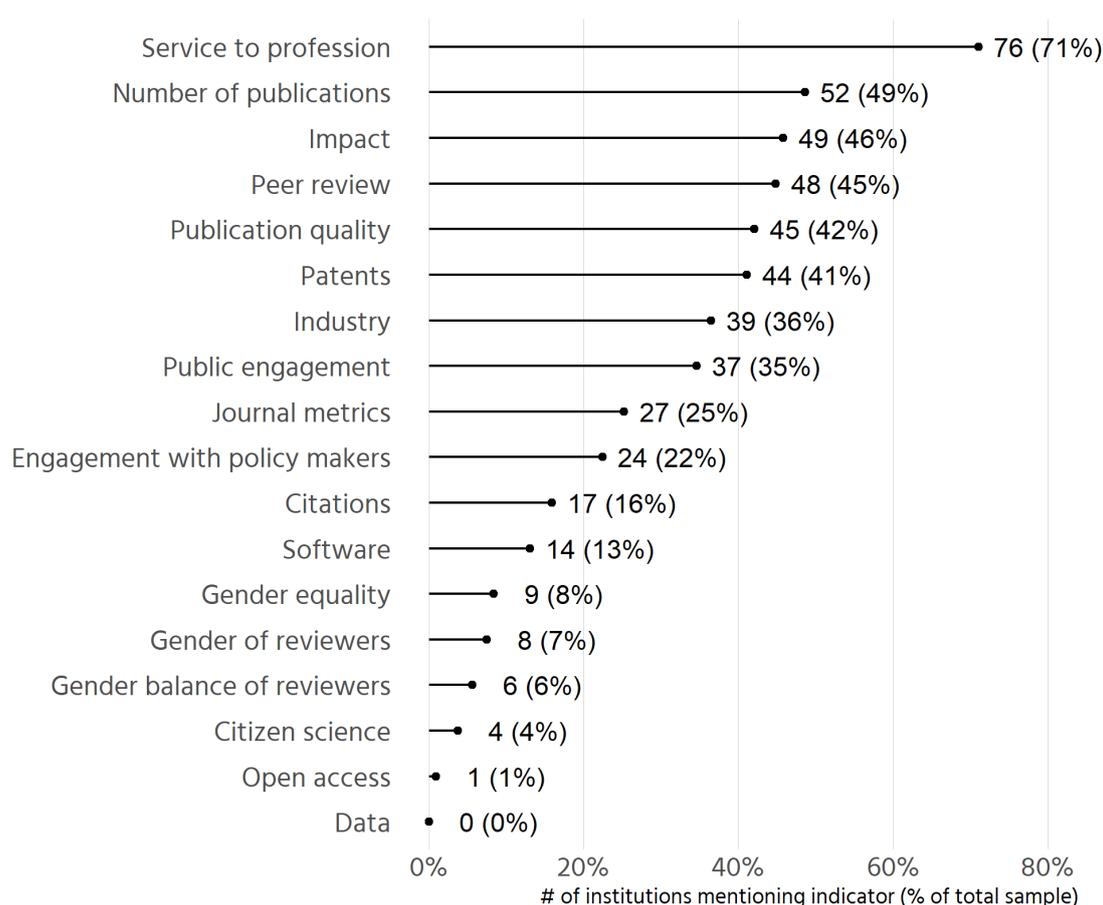


Figure 1. Overall prevalence of indicators across all institutions/countries.

In line with expectations, indicators or criteria relating to OS were very rare, especially in the case of the former. We discovered no mentions of sharing of scientific data, while open access publishing was mentioned by only one institution. Creation of scientific software was quite well represented (13% of cases), however as we shall see below (Figure 3) this is mostly due to its prevalence in policies in Brazil (where it is mentioned at 75% of institutions). The picture concerning RRI elements is slightly more encouraging, as the RRI-related aspects of public engagement (35%) and engagement with policy-makers (22%) were relatively well-represented. However, issues relating to gender were mentioned only in between 6 to 8% of cases.

Worryingly, however, specific mention of journal metrics (such as the JIF, see section 2.1) was made in the policies of 25% of institutions.

#### 4.1. Country comparison

When comparing countries, we found distinct differences. The absolute number of indicators per country of course varies since we sampled more institutions for some countries than for others. However, also the relative number of indicators varies considerably (Table 5). While about one third of the analysed indicators were identified in policies in Austria, Brazil, Germany and Portugal, we detected about 28% of these indicators in the policies from the UK, only 20% in the USA, and 16% in India. The low number in India may reflect the nature of the documents examined in that case, where assessment forms were also analysed as few institutions had official policy documents (see Table 3 and section 3.1.2).

Country	# of universities	# of indicators	# of indicators found	% of all possible indicators
Austria	6	18	33	31%
Brazil	12	18	72	33%
Germany	12	18	71	33%
United Kingdom	24	18	122	28%
India	12	18	35	16%
Portugal	6	18	35	32%
United States	35	18	132	21%

*Table 5. Number and percentage of indicators discovered per country.*

Regarding the prevalence of the various indicators, we found considerable differences between countries (Figures 2 & 3). All Portuguese PRT policies mention public engagement, while this indicator occurred only once in India (8% of institutions analysed) and Austria (17%) and six times in the USA (17%). Mentions of patents are largely absent for the United Kingdom (4%, n=1 university), but present in at least a third of each other countries' institutions. Similarly, service to the profession is a ubiquitous concept in the United Kingdom and Brazil (where all policies mention it), but quite uncommon in Austria and Germany. In contrast, gender equality is explicitly mentioned in many of the PRT policies we sampled from Austria (67%, n=4) and Germany (42%, n=5), but nowhere else. In Germany and Austria, institutions frequently request a full list of publications to be submitted to the

promotion committee. It is possible that acquiring a full list of a candidate’s publications is common practice in other countries too, but through automated processes, such as querying institutional repositories or research management information systems.

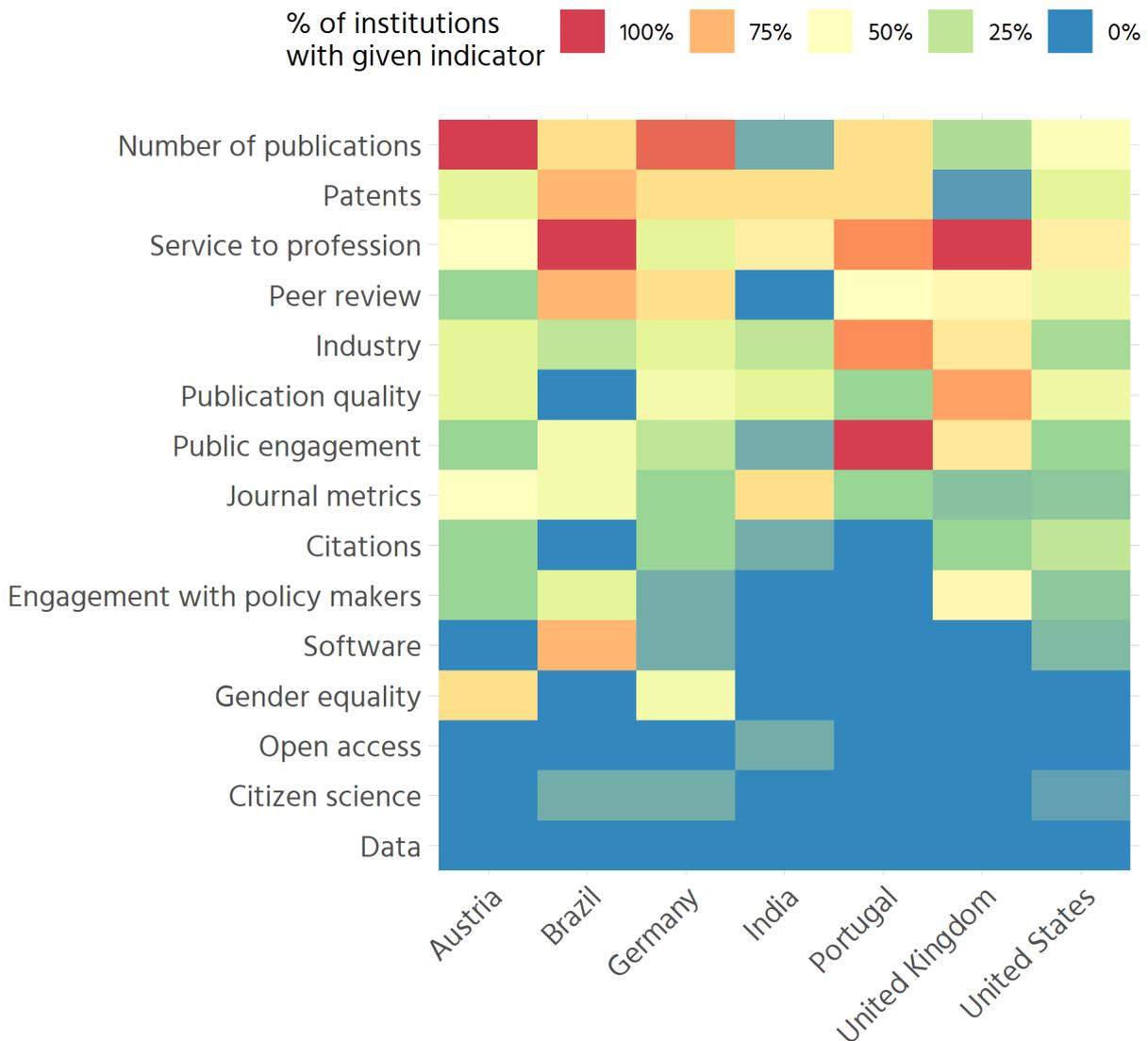


Figure 2. Prevalence of indicators per country.

As discussed in the Methods section above (section 3.1.2), India is a special case. Contrary to all other countries, we found no evidence of PRT policies referring to peer review activities as a criterion for promotion, and few cases that refer to the number of publications a given researcher has produced. Furthermore, mentions of journal metrics were rather common in the PRT policies sampled from India (67%, n=8), while less common among the other countries.

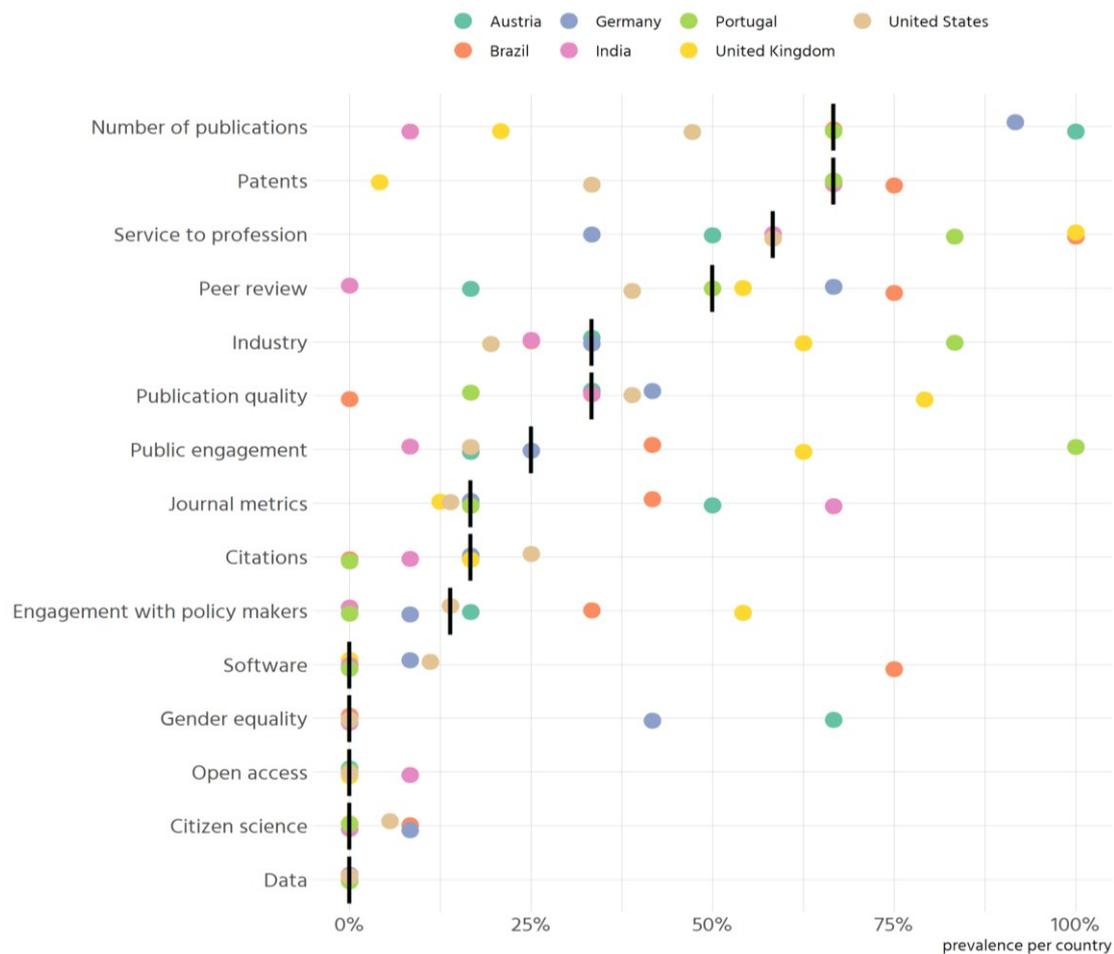


Figure 3. Average prevalence of indicators per country. The black horizontal line represents the median.

## 4.2. Relationship between indicators

To assess whether and how the different indicators are related to one another, we used correlation matrices and principal component analysis (PCA). Figure 4 shows the correlations between all indicators across the whole sample. Interrelationships are generally low, except for a few cases. In line with the finding that gender policies are common in Austria and Germany but nowhere else, we find strong positive correlations between the three indicators pertaining to gender (whether the gender of the candidate is considered, whether the gender of reviewers is considered, and whether the gender of the reviewers has to be balanced). Similarly, we find moderate positive correlations between the indicators pertaining to specific types of impact (on policy-makers, industry, or the public).

Negative correlations between indicators are less common than positive ones, with the strongest negative correlation (-.24) being between “Service to the profession” and “Gender Equality”. This likely represents a difference between countries, since service to the profession is least common in Austria and Germany, whereas these are the only countries where policies mention gender equality.

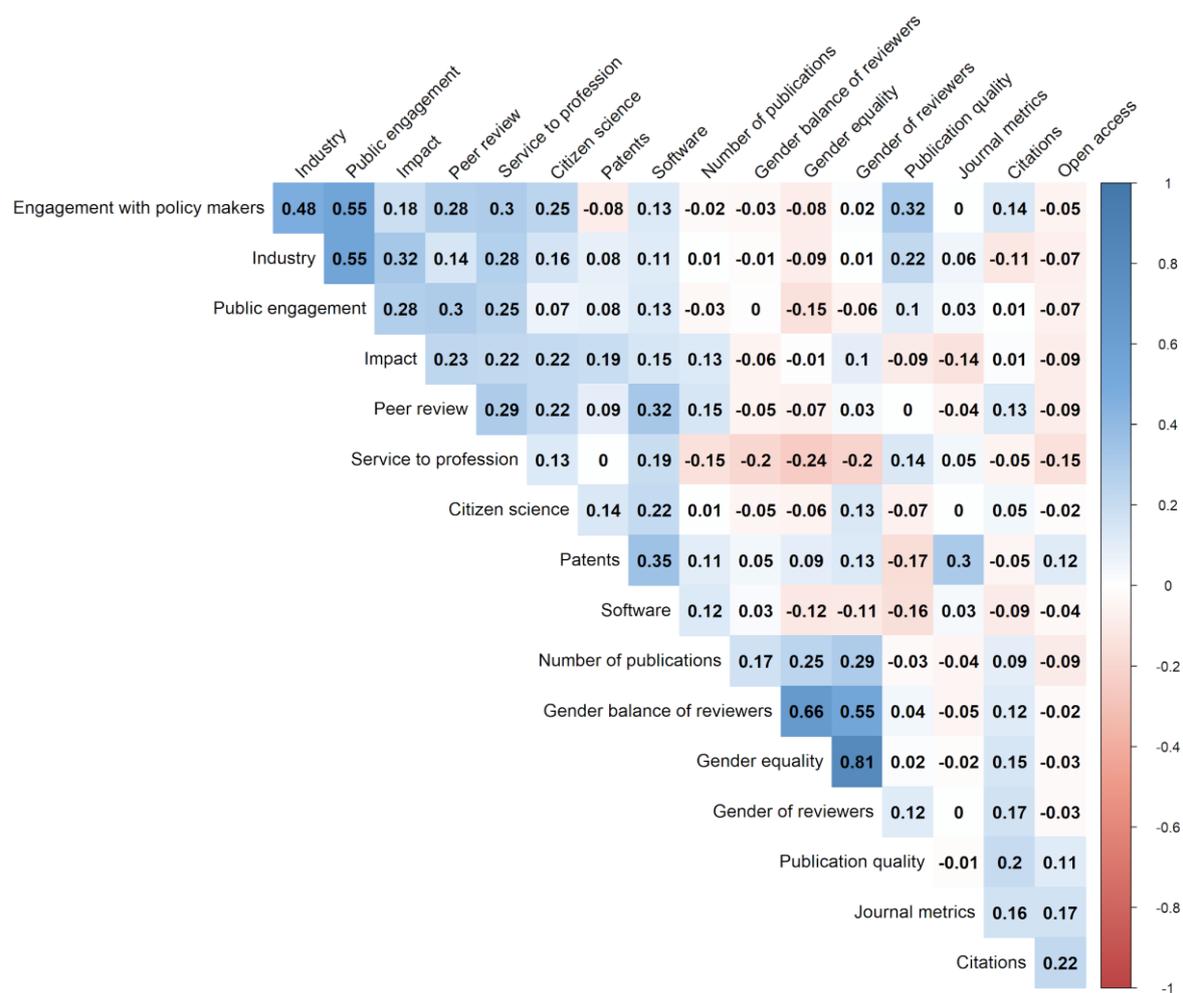


Figure 4. Correlation matrix (Pearson) of indicators.

To limit confounding from different traditions of evaluating researchers in the countries sampled, Figure 5 depicts the correlations between indicators for US universities only<sup>10</sup>. The number of indicators here is lower, since some (like the ones related to gender) were not found at all in that country. Overall correlations are positive for most cases and follow the same direction. Generally speaking, some correlations tend to be stronger, for example the linkage between peer review and service to the profession, as well as between journal metrics and engagement with policy makers. Nonetheless, the general picture remains unchanged.

A further way to investigate the relationship between the indicators is via PCA, which tries to represent the relationship between the variables with “principal components” that reduce the complexity of the original relationships. Results from the parallel test and the scree plot indicate that a solution with four principal components would be best suited (see Figure A1 in the Annex).

<sup>10</sup> We do not calculate correlations for indicators in other countries since we deem the sample size to be too low.

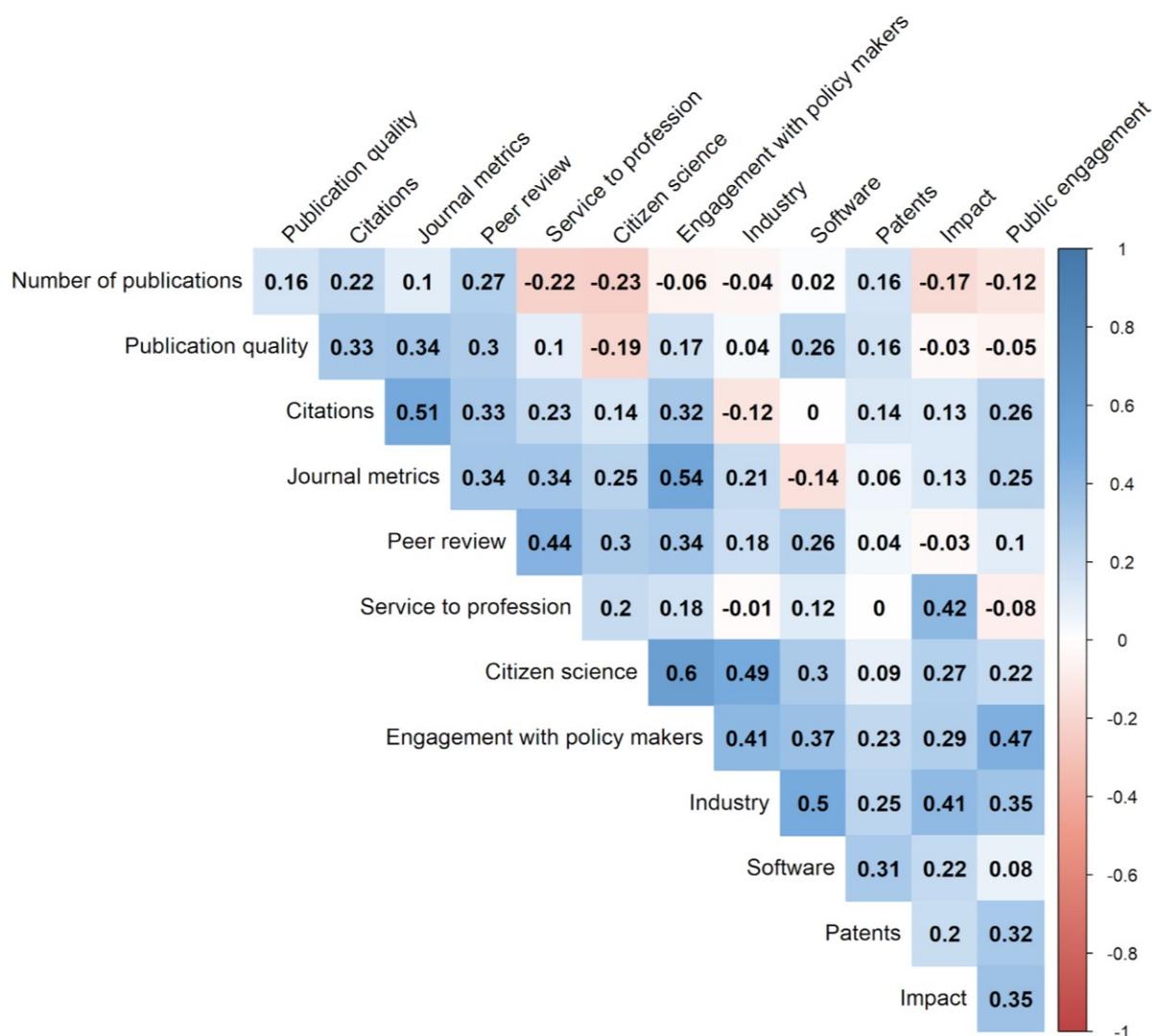


Figure 5. Correlation matrix (Pearson) of indicators (USA only).

Table 6 displays the results of a principal component analysis of all promotion indicators. The solution is able to explain 52% of the total variance, which means that about half of the interrelationships between the indicators are represented in the model, with the other half being treated as random error. The first component (RC1) mainly refers to indicators related to the concept of impact, such as engagement with policy makers, the public, or industry, but also includes service to the profession. The second component (RC2) has strong loadings with the gender dimension, along with the number of publications, but a negative association with service to the profession (as the correlation analysis already indicated). The third component (RC3) is mainly related to patenting and production of software, with a strong negative association with publication quality. The fourth component (RC4) is mainly related to journal metrics and OA publishing, with a weaker association with citations.

Indicators with low communality values are not well represented by the solution, which is the case for citizen science and the number of publications. Items with high values in item complexity on the other hand are not well represented by any *single* component. This is the case for general impact and publication quality. We can interpret this to mean that these two indicators are cross-cutting in their nature and are not exclusively related to any of the components.

Indicator	RC1	RC2	RC3	RC4	communality	item complexity
Engagement with policy makers	0.81				0.68	1.0
Public engagement	0.74				0.56	1.0
Industry	0.73				0.54	1.0
Service to profession	0.52	-0.31			0.39	1.8
Peer review	0.46		0.39		0.37	2.0
Impact	0.42		0.38	-0.23	0.39	2.7
Gender equality		0.90			0.83	1.0
Gender of reviewers		0.89			0.80	1.0
Gender balance of reviewers		0.77			0.60	1.0
Number of publications		0.45	0.25		0.28	1.7
Patents			0.72	0.32	0.63	1.4
Software			0.70		0.51	1.1
Publication quality	0.42		-0.52	0.30	0.55	2.6
Citizen science	0.29		0.39		0.24	1.9
Open access				0.68	0.49	1.1
Journal metrics			0.23	0.68	0.52	1.3
Citations		0.23		0.56	0.41	1.6

Table 6. Principal component analysis of promotion indicators (varimax rotation, only loadings above 0.2 shown).

### 4.3. Comparison with university ranking

We also compared the prevalence of certain indicators within a university's ranking from the THE WUR list. Institutions were sampled based on three ranking categories (high, medium, low) within the research and citation rankings. Figure 6 displays the proportion of institutions within a given tier across both research and citation ranking. Overall, there is no clear pattern, but differences exist between different tiers for some of the indicators. For instance, the indicator "impact" follows the institutional hierarchy, with higher ranked institutions mentioning impact more frequently. The indicator of peer reviewing is much less common in higher ranked institutions than in medium or low ranked institutions, whereas efforts to assess publication quality are more common at higher ranked institutions and least common at middle ranked institutions.

Another perspective is the correlation between citation and research rankings, and their different indicators (Figures 7 & 8). Here, the correlations are generally low, which corresponds to the findings from Figure 6. Notable is the moderate negative correlation between the research ranking of US-based institutions and whether they consider peer review activities in their policies, while the correlation with the citation-based ranking is much lower.

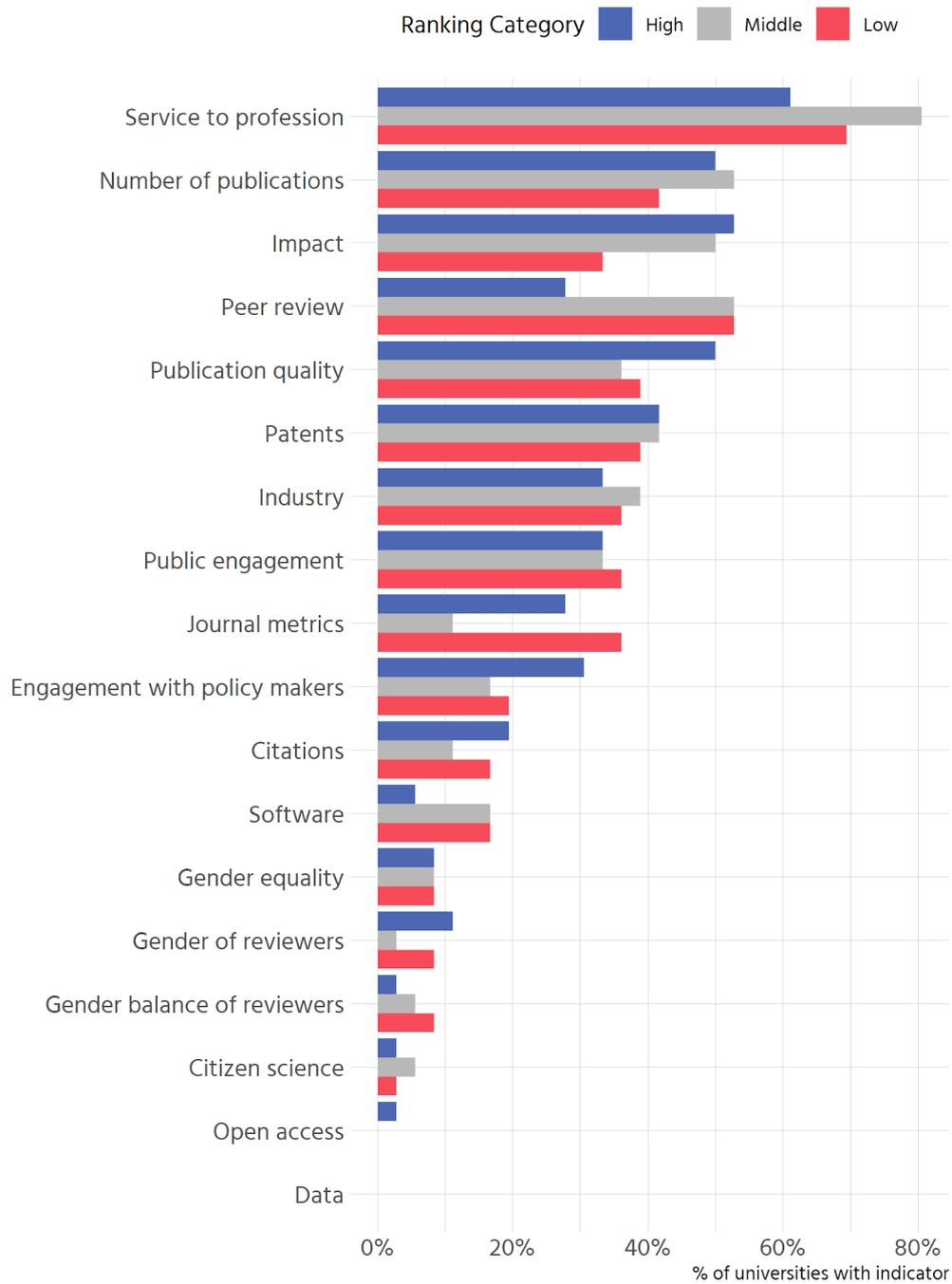


Figure 6. Indicators versus university ranking.

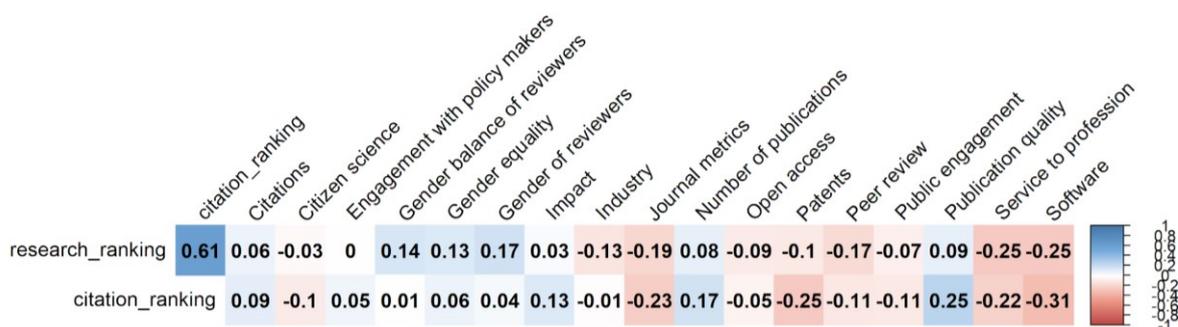


Figure 7. Correlation between rankings and indicators.

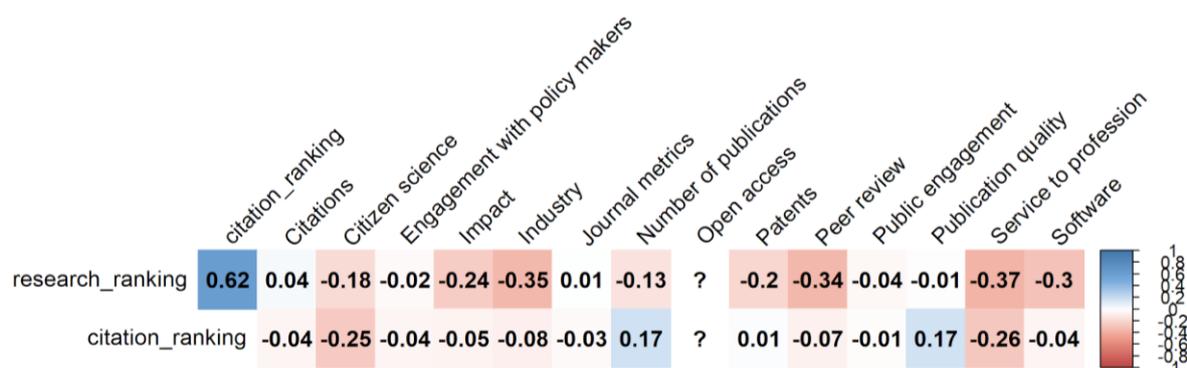


Figure 8. Correlation between rankings and indicators (USA only).

#### 4.4. Policy analysis findings summary

Our analysis of PRT policies shows that more traditional indicators such as "service to the profession", "number of publications" or "impact" are much more common than indicators related to the concepts of OS or RRI. The prevalence of indicators differs substantially across countries, with indicators referring to engagement with "industry" and the "public" being most common in Portugal, and indicators for gender equality common in Austria and Germany, but not anywhere else. The analysis thus paints a multi-faceted picture of PRT policies across the globe. The current state of PRT policies is likely the product of country-specific idiosyncrasies, diverging evaluation cultures and individual institutional policies. Our results further suggest that certain types of indicators commonly appear together in PRT policies. Policies that refer to the dimensions of wider societal impact (interaction with policy-makers, industry, or the general public) tend to mention more than one of them. Similarly, mentions of gender equality are only present in Austria and Germany, where in turn mentions of service to the profession are less common.

Relationships between the presence or absence of specific indicators and an institution's citation ranking are weak. For the USA, we found a weak positive relationship (.17) between an institution's citation ranking and the presence of indicators on the number of publications and publication quality. Conversely, citizen science (-.25) and service to the profession (-.26) are less common among institutions ranked higher in terms of citations. These findings suggest that there is only a weak link between an institution's impact and its PRT-policies.

In line with previous findings (Rice et al. 2020), we found only rare mentions of alternative indicators in our data, such as Open Access publications, data sharing or contributions to scientific software. Despite recurring calls for revised PRT criteria (Cagan 2013), such criteria have not found their way into many policies yet. It would be timely for universities to move away from traditional indicators, embracing alternative approaches that put more emphasis on aspects of scholarly practice that promise to foster research integrity, transparency, and engagement with a wider range of stakeholders.

## 5. Results (2): International survey of research assessment experiences and attitudes amongst current researchers

We next report the results of our international survey of researchers which sought to gauge attitudes and experience related to indicators for research activities used to assess researchers in promotion processes at academic institutions (see methods presented in section 3.2).

Survey responses were collected from 29th June 2021 to 30th July 2021, during which time a total of 323 responses were received. Of these responses, 40 answered an initial stop question to indicate that they were not currently active researchers “conducting research as part of a contract at a higher education institution”. As our survey only targeted active researchers, these respondents were thanked for their time and excluded from the survey. A further 83 respondents did not fully complete the survey, and their contributions are excluded from our analysis. We therefore consider  $N=200$  responses for our analysis. (The notation for the analysed sample size will be the capital “ $N$ ”, e.g.  $N=200$ . A lowercase “ $n$ ” will be used to denote a specific size within a sample, e.g.  $n=90$ .)

### 5.1. Demographics

Respondents came from a wide range of countries around the world (top 15 responses in Figure 9). The top five locations were: United Kingdom (UK) (16.6%,  $n=33$ ), United States (USA) (11.6%,  $n=23$ ), Italy (10.6%,  $n=21$ ), Netherlands (6%,  $n=12$ ), and Sweden (5.5%,  $n=11$ ).

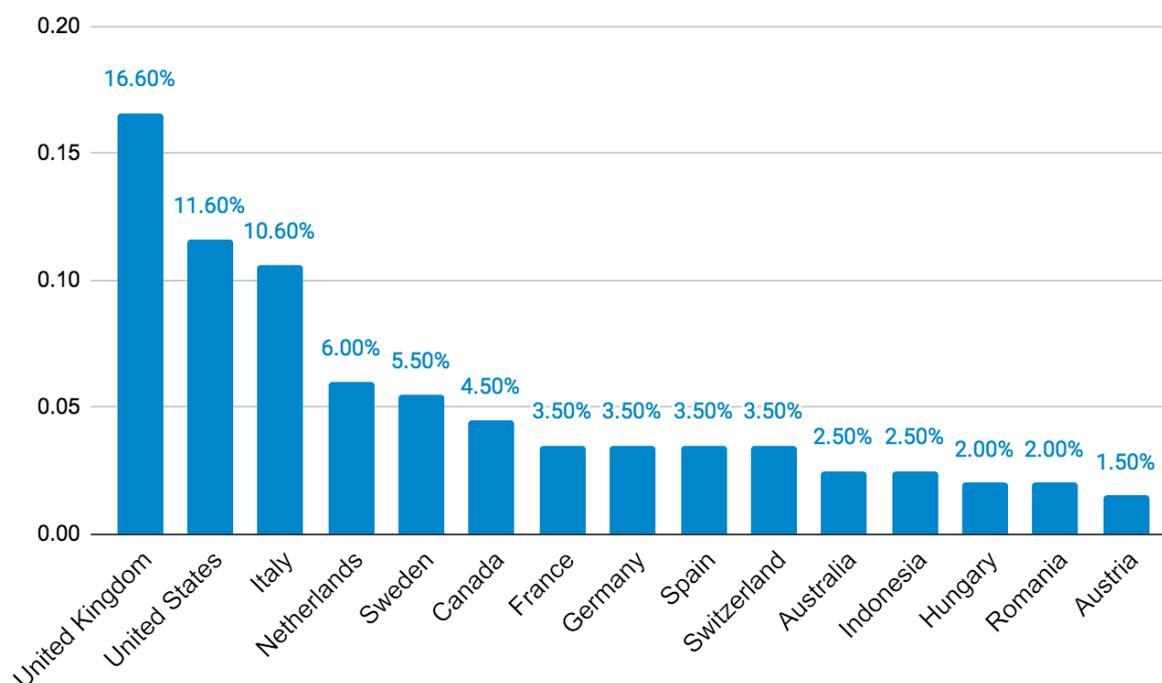


Figure 9. Countries of respondents affiliated institutions ( $N=200$ ).

We invited 1,828 authors with an email address affiliated with a UK institution to the survey and 1,765 authors with one affiliated to a US-based institution. As seen in Figure 9, a higher percentage of responses was received from UK authors (16.6%, n=34 from the UK and 11.6%, n=24 from the USA). One possible explanation could be that currently the UK has more OA funder policies connected to national funders, impacting a larger number of researchers, who saw a connection between the topic of this research and their current working experiences. Another possible explanation could be that the survey organiser was from the UK and the survey invitation was sent out by a UK email address.

Regarding gender, the majority of respondents were male (70.9%, n=141), with a proportion of female respondents just under 30% (28%, n=56). The three remaining respondents indicated “Prefer not to say”. None indicated “Non-binary”

Respondents were generally from more senior roles (Figure 10), with the most popular role being “Professor” (41.2%, n=82), followed by “Senior Lecturer, Associate Professor, Senior Researcher” (36.2%, n=72) and “Lecturer, Assistant Professor, Research Fellow (14.6%, n=29). We received responses from a few “Post-doctoral researchers” (4%, n=8) and “Doctoral researchers” (2.5%, n=5). This skewed composition towards more senior researchers is possibly an artefact of our sampling strategy, wherein email addresses of corresponding authors were harvested from Open Access papers in the CORE database (see section 3.2.1), since more senior authors likely have more papers within that set.

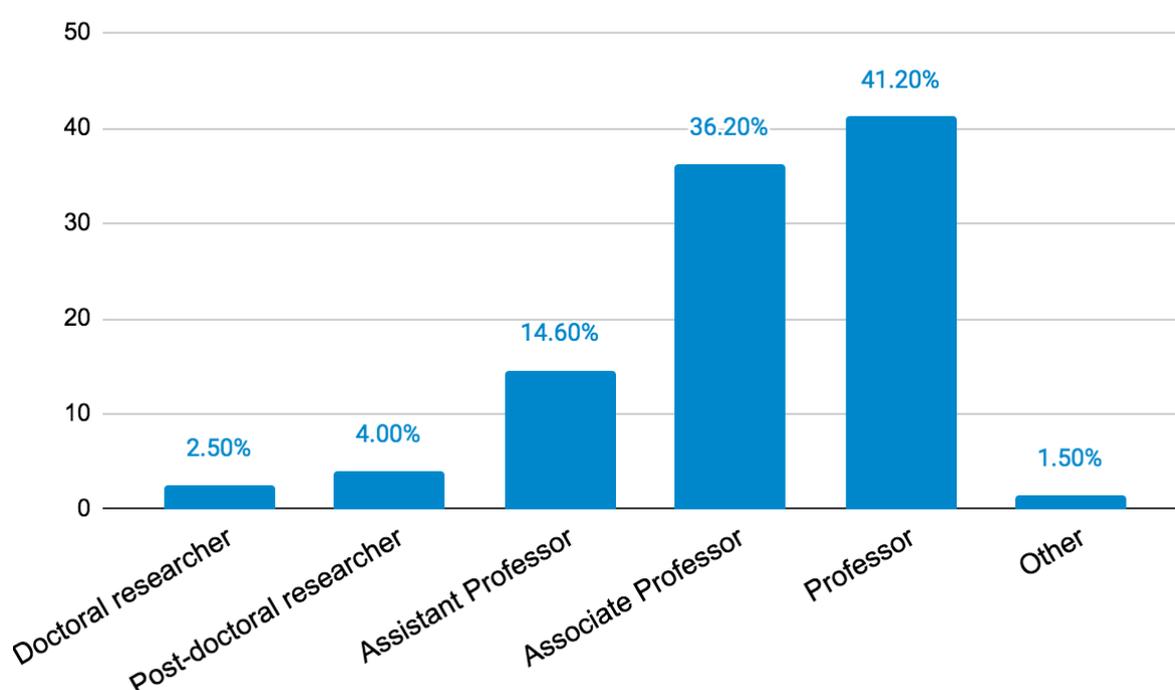


Figure 10. Respondents' academic role (N=200).

Next, respondents were asked to classify the institution for which they worked as either research-intensive, teaching-intensive or both. The majority indicated their affiliated institutions were “Both

research and teaching intensive” (59.3%, n=118), while just under a quarter answered “Research intensive” (24.1%, n=48), and the remainder “Teaching intensive” (11.6%, n=23).

Regarding disciplines (Figure 11), we received responses from academics covering a wide variety of academic fields, with most respondents working in Health (10.6%, n=21), followed by Computer Science (10.1%, n=20), Biology (8%, n=16), Engineering (7.5%, n=15), Medicine (7.5%, n=15), Environmental Sciences (7%, n=14). Unfortunately, only low numbers of participants came from Humanities and Social Sciences fields, such as Archaeology (1.0%, n=2), History (1.0%, n=2), Philosophy (1.0%, n=2) and Sociology (1.0%, n=2).

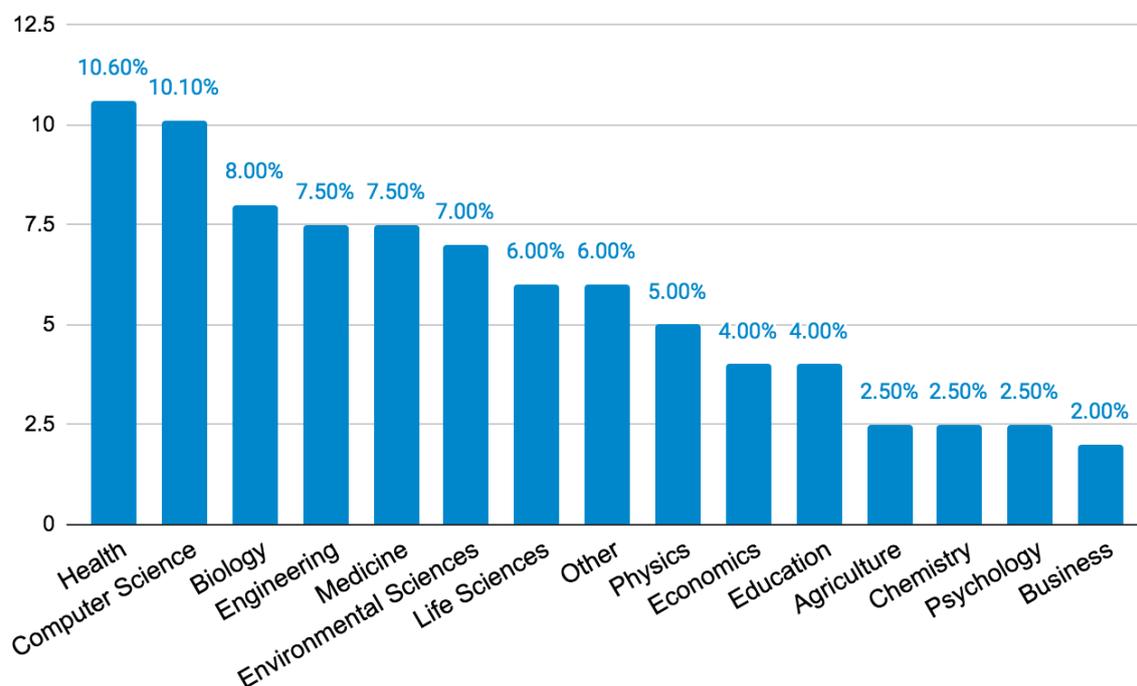


Figure 11. Respondents subject field (N=200).

Based on the above, we conclude that our sample is somewhat skewed in favour of male, senior academics from STEM subjects.

## 5.2. Institutional context

We next sought to better understand the institutional context of our respondents through a series of questions examining their current career intentions and knowledge of their institution’s policies. The overwhelming majority of respondents had permanent contracts (79.9%, n=159) and saw themselves working at the same institution in five years (73.9%, n=147) (Figure 12). Asked whether they intended to apply for promotion within the next five years (Figure 13), more respondents (41.7%, n=83) said that they intended to do so than said they did not (31.7%, n=63).

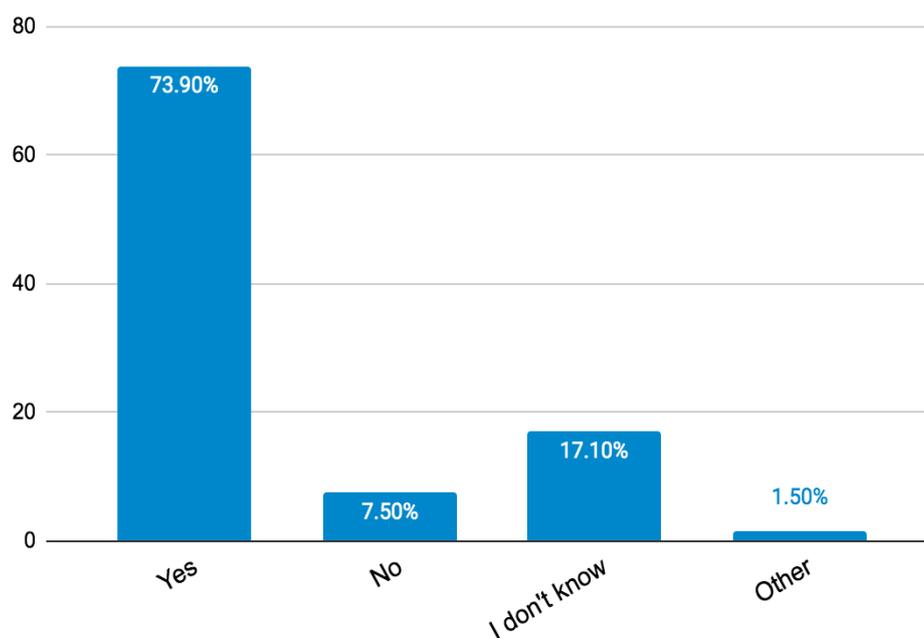


Figure 12. Respondents who said they would work at the same institution in 5 years (N=200).

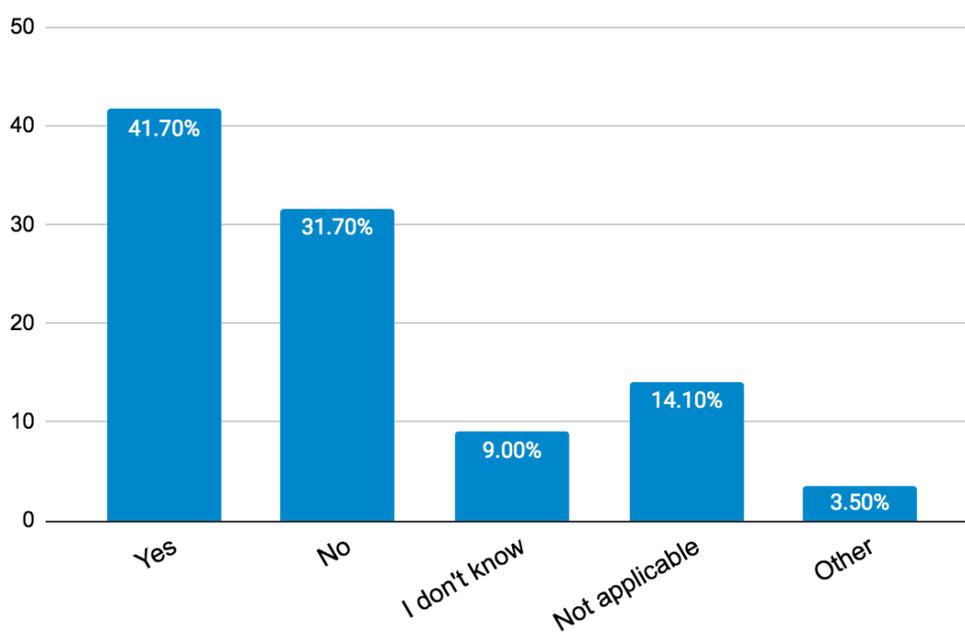


Figure 13. Respondents who said they would apply for a promotion within the next five years (N=200).

Survey respondents were asked to answer questions relating to their familiarity with the promotion, review and tenure policies at their institution next.

Asked whether they know where to find the promotion policy relevant to their current career stage as a researcher (e.g. institution's website, intranet or handbook), the vast majority indicated that they could, with (38.2%, n=76) choosing "Agree" and a similar number (36.2%, n=72) "Completely Agree" (Figure 14).

The next question asked respondents' agreement with the statement "I am familiar with the promotion policy that applies to my current career stage". Again, levels of knowledge were reported as very high, with 73.9% in agreement (37.7%, n=75 "Completely agree" and 36.2%, n=72 "Agree" ) (Figure 14).

In summary, we can say that the majority of the survey participants had a permanent contract and planned to work at the same institution within the next 5 years. Most intended to apply for promotion within the next five years (although almost a third indicated they did not, reflecting the seniority of our sample). In addition, they knew where to find the policies at their own institution and could locate the relevant ones to their career stage. Hence, it is fair to say that our sample is highly motivated and knowledgeable regarding promotion processes at their institutions.

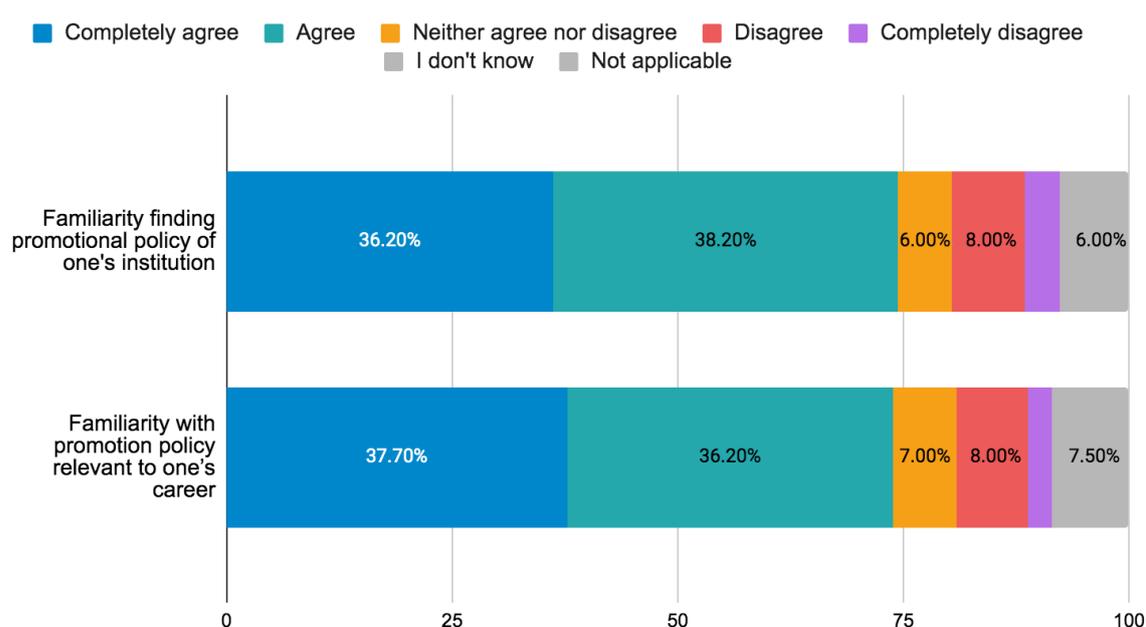


Figure 14. Familiarity with finding the promotional policy of one's institution and relevant to one's career (N=200).

### 5.3. Institutional policies and researcher attitudes towards research assessment criteria in promotion decisions

With the next group of questions, we sought to: (1) gauge researchers' perceptions of the extent to which a range of criteria were important within their institutions in promotion, review and tenure processes, (2) gauge how important researchers themselves thought these criteria should be, and (3) understand differences between these institutional and personal priorities in research assessment.

The first question of this group, "Organisational attitudes", asked respondents to rate the importance of a series of activities in making promotion decisions in relation to their current career stage on a scale from "Very important" to "Very unimportant" (Figure 15).

Respondents signalled that most criteria were important (sum of "very important" and "somewhat important") in the stated policies of their institutions when making promotion decisions, with 13 of 19 indicators rated as such by more than 50% of respondents, and only two (sharing research data

and code) rated as unimportant by more respondents than thought them important. The most important factors were, in line with the literature (section 2), generating funding (89.5% very/somewhat important), leading projects (84.5% very/somewhat important), and generating high-quality publications (83.4% very/somewhat important). However, other elements linked to questionable practices identified in Section 2 were also dominant, with publishing in highly-regarded conferences and journals (81.4% very/somewhat important) and publishing large numbers of articles (80.4% very/somewhat important) also indicated as important by more than four fifths of respondents.

Criteria relating to Open Science practices, on the other hand, are not considered important to a large extent. Here, publishing Open Access (32% very/somewhat important), sharing Open Data (26.6% very/somewhat important) and sharing research Code (25.1% very/somewhat important) were all seen as important by less than a third of respondents. Again, the relative lack of importance of these factors is in line with the trends reported in previous sections. However, that almost a third of respondents should advise that OA is important in the promotion criteria of their institution, or that a quarter report the importance of open code and data, does conflict with our analysis of actual policies above, where mentions of these factors is minimal. Hence, we may posit that even where not officially declared as criteria, nonetheless researchers feel these factors as valuable, possibly as a result of institutional mandates.

For each of the same criteria, we next asked for researchers' own opinions on how important they thought they *should be* for promotion decisions.

With regard to researchers' beliefs about what should be prioritised in making promotion decisions, clear differences emerge, with emphasis given to the quality *per se* of research work, care aspects like mentoring and leadership, and collegiality. For respondents, the most desired criteria (Figure 16) were "Generating high-quality publications, as assessed by independent qualitative assessment (e.g. peer review)" (96% very/somewhat important, n=192), "Mentoring PhDs and postdocs" (94% very/somewhat important, n=187), "Leading projects" (88.9% very/somewhat important, n=177) and "Being collegial, helpful and respectful" (87.9% very/somewhat important, n=175). However, the eighth most important factor was given as "Publishing in highly regarded journals or conferences (as measured by e.g. JIF conference rank, etc.)" (77.4% very/somewhat important, n=154), demonstrating the continued (perceived) importance of publication venues (and the metrics used to rank them).

The least important factors, according to the personal views of respondents, were "Developing industry collaborations" (56.8% important/very important, n=113) and "Creating intellectual property" (48.3% important/very important, n=86). However, even in these cases, more participants judged them important than thought them unimportant.

When we consider the differences between what respondents perceive as being important to their institutions as opposed to themselves personally (Table 7, Figure 17), we find that they consider 14 of 19 elements to be more important to themselves rather than their institution.

Here we find that in addition to factors relating to esteem and community (mentoring, peer review, giving invited talks, collegiality), the factors where there is the largest disjunct between what the

institution and the individual values are strongly related to OS/RRI (public engagement, Open Access, Open Data, open code/software, engaging policy-makers). Although these are not necessarily the factors respondents thought most important, it is nonetheless clear that they believe them currently undervalued in PRT processes.

On the other hand, there were a few cases where respondents thought criteria less important than their institutions. The largest discrepancies here were in generating research funding and generating large numbers of publications. This validates our suggestion in the review section that current PRT policies are seen as overly-focused on quantitative indicators (sheer amounts of research funds brought in or research outputs created) rather than on the quality of the work conducted with those funds or reflected in those publications.

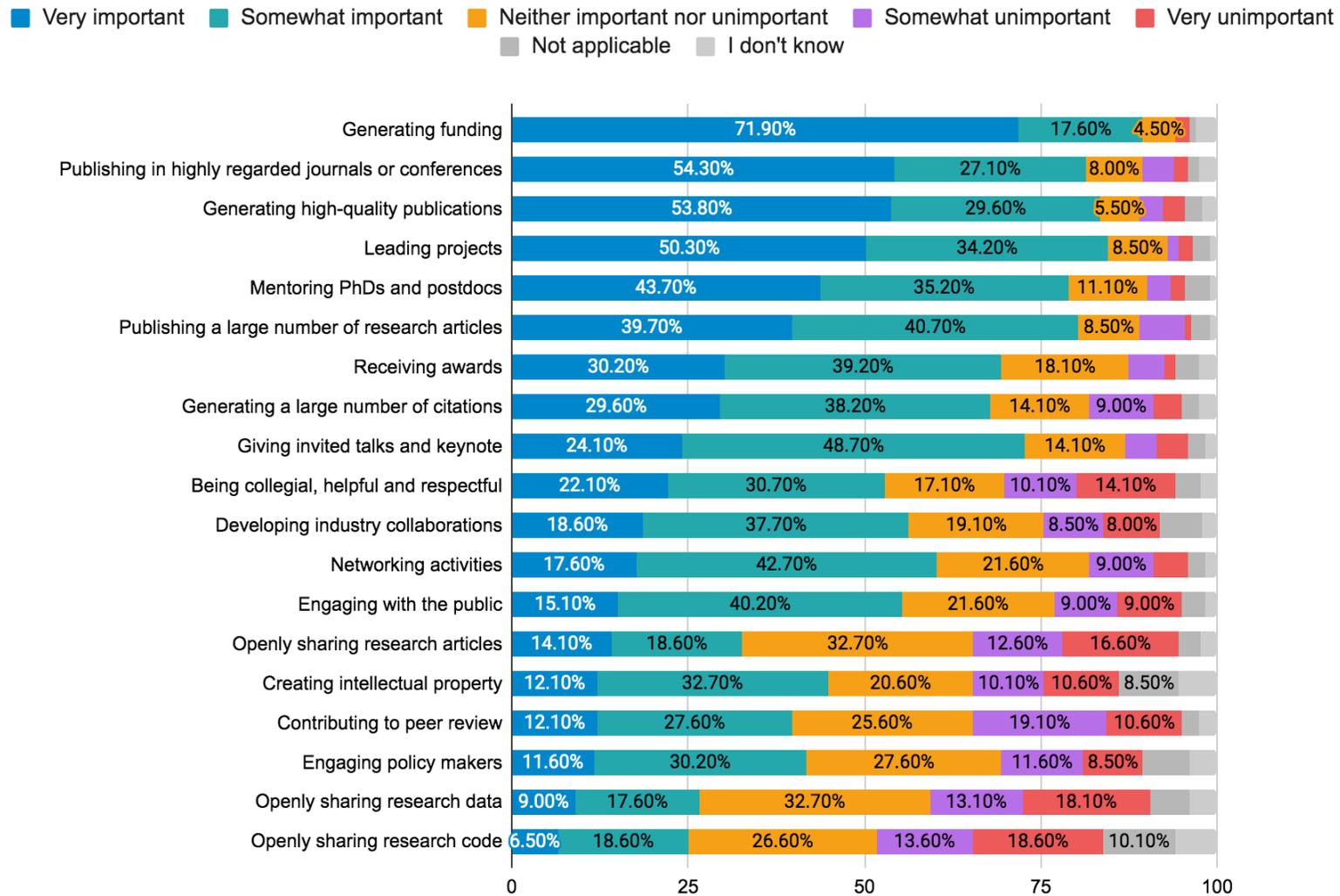


Figure 15. Importance within institutional policies of activities in making promotion decisions in relation to the current career stage (N=200).

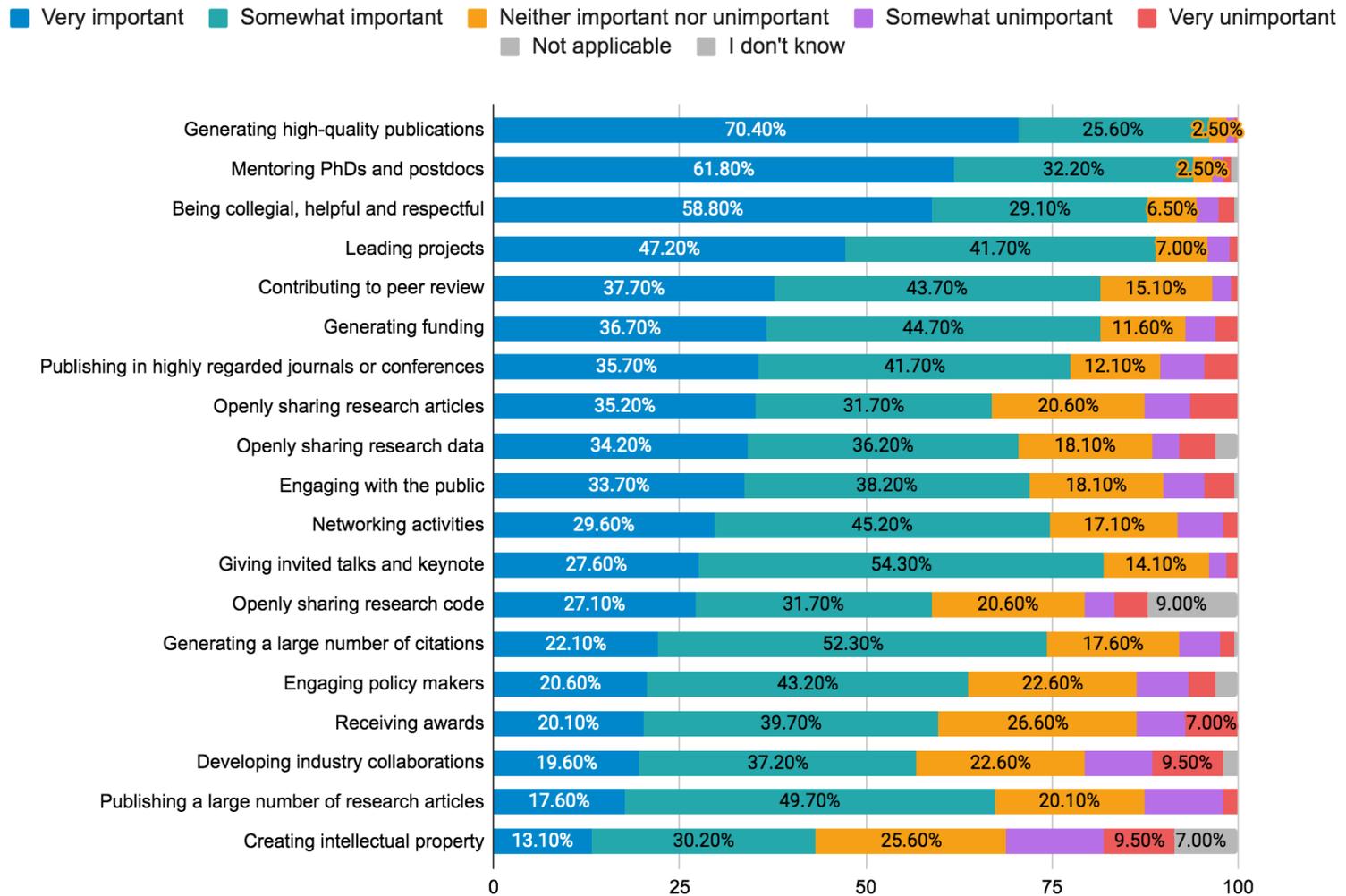


Figure 16. Survey participants' personal opinion about making promotion decisions at their current career stage (N=200).

Statement	Personal	Institutional	Difference
Engaging with the public	3.9	2.33	1.57
Mentoring PhDs and postdocs	4.49	3.19	1.3
Contributing to peer review	4.15	2.96	1.19
Giving invited talks and keynotes	4.04	2.93	1.11
Openly sharing research articles	3.83	2.84	0.99
Openly sharing research data	3.81	2.84	0.97
Openly sharing research code or creating research software	3.37	2.58	0.79
Engaging policy makers	3.61	2.83	0.78
Being collegial, helpful and respectful	4.38	3.71	0.67
Generating high-quality publications	4.64	4.14	0.5
Networking activities	3.94	3.47	0.47
Generating funding	4.08	4.45	-0.37
Publishing a large number of research articles	3.7	4.01	-0.31
Creating intellectual property	2.98	3.26	-0.28
Generating a large number of citations	3.85	3.65	0.2
Publishing in highly regarded journals or conferences	4.15	4.32	-0.17
Receiving awards	3.59	3.73	-0.14
Developing industry collaborations	3.42	3.28	0.14
Leading projects	4.31	4.19	0.12

Table 7. Difference between individual and institutional opinions.

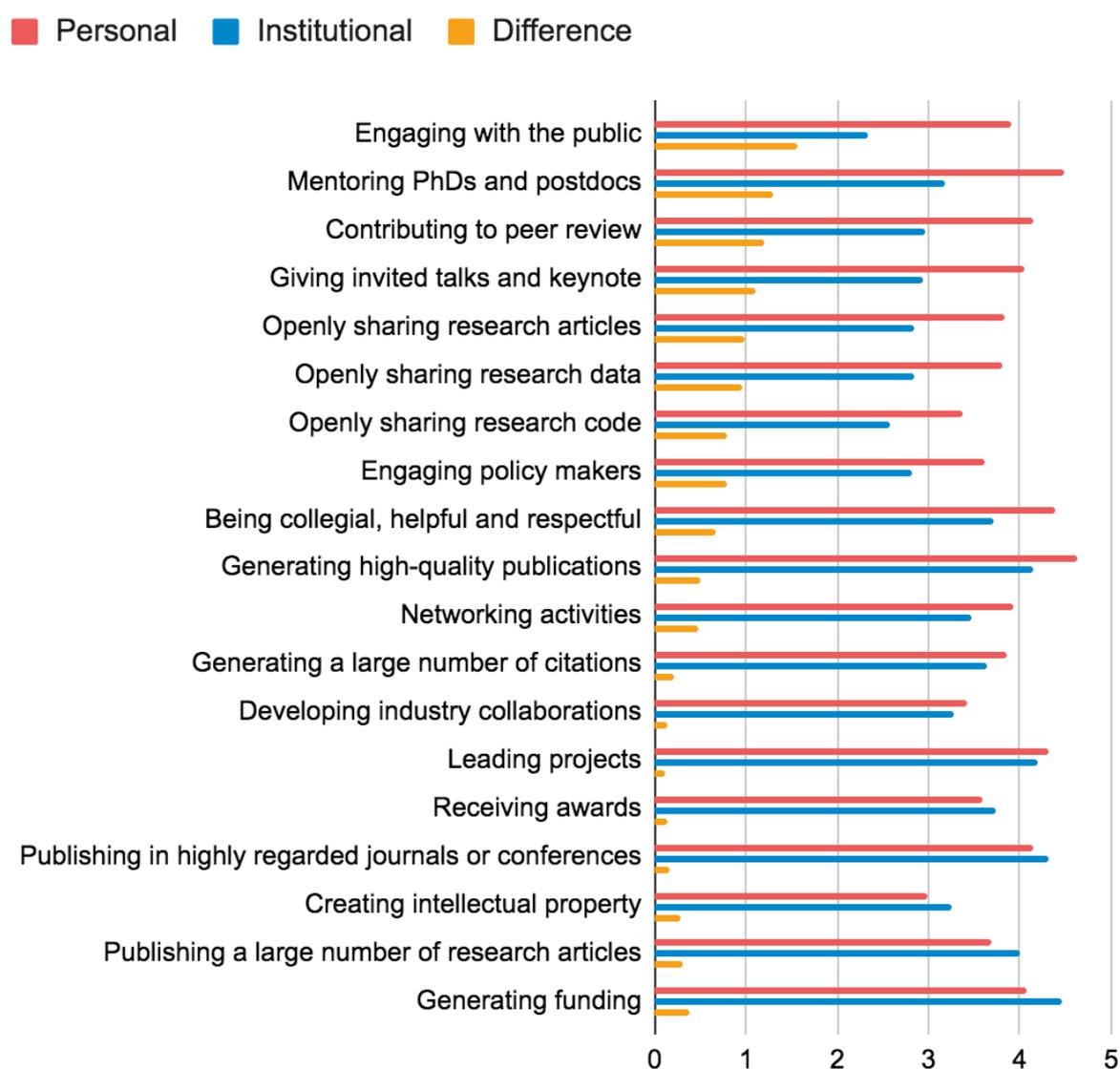


Figure 17. Agreement scores between personal opinions and institutional policies, N=200.

#### 5.4. Exploratory analysis

We next extracted the data for those answering somewhat/very important per institutional and personal criteria and next performed a cross-tabulation of this data with respondents' academic roles to investigate how attitudes and experiences vary across levels of seniority. Here we must remind the reader that as a consequence of the low numbers of junior researchers (PhDs and post-docs), results for those groups should be treated with caution (we group these together for this analysis as "junior researchers", but this still only comprises the views of 13 respondents). For brevity, we here present only the main findings relating to key issues, namely Open Science and RRI indicators, as well as publication quantity.

Taking this view (Table 8, Figure 18) shows that across all levels of seniority, topics of Open Science are judged as more important in respondents' personal opinions than is reflected in current

institutional policies. In addition, we can observe a slight trend in increased importance ascribed by more junior than more senior researchers.

		Publishing large number of research articles	Openly sharing research articles	Openly sharing research data	Openly sharing research code	Engage with policy makers
Junior researcher	Very important	40%	70%	74%	58%	59%
	Important	32%	20%	17%	17%	19%
Assistant professor	Very important	17%	41%	45%	35%	17%
	Important	48%	27%	35%	28%	38%
Associate professor	Very important	18%	26%	26%	21%	17%
	Important	46%	38%	39%	29%	44%
Professor	Very important	16%	38%	31%	25%	18%
	Important	56%	32%	38%	38%	49%

Table 8. Percentage of respondents, stratified by level of seniority, who answered that they believe the listed criteria should be somewhat or very important for PRT processes, N=200.

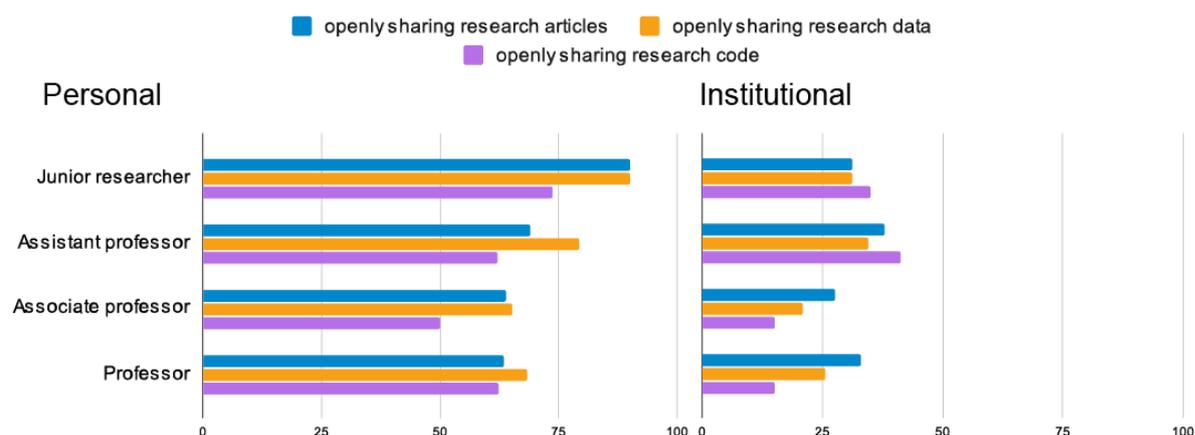


Figure 18. Comparing personal and institutional responses on three elements of Open Science (somewhat or very important) for PRT processes (N=200).

When examining differences in the personal responses between men and women no major overall trends emerged. Nonetheless, we identified three areas that had the greatest difference: “engaging with the public”, “mentoring PhDs and post-docs” and “leading projects”, as shown in Figure 19.

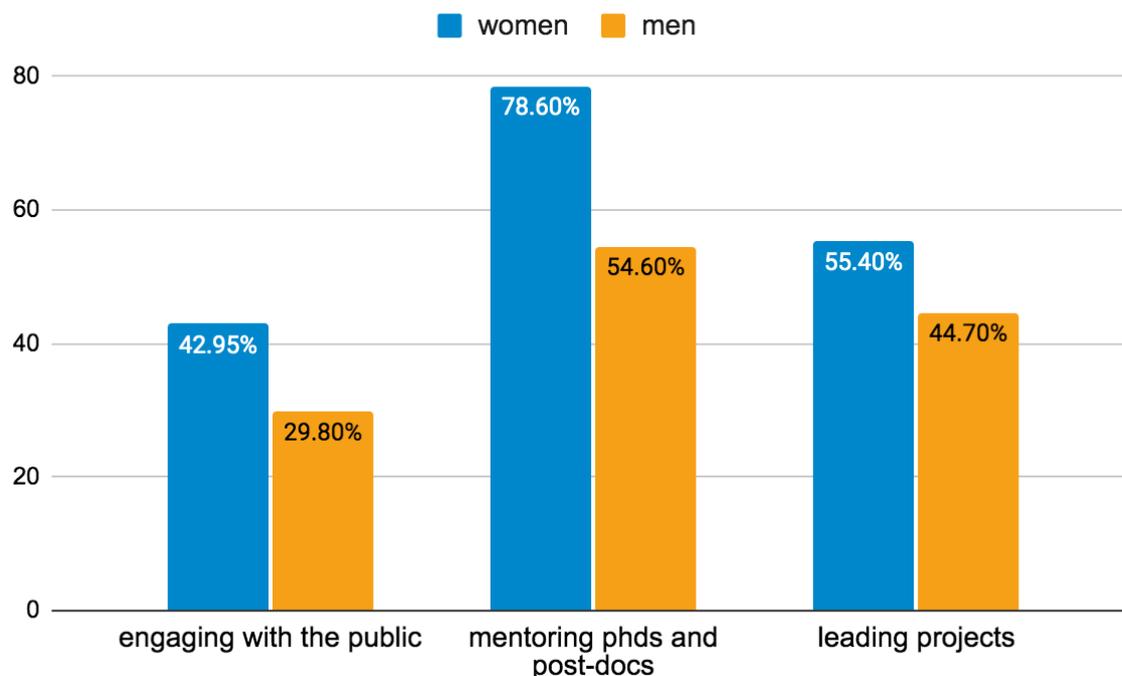


Figure 19. Major differences of personal opinion on importance of selected criteria between women and men (N=200).

### 5.5. Criteria for diversity

The survey respondents were also asked to indicate how important within their institutional policy were criteria with respect to equality, gender and diversity. Respondents were asked to agree or disagree with the following statements about promotion processes at their institutions:

- Where two candidates are equally qualified, candidates from under-represented groups are preferred (e.g. women/men or minority groups) for promotion.
- Where possible, promotion committees include representative numbers of women and minorities.

Results (Figure 20) show that according to our respondents, about a third of institutions actively seek to promote women and minority groups where two candidates are equally qualified, while almost half (44.3%) actively seek representation of women and minorities on promotion committees. We should also note that the relatively high numbers of respondents answering “don’t know” or “not applicable” to this question in itself is perhaps an indicator that levels of knowledge on these issues may need to be increased.

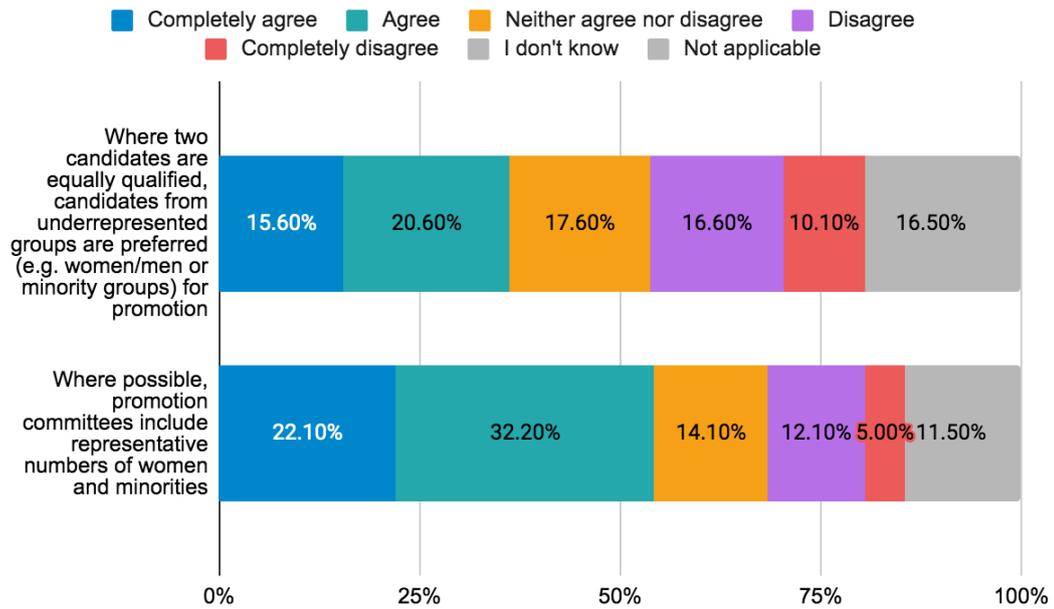


Figure 20. Institutional policies on equity and diversity in promotion processes (N=200).

Participants were then asked to what extent they personally agree with general statements of principle mirroring these two statements relating to equality, women and minorities, but now with the focus on their personal opinion (Figure 21).

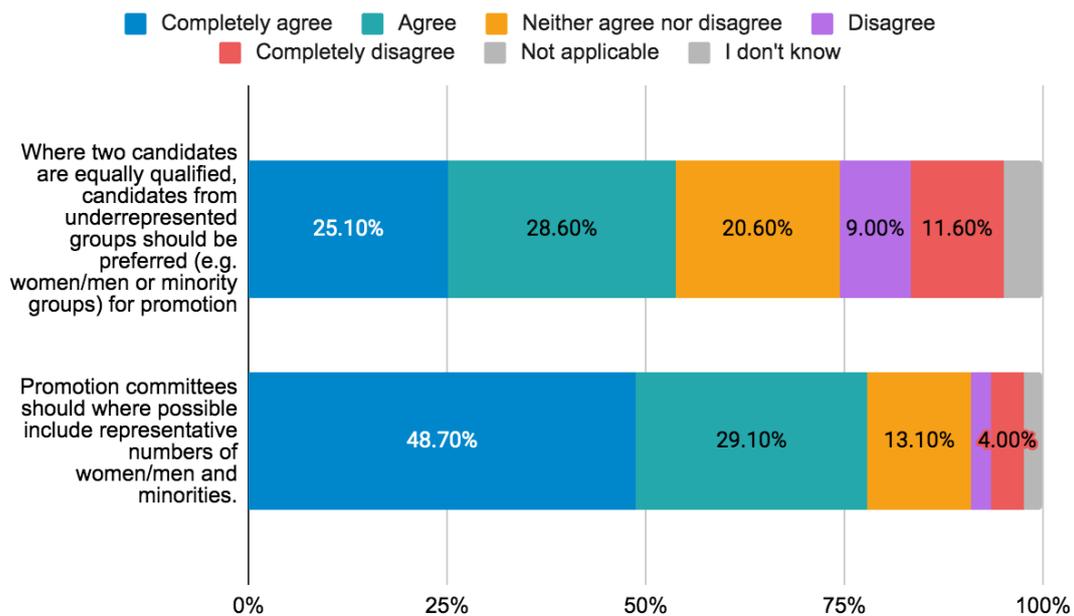


Figure 21. Personal opinions about equity and diversity in promotion processes (N=200).

We observe that our participants were more heavily in favour of both factors than currently reflected in their institutional policies, indicating general support for greater expansion of these principles. In particular, that 77.8% of respondents either agreed or strongly agreed that promotion committees

should strive for equitable representation regarding gender and diversity conveys a particularly strong message in this regard.

## 5.6. Qualitative responses

In addition to likert-scale quantitative questions, respondents were also given the opportunity to contribute free-text responses to three questions. These answers were analysed in NVivo using an iterative bottom-up approach by one coder.<sup>11</sup> We here summarise the results of this analysis. When quoting, obvious mistakes in spelling have been corrected, but the text is otherwise presented verbatim.

### 5.6.1. Consideration of other criteria in research assessment

First, survey respondents were asked to name any other criteria which should be considered during research assessment processes other than those named above. A range of responses were received, although with little consensus. Diversity and inclusion were mentioned by two (“increasing diversity in the research community” and “inclusion of students at all levels into the research process”). Societal impact measures were also mentioned by two participants, with one emphasising the importance of “local/regional links to society”. Other factors mentioned by individual participants were “International collaborations”, “curiosity-driven research”, monographs, accurate project administration, return-on-investment on project funding, author position on publications, and “behind the scenes infrastructure work”. Finally, one respondent thought that “outside activities” including parenthood, assisting dependent persons and volunteer work should be recognized or considered in promotion activities, noting that not acknowledging such factors particularly negatively impacts women.

### 5.6.2. Overall attitudes to research assessment criteria

Another open-ended question asked how participants feel about the research assessment indicators used in promotion processes at their own institution. Over half (N=112) of our respondents provided an answer to this optional question. Figure 22 below shows a word cloud showing overall word frequency (excluding stop words) throughout all responses.

Many respondents answered in such a way that their overall opinion on the subject could be coded for sentiment, either negative or positive. Slightly more negative (n=35) than positive (n=31) responses were received.

Negative sentiments frequently included strongly-worded statements. Mild statements like “Not as stringent as it should be” were outnumbered by strong statements like “biased”, “totally biased”, “[b]ad”, “[t]wo-faced”, “not fair at all”, “a mess”, and even “almost bullshit”. In addition, respondents also reported emotions including feeling “disappointed”, “very sad (I would say also demotivated, yet, I do research because I like it)”, “[e]xtremely challenging to obtain [a]nd feeling overwhelmed”, “I feel frustrated”, “[v]ery uncomfortable”.

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<sup>11</sup> Tony Ross-Hellauer



Figure 22. Word cloud showing word frequency (excluding stop words) across all N=112 responses to this question.

Positive statements, meanwhile, tended to be milder in their approval with statements like “[f]air”, “fair enough”, “OK” (including “generally OK” and “overall OK”), “fine”, “[s]atisfactory”, “generally suitable” and “reasonable” the norm. Some however were more positive with statements like “[g]ood”, “good and balanced” and “quite happy”. Interestingly, two of the respondents who answered positively indicated they were themselves involved in designing the indicators in use at their institution (e.g. “I think they are fair, but I am biased since I designed them”), perhaps indicating that involvement in the processes of designing indicators makes people more appreciative of the difficulties in designing suitable criteria.

### Quantification (n=27)

Many respondents’ linked their overall opinions of research assessment to individual factors. These were iteratively coded according to theme. By far the most commonly-mentioned factor here was quantification in indicators (24 respondents). In general, these respondents felt that there was an overreliance on metrics and that processes were, in the words of one, too “number-focused”. One respondent even indicated that their institution’s criteria were “Utterly focused on metrics and quantity”. Another advised theirs were “Mechanistic to the detriment of quality assessment. Largely a game of numbers”. Respondents’ answers here seemed to reflect a view that processes are, in the words of one, “focused on scientific productivity regardless [of] quality and reproducibility”, and in the words of another “tend to emphasize the number of publication[s] instead of the quality”. Many highlighted issues with this approach. One thought that metrics “can be gamed fairly easily”, while another claimed that their institution just “selected the easiest metrics to obtain, and are using them not as carrots, but as sticks”. Another felt that mere numbers meant “comparative views are not of content or personality ... [which] ‘objectivizes’ a comparison, but loses the human in the loop, who shall act as a teacher, a supervisor, and as a person - key for successful teams”. One respondent answered at length on the ways they feel such quantification is to the detriment of research culture and to the advantage of for-profit publishers:

“Generating large numbers of publications and/or generating funding is a prerequisite for keeping your job. This makes producing quality research difficult and discourages research into topics that are not trendy. More fundamentally, this attitude has led to major journals being flooded with submissions and forced to make almost arbitrary decisions and what or what not to publish. This, in turn, is putting undue stress on the reviewers which are not paid despite the fact that the publisher monetizes their and the author’s work. Overall this leads to researchers chasing public funding in order to spend it

producing mountains of research papers that are not even available to the taxpayer who funds their research. Academia has become a rat race where the only winners are the publishers!”

This was related to a generally-stated feeling that metrics were ill-understood and misapplied: “I feel that we are not highly devoted in learning about scientometrics and related fields and that we sometimes just apply some things that we do not understand well - I mean - I feel frustrated”. Misuse of the JIF was a particular point for three respondents (e.g., “I don’t agree with using journal impact factors as proxies for research quality”).

More optimistically on this point, some were aware of initiatives for responsible metrics in research assessment. One respondent saw a need to “follow European trends in this area (e.g. asking for publications such as those in WoS, Scopus etc.)” but also to acknowledge that the role of metrics differs across disciplines. They specifically mentioned that “The Leiden Manifesto could serve as one of the crucial guidelines within this question”. Another noted the positive influence of DORA in this regard: “It is better since DORA is being used. I don't think research assessment indicators can be considered in isolation from the other demands”. Such change was visible in the responses of others. One respondent who reported feeling that criteria at their institution were “[l]argely standard and overall OK” nonetheless noted a trend away from quantification: “However, criteria are currently shifting (e.g. in direction of OS, away from impact-based metrics), which I find positive”. Finally, another reported that at their institution “I am happy that quality is more important than quantity.”

### **Research funding (n=10)**

The next most mentioned factor (10 respondents) was that too much weight was awarded to accruing research funding. In the words of one:

“In my experience at my institution, the most important indicator is funding. Have you secured enough funding? What is your potential to secure funding? What is your grant pipeline... do you have funding from industrial partners? This tops any indicator above papers, where they are published or how many citations they have. Money is king.”

Respondents cited an “[u]nfair emphasis on winning funding”, that the “[b]iggest weight is given to the volume of attracted funding, approximately equal to the weight of all other factors put together”, and that “[f]ar too much importance given to research funding secured”. Again, this was seen to be to the detriment of other important factors, as other respondents argued: “It is more about getting funds than what you actually do with it”; “inputs (ie research income) are given far more value than research outputs ... ‘research’ has become synonymous with ‘research income’”. Another expounded at length:

“They're all about money money money. We shouldn't be promoting entrepreneurs in academia who are bringing in loads of funding yet doing nothing to develop the researchers they hire - just expect them to get on with the job and give them a hard time if they don't manage. In a nutshell: An academic leader or research leader should be promoted based on their ability to develop and nurture a research environment to make research flourish and then continue beyond their retirement. They should not be focused on greasing their palms with money or getting their name on papers they haven't helped write where they are just fattening up their belly with citations to make them look good. This is what several so-called academic leaders are doing to this day - and of course it's all men doing this so women don't have a chance of promotion. When they retire, everything will tumble in the research environment and have to be rebuilt again. But sometimes fortunately there are some good ones who do what they should do and their research groups are so successful but sadly they are not big in number.”

### Differences between official criteria and actual use (n=10)

10 respondents indicated that they perceived a disconnect at their institution between the officially-stated policies and the ways in which they were applied. For example, one stated that some criteria may “matter officially but not in reality”. Another said “I agree with the indicators that are SAID to be used; I'm not sure they are really used, though. Or only when it suits the evaluation committees”. In this context, some respondents raised an issue to which we return in our next subsection, that political positioning within the institution, and especially good relationships with heads of department or faculty, are often of great importance, despite the official criteria. One respondent said that “[u]sually, personal assessments are more important than numbers estimating the research quantitatively and qualitatively”. Two further examples (among many) show the prevalence of this sentiment: “There are several other aspects important to be promoted in our Academic institution such as being involved in politics, having relative or friend with influence in the management of the institution and so on” and “My personal experience: I do not know that they are of importance unless promoted by your section chief”.

Here the interpretive flexibility of research assessment criteria seems at issue. One respondent advised that at their institution criteria were “used selectively for different people”. Another said: “They can justify any promotion based on any metric they want”. Here, it is natural that good working-relationships with one’s colleagues may be a factor in deciding who should progress. However, the fact that gatekeepers like heads of department or faculty hold such singular power might be taken to be of concern, especially since these people will often come from already privileged demographics and may (based on the principle of homophily) be more responsive to people like them in their personal relationships. One respondent spoke directly to this in their assessment that processes at their institution are “totally biased towards white men.”

Other important factors included:

- **Criteria and guidelines being unclear, intransparent or insufficiently communicated (n=7):** this ranged from relatively benign statements like “Okay but they could be clearer to faculty and better communicated” to others who thought theirs “vague to the extent of obscurity”, or even left “intentionally vague” to allow for the interpretive flexibility mentioned above.
- **Over-valuing of journal prestige (n=5):** linked to the above-mentioned issue of over quantification (and use of JIFs), some respondents thought that the name of the journal in which research was published took too much precedence over the quality of the research itself and to other forms of dissemination. For example, “Biased towards producing top quality journal publications which can under-value other forms of engagement, impact and dissemination”.
- **Tensions in disciplinary differences (n=4):** two respondents noted a need for institutions to allow flexibility across disciplines, for instance: “My institution recognises that not all fields of endeavour attract large funding opportunities so an absence of funded research is not a deal-breaker for promotion”. Another said that the size of research communities should be accounted for in any such exercises, with metrics more useful in some than others. However, others advised this meant they felt that allowing such flexibility could lead to unfairness. One said: “In my field in Medicine, I do not believe the criteria are as rigorous as in other fields at my large research-oriented university.” Another stated: “They are not transparent. They vary from School to School. School policies on what matters in terms of research are too



benign acknowledgements that “[n]etworking within faculty” is important or that a “candidates existing and positive history in the institution can be an advantage”. Others acknowledged that “Personal relationships and endorsements play an important role”, especially relationships with line-managers and heads of department or faculty “who may lobby for you”. Another respondent framed this in terms of “[u]nderstanding the organisation politics, knowing the gate keepers and the landscape”. Even where expressed in a more-or-less neutral way, there was acknowledgement that such factors are often only unofficially applied: “It is obvious that it is quite important to be well-connected with the important people involved in the decision making process. This is not officially used of course, but practically it is.”

Some were more negative in their statements on this point. One thought that “issues linked to conflict of interest are not addressed adequately enough in the evaluation committees”. This sentiment can also be observed in the responses of others. One thought that “loyalty to management” played a large role. Others used words like “[i]nbreeding” and “cronyism” and linked this to perceived unjust outcomes. In the words of one: “To be promoted, you have to be on the team of the person making the decision (lots of promotions to people who don't deserve them but are friends with the Director of Research)”. Many framed this in terms of internal politics and believed it had a corrosive influence: “Political factors are hugely important for promotion. That is why this institute is corrupted and many faculty members have been leaving.” Others framed it in terms of personal like and dislike or a need for belonging to the “exclusive group”. This is potentially detrimental to more junior researchers working for less well-connected seniors, as “some line-managers hold more power than others”. Research-focus was also considered a factor: “It very much helps to do research in the areas closest to the most important/powerful professors in the department”.

Two respondents mentioned that local people are preferred to those from outside the region. In addition, political affiliations were mentioned by two participants. The first, a researcher in Engineering from a research-intensive university in the UK, said: “Who are friends with who can have some influence and indeed some senior people may be affiliated to the same political party and can get footing to negotiate behind the scenes. This does appear to happen in some cases that is ultimately corrupt.”

The second, a researcher in Environmental Science in Taiwan, advised: “Taiwan is a very political environment, so things might be tough if you were from Mainland China, and there is additionally a strong North-South divide in the country in terms of social and political attitudes. Oddly I suspect in some areas religion might be a factor in promotion within research groups.”

### **Research trends (n=7)**

The importance of research-focus and how this related to current trends was cited as a factor by 7 respondents. One expressed that “balanced research interests and diversity of topics” are an advantage. However, others advised that particular specialisations were advisable. One advised: “Definitely: there are two subfields outside of which it is almost impossible to get a promotion (and I'm not in these fields, of course...)”, while another said that “My impression is: Young scientists acting beyond certain mainstream fields have lower likelihood of getting promoted.” Interestingly, adherence to disciplinary-norms regarding research methods seemed important, as two researchers from opposite sides of the qualitative-quantitative divide in fields where those approaches are the norm had similar complaints:

“[R]esearch that does not validate held perspectives of trends in education are not valued. Qualitative research has preeminence in Education”

“There is a bias towards quantitative research in medical / health research rather than increasing our understanding of the nature of a problem via qualitative methods. "Women's research" (eg working with domestic violence), when framed as health inequalities is more likely to be understood and valued from my experience.”

### **Service work (n=6)**

Although service work is often included as a formal part of promotion criteria, this is perhaps not always the case at all institutions, as 6 respondents mentioned this as an unofficial criteria at their institution. Tasks mentioned included administration, management, participating in committees and working groups and other “leadership roles which are not always research related”.

### **Gender and diversity (n=6)**

Finally, 6 respondents also reflected on the role of gender and diversity criteria in promotion decisions. One advised thinking of gender equality as an important issue but was unaware if it was taken into account at their institution. Another advised “There is rightly a push to get more under-represented groups into positions of leadership”. Two respondents reflected upon underlying structural reasons for inequity and argued that merely adjusting criteria will not compensate for this. The first (a male) pointed to how gender differences impact publication patterns, while the second (a female) argued that: “It is not about the criteria, but opportunities to have produced research work. Disadvantaged groups are not given fair opportunities. The advantaged group, i.e. white are given opportunities for promotion such as fellowship, grant collaboration, and a permanent post.” This latter contribution makes clear that promotion criteria are merely one barrier amongst many in fostering equity in research careers. Such structural factors, as well as simple sexism, perhaps underlie the reasoning behind the pessimistic assessment of one female professor:

“In the end, my field and my institution are governed by (white) males. In spite of everything that is tried, or said, women are simply overlooked. I am afraid this especially applies to older women. The combi[nation] of ageism and sexism is maybe not additive, but even more harmful.”

The agenda for change in this regard was not uniformly appreciated, however, as one male respondent advised: “It seems that heterosexual males who are either unmarried or without children are actively discriminated against.”

## **5.7. Practices**

In this final substantive section of the survey, we describe participants’ personal and organisational practices with regards to OS/RRI activities which could be taken into account in assessing research contributions.

First, participants were asked to estimate the total number of publications they had published in the previous three years, and how many of them were OA (Figure 24). The mean value calculated for all publications is 19.21, while the mean obtained for OA papers is 11.73.

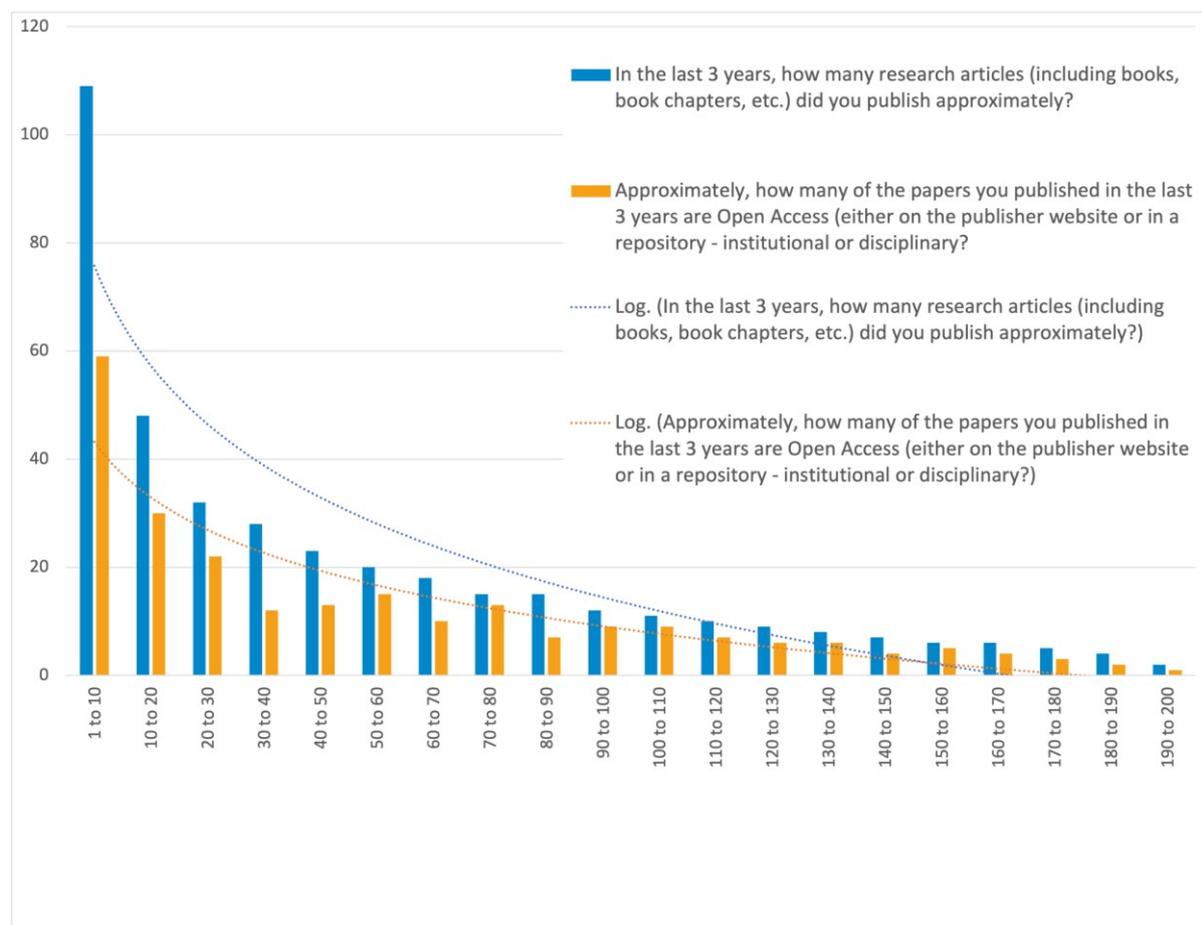


Figure 24. Number of research articles' publications, including closed access and open access (N=200).

Similarly, we also asked for the number of research datasets respondents had produced in the last three years, and how many of them had been open research datasets (Figure 25). The mean for datasets in general was 9.04, while that for open datasets was 4.18, meaning that amongst our respondents, 46% of recently created datasets had been openly shared.

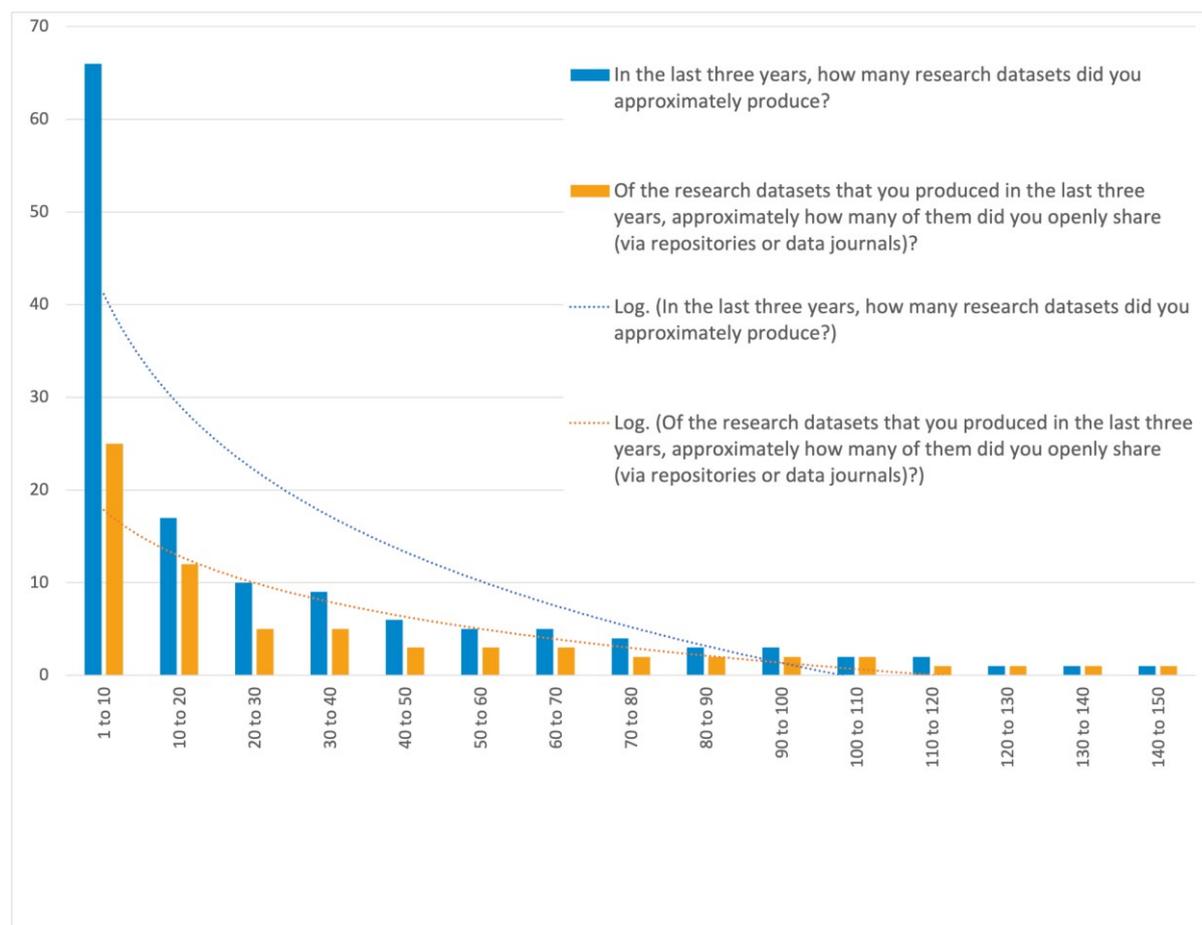


Figure 25. Produced research datasets and open datasets (N=200).

Respondents were then asked to state how many peer reviews they had approximately carried out in the last three years, and how many of them were open peer reviews (Figure 26). With a mean of 31.93 peer reviews per respondent and a mean of 5.54 for open peer reviews, we can conclude that open peer review is not yet the norm amongst our respondents.

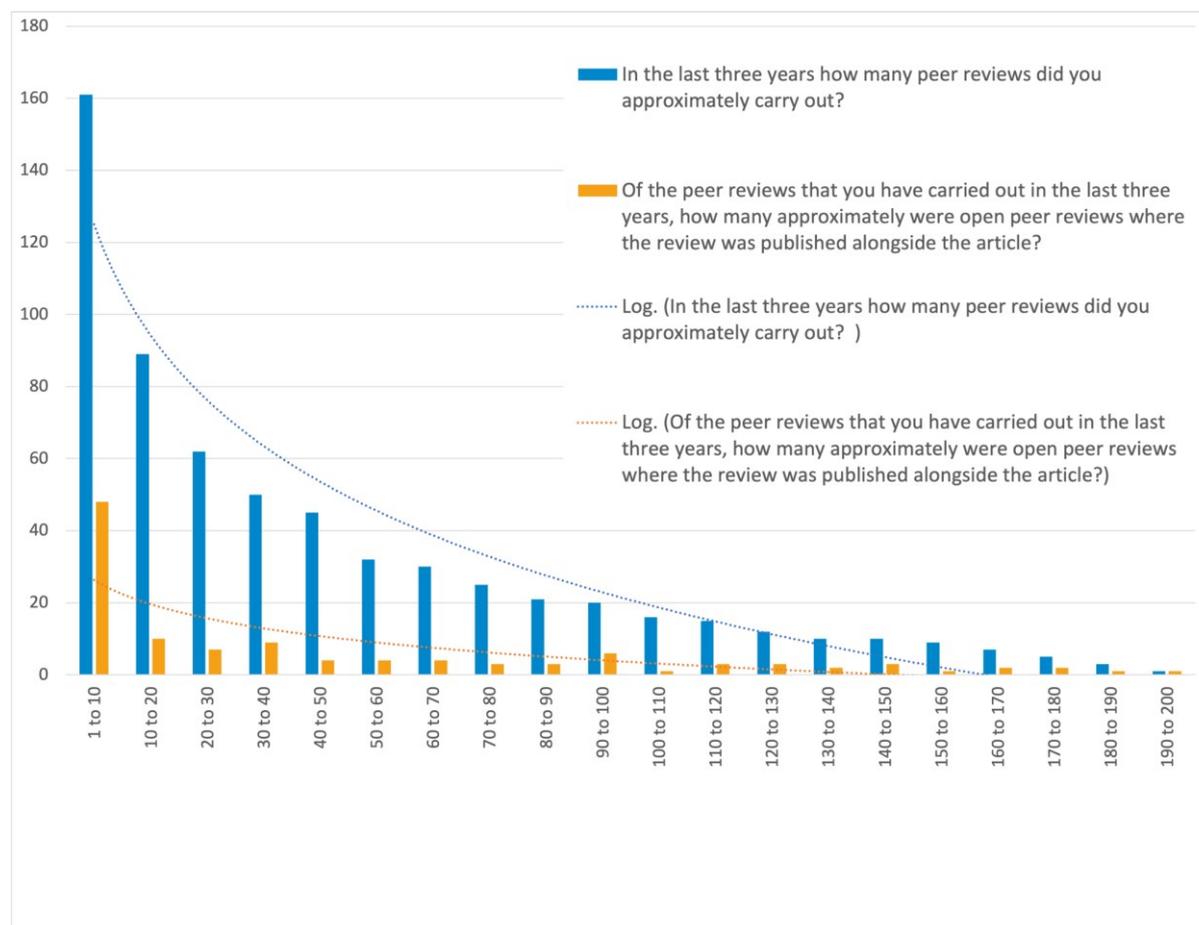


Figure 26. Conducted peer reviews and open peer reviews (n=200).

In an attempt to understand how research assessment criteria may shape publication decisions, survey participants were also asked whether in the last three years, their choice of publication venue (journal, book publisher, conference, etc.) had been influenced by the promotion indicators of their institution (Figure 27). The vast majority of the responses were positive (33.7%, n=67), with the negative answers “Rarely and Very rarely” being slightly lower (32.7%, n=65), while the smallest number of participants answered “Neither often nor rarely” (23.6%, n=47).

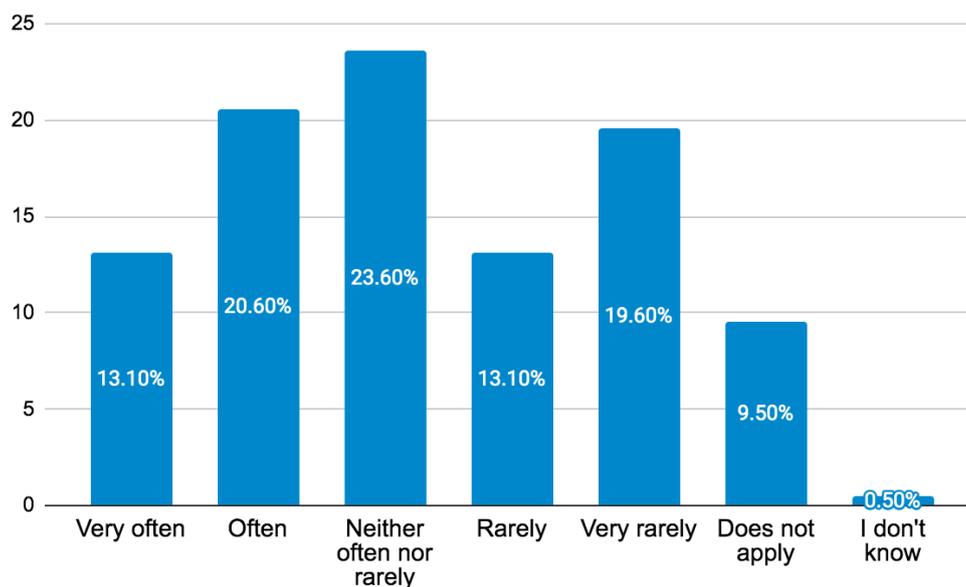


Figure 27. Choice of publication venue (journal, book publisher, conference, etc.) and its influence by the promotion indicators of the participants institution (N=200).

As a final question group, survey participants were asked to comment on how important, for the success of their research and eventually the progress of their career, it was for them to engage with: (1) the public (e.g. uptake by non-academic groups, citizen science, science communication), (2) industry, and (3) policy makers.

The results are presented in Figure 28. They show that the majority of participants (52.3%, n=104) found engaging with the public somewhat or very important for their research. 45.2% (n=90) advised engaging industry to be somewhat or very important for them. A very similar number (43.7%, n=87) said engaging policy-makers was somewhat or very important for their research.

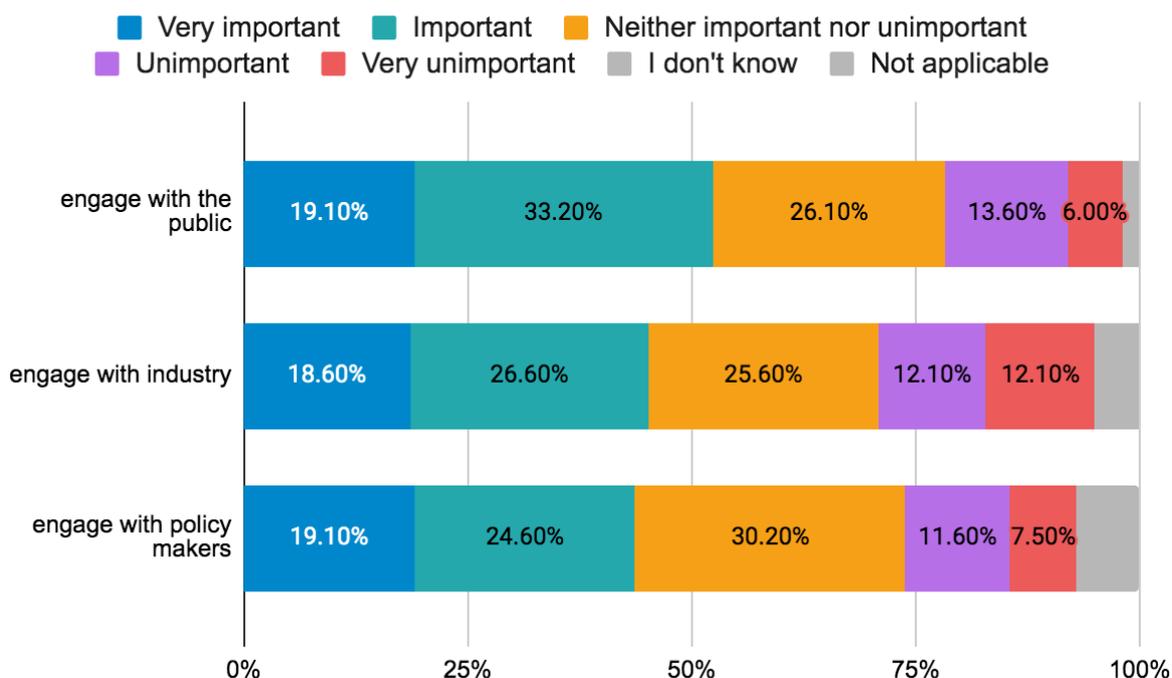


Figure 28. Responses relating to engaging with 1. public, 2. industry and 3. policy makers (N=200).

Even though the numbers were approximately the same for all three items, we saw that “engaging with industry” was the least valued element, with almost a quarter of respondents indicating it was somewhat or very unimportant for their research.

#### 5.7.1. Incentives and motivations

In addition to asking the extent to which respondents engaged in these practices, we also sought to gauge which factors, if any, they believed would further incentivise them to take them up. Respondents were allowed to give optional free-text answers and were asked to name up to three factors.

When the survey participants were asked what would incentivise them to achieve a higher number of OA publications (Table 9), a high proportion of respondents offered a response (N=135). The most popular answer (mentioned by 32.5% of respondents) was “receiving funding for covering article processing charges (APCs)”, with some of them (5.9%) specifically identifying that the institution should cover APCs. As one of them said:

“Many of my papers are not directly the result of large funded projects; for these, there are no pathways to find any funding covering either APC or OA costs, so it's simply impossible to publish them OA.”

The second most common opinion was to lower APC costs, and third, to completely abandon APCs. A small number of responses prefer more OA journals with a higher readership, while a few requested more time. Smaller percentages wanted OA journals to have efficient editorial policies and practices (this could have been a popular opinion holding over from the old days when all OA journals were

typified as predatory by the traditional publishers), while a slightly smaller percentage expressed their interest that OA journals should gain more citations and that OA needs to be added to the institutions' promotion policies. A small percentage of survey respondents mentioned that all their papers were OA already. It is interesting to note here that most respondents interpreted this question to relate only to OA publishing (gold OA), with issues related to author self-archiving (green OA) not mentioned.

Incentives	Count number	Percent
Receive funding to cover APC costs	44	32.5%
Lower APC costs	31	22.9%
Abandon APC charges	13	9.6%
Already make publications open access	11	8.1%
Open access journals to have a higher readership	8	5.9%
More time in their day	5	3.7%
Open access journals to have more effective editorial policies and practices	4	2.9%
Open access journals to gain more citations	3	2.2%
Publishing in Open Access journals to be included in promotional policies	3	2.2%

Table 9. Participant incentives to publish more in open access journals (n=135).

Survey participants were also asked to describe what would incentivise them to share their research data openly. From the total responses received (N=95) (Table 10), the most popular answer, irrespective of discipline, was that it is a common practice to make their datasets always openly available, regardless of any incentive. Similar to the OA publications above, respondents also wished for more funding, which they claimed is necessary to make data open. Researchers also discussed legal issues such as Intellectual Property and the General Data Protection Regulation as barriers to openly sharing data. Other common responses were that more time was needed, making a dataset openly available needs to be an easy task and that journals making open data a requirement would be a good incentive.

Incentives	Count number	Percent
Make datasets openly available already	10	10.5%
Receive funding to make open data openly available	9	9.7%
More time	6	6.3%
Make the opening of data an easy task	5	5.2%
Journals to make a requirement the open availability of the data	4	4.2%

Table 10. Participant incentives to share their research data openly (n=95).

Regarding what could incentivise open peer review (N=103) (Table 11), the most common answer was that open peer review is not an option for the journals that the survey respondents have peer-reviewed for so far. One respondent said:

“I have never been asked to undertake open peer review: reviews have always been blinded to advise editors on whether an article should be published or not a source to help authors improve the work.”

A small number of participants mentioned that if journals made open peer review their standard procedure, then they would be discouraged to conduct peer reviews and mentioned that they are supporters of open peer review and have practiced it in the past. With regards to open peer review incentives, several participants mentioned that money would incentivise them.

Incentives	Count number	Percent
Open peer review to become a journal option	29	28.1%
Standard procedure they would not conduct it	14	13.5%
Open peer review supporters and have been practicing it	9	8.7%
Monetary incentives	6	5.8%

Table 11. Participant incentives to perform open peer review (n=103).

The participants were also asked to state what would motivate them to engage more with the public (N=82) (Table 12). The largest number of responders wish they had more time for this. One respondent bluntly expressed this by saying:

“Simply, I don't have the time to engage with the public. Too many other tasks.”

Researchers would appreciate recognising their effort to engage with the public in promotion and funding policies and their efforts to be rewarded. This relates to time as well, since researchers choose not to spend their time on a task that is not being recognised. The third most common component was the allocation of resources. Researchers also required institutional support on this task, mostly administrative. A small number claimed that they already practice this, while the same number argued that there is no public interest in this due to their research being rather niche.

Incentives	Count number	Percent
More time in the day	19	23.1%
Reward of effort	16	19.5%
Allocation of resources	14	17.0%
Institutional support	8	9.5%
Already practicing it	8	9.5%

Table 12. Incentives regarding the engagement with public engagement (n=82).

With regards to industry, the survey participants were asked what would motivate them to collaborate more with industry. 72 respondents answered this question (Table 13). The most common answer was that the respondents wish for industry to fund research. A survey respondent claimed:

“Money. I have only so much time for things that aren’t the most important part of my tenure file.”

However, the rest of the responses are factors related to internal constraints, including needing more time and resources, more training, and to be rewarded for this practice. Seven participants (9.7% of those answering) claimed that they have no interest in such collaborations, either because their research is irrelevant to the field, or because they find that industry is often a negative factor in their research field (climate change).

Incentives	Count number	Percent
Industry to fund research	12	16.6%
More resources	11	15.2%
More time	8	11.1%
More training	7	9.7%
Rewarded	5	6.9%

Table 13. Incentives regarding the engagement with the industry (n=72).

Finally, asked about possible incentives to engage more with policy-makers (Table 14). Respondents (N=62) wished for institutional support and training, for more time to perform these activities, and for more funding. To give two examples:

“The university needs to set up structures that make it easy to access policy-makers.”

“Better institutional support for arranging such interactions.”

Nine respondents stated that they simply have no intention to engage in this activity (even if their work may be relevant), while eight stated that they feel they are not heard by policy-makers anyway. Such respondents, for example, were of the opinion that politicians care only about politics and are not interested in an exchange of ideas with researchers:

“If policy makers would care more about scientific opinions.”

“Nothing. They seek political capital and not to solve problems. And no, think-tanks are not preparing scientific opinions, but political buzz.”

“More venues and a sense that they actually care about research output and would be willing to act. I fear many policy makers simply see research as a way of supporting policy decisions they have already made.”

Incentives	Count number	Percent
Institutional support and training	10	16.1%
More time	9	19.5%
No intention to collaborate	9	14.5%
Not being heard	8	12.9%
More funding	6	9.6%

Table 14. Incentives regarding the engagement with policy makers (n=62).

### 5.8. Survey findings summary

Reviewing these findings briefly, we can say that our sample is somewhat skewed towards more senior, male academics from STEM subjects. It is worth considering how this may impact on the interpretability of our results. That almost two thirds of respondents were professors or associate professors could mean that they would have filled in the survey by providing answers that could be considered more extreme or open minded - since they have already succeeded in creating a reputation under their name, have had already achieved a high academic role in their university and do not have to worry about permanency anymore. However, it may also be the case that some element of “survivor bias” is in play amongst some - the belief that because they have prospered within the current system that the current system is well-constructed. In addition, the vast majority of the responses are from STEM researchers; since STEM researchers are more advanced in uptake of OS practices (Nowick 2008) this could also have an impact.

The majority of the survey participants had a permanent contract and planned to work at the same institution within the next 5 years. Many intended to apply for promotion within that time, and most were confident they knew where to find policies at their own institution. Hence, it is fair to say that our sample is highly-motivated and knowledgeable regarding the survey theme.

We have seen that there is a large disjunct between what is valued by institutions and respondents themselves in PRT processes. Respondents generally ascribed more importance to most indicators, including those related to OS and RRI. They ascribed less value personally than they feel institutions currently do to elements of quantification such as levels of funding and brute numbers of publications. In addition, they favoured observing principles of equity and diversity regarding gender and minorities in PRT processes than they felt is currently the case.

Given the opportunity to give free-text responses, respondents offered rich opinions on current research assessment criteria. Although similar numbers advised they were for and against the status-quo, the latter were much more vocal in their dissent than the former were in their approbation. With regards to research assessment indicators used in promotion processes at their own institutions, they responded that there is an overreliance on metrics and that processes are sometimes too opaque. In particular, respondents provided rich information on the social and political factors which influence PRT outcomes “behind the scenes”. Participants were also asked to identify performance indicators that would further incentivise them to practice OS/RRI. Participants identified some topic-specific

factors (e.g., APC funds to support Open Access publication), but also some overarching factors relevant to all factors, such as support and training from the institution and monetary incentives.

In sum, our survey shows that researchers value OS/RRI issues more than is reflected in current PRT policies at their institutions. They identified a host of confounding issues, including social and political factors, which also remain to be resolved. But they also suggested concrete ideas to further incentivise OS/RRI beyond PRT policies.

## 6. Discussion

The two studies comprising this research have sought to (1) scope the state-of-play regarding institutional research assessment processes in relation to Open Science and RRI, and (2) gauge experiences and attitudes to reform amongst active researchers relating to these issues.

### 6.1. Promotion, review and tenure policies from the perspective of researchers

Our systematic analysis of promotion, review and tenure (PRT) documents from seven countries across the globe has shown that OS/RRI indicators remain rare, with barely any mentions within these of terms such as "citizen science", "gender balanced reviewers", "gender reviewers", "gender equality", and "policy makers". There are differences across countries, however. Some are significant (e.g. service to profession and number of publications) while others are more moderate (e.g. patents and publication quality) in their application. For example, the number of publications is a common indicator in Austria, while service to the profession is common in Brazil and the UK. In contrast, there are countries, e.g. India, where full policies were not publicly available and the researchers of these institutions seemed not to have received clear instructions relating to the promotion criteria applicable to them. Nonetheless, the fact remains that OS and RRI elements remain rare, and measures associated with quantification largely dominate. This lack of change could be due to the long history of the institutions, the promotion history and the practices, which were established many years ago to assist researchers (Seipel 2003; Adler, Ewing, and Taylor 2009; Coonin and Younce 2009; D. King, Acord, and Earl-Novell, Sarah 2010; Walker et al. 2010; McGill and Settle 2011; S. Gardner and Véliz Calderón 2014; Brown 2014).

Our international survey of active researchers then confirmed these findings from the perspective of those currently subject to these policies. It also found that representation of OS and some RRI practices was limited, although respondents seemed to suggest these were more valued within institutional processes than our analysis of policies themselves would suggest. We found that measures of quantification (research funding, number of publications, number of citations) remained very important, as opposed to more qualitative factors which assessed the value of research in itself. Despite ten years of DORA, publishing in highly-regarded journals or conferences (as measured by metrics like JIF) were reported as being somewhat or very important in their institutional policies by the overwhelming majority. Since this factor appeared much less prominently in our review of PRT documents, we might here surmise that the JIF is increasingly employed as a "hidden" indicator (officially stricken from policies but nonetheless still in use unofficially).

When comparing this picture with the personal opinions of researchers as to what *should* be important, stark differences emerged. Factors relating to abstract notions of being a good research citizen, such as mentoring, collegiality, and quality in research processes (including engaging in OS/RRI) were much more highly valued here. In most of the aspects we inquired about, researchers saw them as more important than they believed was reflected in their institutional policies. Only aspects such as those relating to quantification (levels of research funding, number of publications) were seen as more important in the eyes of the institution than the individual. Nonetheless, researchers still clearly indicated that they themselves see these factors as important, if not to the same degree as their institutions.

As we move on to consider the deeper implications of these findings, it is worth noting that the reasons underlying the push to consider OS and RRI more directly in PRT policies is not merely because they are seen as intrinsically valuable. Rather, it is concerning to see that the OS/RRI remain very much on the fringes of research assessment, if they play any role at all because this puts into question not just the reward hierarchies, but trustworthiness of science itself. If researchers are not valued for making their publications and data freely accessible, for making research reproducible, or for engaging with societal stakeholders to align research priorities and findings with societal values, but rather just for quantity over quality or the brand-name recognition of the venue in which research is published, then we have a major problem. *Not* recognising OS/RRI practices in this regard is actually to potentially incentivise research malpractice over honest science conducted with integrity.

## 6.2. The need to change norms, not just indicators

Our findings show that researchers are ready for change. Yet as we look ahead to what those changes might be, we must be careful not merely to propagate the “tyranny of metrics” responsible for many of the ills within the current system. Simply uncritically introducing further indicators accounting for OS/RRI practices may do more harm than good.

Situating these institutional and individual attitudes regarding PRTs (with the methodological caveat that only individual respondents were asked to rate their institution’s position) in a broader sociological context may help to elucidate them. To begin with, our findings suggest that whereas research institutions are perceived as adhering to what Mitroff (1974) has referred to as counter-norms such as competition, researchers do describe themselves as adhering to other values as well, such as disinterestedness and communalism (Merton 1973, 267 ff.). In his earliest attempts to describe science as an institution, Robert K. Merton (1973) distinguished four meanings of the term “science”: a set of methods, a stock of knowledge, a set of norms, and any combination of these, a taxonomy which enabled him to separate methodological-philosophical considerations of the subject matter from genuinely sociological treatments. Whereas methods and knowledge are guided by cognitive norms, science is also guided by institutional norms that in Merton’s view enable the institutionalized advancement of knowledge and that he termed universalism, communalism, disinterestedness, and organized scepticism.

Recently, however, the normative structure of academia has shifted towards different norms, such as the goals to compete and prioritize self-interest (Anderson et al. 2010). Mitroff (1974) proposed that Merton’s original set of norms (later refined by himself and others) actually rests upon a set of subsidiary norms: particularism, solitariness, interestedness, and organized dogmatism (to name a few salient examples). Contrary to Merton’s account, which holds that adherence to the four norms is necessary for science to fulfill its institutional goal of advancing knowledge, Mitroff’s account of what he calls counternorms was proposed in a more descriptive vein, suggesting that where the two dissociate, individuals (and institutions) tend to follow the counternorm (Farrow, Grolleau, and Ibanez 2017). There is then a discrepancy between what researchers find important (Merton’s norms) and what they actually do (Mitroff’s counter-norms) or, as our survey results show, a discrepancy between what research institutions value and encourage their staff to do, and what researchers actually value. Our survey findings do in fact suggest that whereas individual researchers (in their answers) tend to

uphold Mertonian norms (especially communalism in this case), the position of research institutions in general is much closer to the counter-norms identified by Mitroff (1974). Based on the survey findings, we suspect that the key to incentivizing open research practices is not to introduce additional “traditional” indicators, nor will introducing Open Science indicators be sufficient. Rather, changing the dominant set of (counter)norms (e.g., striving for competition, rather than collaboration) is key to advancing open research practices. Instead of speaking to open research practices, then, PRT policies should advance different aspects of collaboration and collegiality which are incidentally more in line with what respondents themselves value (as seen in our survey results).

## 7. Conclusion

There is increasing recognition that a lack of reward and recognition for Open Science and RRI practices is a barrier to uptake. This deliverable presents work undertaken to understand current policies for promotion, review and tenure, investigate how active researchers perceive them, and develop suggestions for reform to better foster OS/RRI. Through two studies – (1) a review of current institutional PRT policies in seven countries, and (2) an international survey of 200 active researchers – we have shown that currently OS/RRI practices are minimally rewarded while problematic practices of quantification continue to dominate, but that researchers support and value change. The difference in values observed between what researchers value and what they perceive institutional priorities to be is stark. Researchers obviously still value many of the dominant criteria, but they see a much greater place for OS and RRI practices, as well as pastoral and collegial aspects. Put simply when we ask the question “what makes a good researcher” these days, the easy answer is to look to research funding acquired and high-impact publications (as measured by citations or the prestige of the venue in which it was published. Being a good researcher is about much more than this, and in fact if these elements are too afforded too much weight then they may in fact create bad researchers, in terms of those who seek high-impact publications at any cost or are driven by competitive aspects at the expense of the intrinsic motivations associated with the Mertonian norms.

### 7.1 Limitations

The limitations of this study are:

- **PRT analysis:** Collection of policies was conducted under time constraints and in two rounds (one year apart). In addition, obtaining policies was difficult as they were often internal documents. Hence, there may have been some time-lag in that policies we examined were not the most recent versions.
- **Survey:** Our survey received few responses from early-career researchers, a key category of interest when it comes to research assessment reform.

### 7.2. Recommendations

Building on the discussion presented above, we offer the following set of preliminary recommendations to OS/RRI policy-makers (funders and governments), academic and scientific institutional leaders, and researchers. (These recommendations will be refined during the synthesis phase of ON-MERRIT, which will include co-creation processes with these three stakeholder groups.)

#### **Science policymakers (e.g., funders/governments) should:**

- Fund coordination activities to network vanguard initiatives with institutions with less experience in reform of research assessment processes and encouraging mutual learning
- Fund research to assess outcomes over the long-term associated with changes to reward and recognition policies
- Support strongly the principles that changing PRT policies to accommodate OS and RRI cannot only be a matter of further indicators, but also necessitates a change in cultural norms

- Be wary of one-size-fits-all solutions that do account for disciplinary differences, different national frameworks of institutional autonomy, and differing needs related to career-stage
- Continue to foster Open Science and RRI by further making them count in assessment of funding proposals and project deliverables

**Research performing organisations should:**

- Incentivise researchers for the uptake of new indicators for the practice of Open Science and RRI. Based on the findings from our survey, the most desired incentives related to financial support (inc. for APCs), recognition, being allowed to dedicate more time (e.g. to make datasets open), transparency of processes (e.g. making open peer review a possibility) and training.
- Do more to encourage the embedding of OS and RRI aspects in PRT policies. Institutional policy makers, such as heads of research policy and strategy at institutions should be at the forefront of this activity
- Consult researchers about the qualities that should be valued in research assessment locally to ensure buy-in from researchers
- Sign DORA and commit to eradicating discredited quantitative indicators (most prominently JIF) in research assessment. Test and trial alternative approaches (including alternative indicators) and share this knowledge with the community
- Promote qualitative indicators incentivising researchers in producing rigorous and reproducible research
- Avoid one-size-fits-all approaches and design reformed PRT processes that account for disciplinary differences at their institution, the national frameworks to which they are related, and differing needs related to gender, diversity and career-stage

**Researchers should:**

- Lobby for reform to PRT processes within their institutions where these are seen as outmoded in light of current evidence regarding the ill-effects of over-quantification (e.g., use of JIF). Discuss with all research stakeholders the need for change
- Practice Open Science and RRI for their own sake, because they make research more because rigorous, reproducible, re-usable and oriented to the values of society

## 8. References

- Acord, Sophia Krzys, and Diane Harley. 2013. 'Credit, Time, and Personality: The Human Challenges to Sharing Scholarly Work Using Web 2.0'. *New Media & Society* 15 (3): 379–97. <https://doi.org/10.1177/1461444812465140>.
- Adler, Robert, John Ewing, and Peter Taylor. 2009. 'Citation Statistics'. *Statistical Science* 24 (1): 1–14. <https://doi.org/10.1214/09-STS285>.
- Alperin, Juan P, Carol Muñoz Nieves, Lesley A Schimanski, Gustavo E Fischman, Meredith T Niles, and Erin C McKiernan. 2019. 'How Significant Are the Public Dimensions of Faculty Work in Review, Promotion and Tenure Documents?' *ELife* 8 (February): e42254. <https://doi.org/10.7554/eLife.42254>.
- Alperin, Juan Pablo, Lesley A. Schimanski, Michelle La, Meredith T. Niles, and Erin C. McKiernan. 2020. 'The Value of Data and Other Non-Traditional Scholarly Outputs in Academic Review, Promotion, and Tenure in Canada and the United States'. *Open Handbook of Linguistic Data Management*. <https://hcommons.org/deposits/item/hc:32909/>.
- Anderson, Melissa S., Emily A. Ronning, Raymond G. De Vries, and Brian C. Martinson. 2010. 'Extending the Mertonian Norms: Scientists' Subscription to Norms of Research'. *The Journal of Higher Education* 81 (3): 366–93. <https://doi.org/10.1353/jhe.0.0095>.
- Blackmore, Paul, and Camille B. Kandiko. 2011. 'Motivation in Academic Life: A Prestige Economy'. *Research in Post-Compulsory Education* 16 (4): 399–411. <https://doi.org/10.1080/13596748.2011.626971>.
- Blankstein, Melissa, and Christine Wolff-Eisenberg. 2018. 'Ithaka S+R US Faculty Survey 2018', 70.
- Brown. 2014. 'Citation Searching for Tenure and Promotion: An Overview of Issues and Tools'. *Reference Services Review* 42 (1): 70–89. <https://doi.org/10.1108/RSR-05-2013-0023>.
- Burget, Mirjam, Emanuele Bardone, and Margus Pedaste. 2017. 'Definitions and Conceptual Dimensions of Responsible Research and Innovation: A Literature Review'. *Science and Engineering Ethics* 23 (1): 1–19. <https://doi.org/10.1007/s11948-016-9782-1>.
- Cagan, Ross. 2013. 'The San Francisco Declaration on Research Assessment'. *Disease Models & Mechanisms* 6 (4): 869–70. <https://doi.org/10.1242/dmm.012955>.
- Colavizza, Giovanni, Iain Hrynaszkiewicz, Isla Staden, Kirstie Whitaker, and Barbara McGillivray. 2020. 'The Citation Advantage of Linking Publications to Research Data'. *PLOS ONE* 15 (4): e0230416. <https://doi.org/10.1371/journal.pone.0230416>.
- Coonin, Bryna, and Leigh Younce. 2009. 'Publishing in Open Access Journals in The Social Sciences and Humanities: Who's Doing It and Why', 10.
- Cox, Alexander M. G., and Jan Obloj. 2015. 'On Joint Distributions of the Maximum, Minimum and Terminal Value of a Continuous Uniformly Integrable Martingale'. *Stochastic Processes and Their Applications* 125 (8): 3280–3300. <https://doi.org/10.1016/j.spa.2015.03.005>.
- Cronin, Blaise, and Kara Overfelt. 1995. 'E-Journals and Tenure', 4.
- Curry, Stephen. 2018. 'Let's Move beyond the Rhetoric: It's Time to Change How We Judge Research'. *Nature* 554 (7691): 147–147. <https://doi.org/10.1038/d41586-018-01642-w>.
- Directorate-General for Research and Innovation, ed. 2016. *Open Innovation, Open Science, Open to the World: A Vision for Europe*. Luxembourg: Publications Office of the European Union.
- Directorate-General for Research and Innovation (European Commission), Rebecca Lawrence, and Eva Mendez. 2020. *Progress on Open Science: Towards a Shared Research Knowledge System : Final Report of the Open Science Policy Platform*. LU: Publications Office of the European Union. <https://data.europa.eu/doi/10.2777/00139>.
- Directorate-General for Research and Innovation (European Commission), Rene von Schomberg, J. Britt Holbrook, Alis Oancea, Shina Caroline Lynn Kamerlin, Ismael Ràfols, Merle Jacob, and Paul Wouters. 2019. *Indicator Frameworks for Fostering Open Knowledge Practices in Science and Scholarship*. LU: Publications Office of the European Union. <https://data.europa.eu/doi/10.2777/445286>.

- 'EUA Roadmap on Research Assessment in the Transition to Open Science'. 2018. 2018.  
<https://eua.eu/resources/publications/316:eua-roadmap-on-research-assessment-in-the-transition-to-open-science.html>.
- European Commission. Directorate General for Research and Innovation. 2017. *Evaluation of Research Careers Fully Acknowledging Open Science Practices: Rewards, Incentives and/or Recognition for Researchers Practicing Open Science*. LU: Publications Office.  
<https://data.europa.eu/doi/10.2777/75255>.
- Farrow, Katherine, Gilles Grolleau, and Lisette Ibanez. 2017. 'Social Norms and Pro-Environmental Behavior: A Review of the Evidence'. *Ecological Economics* 140 (October): 1–13.  
<https://doi.org/10.1016/j.ecolecon.2017.04.017>.
- Fauzi, Muhammad Ashraf, Christine Nya-Ling Tan, Mahyuddin Daud, and Muhammad Mukhtar Noor Awalludin. 2020. 'University Rankings: A Review of Methodological Flaws'. *University Rankings*, 19.
- Fleck, Christian. 2013. 'Impact Factor Fetishism'. *European Journal of Sociology* 2: 327–56.  
<https://doi.org/10.1017/S0003975613000167>.
- Gardner, Susan K., and Daniela Veliz. 2014. 'Evincing the Ratchet: A Thematic Analysis of the Promotion and Tenure Guidelines at a Striving University'. *The Review of Higher Education* 38 (1): 105–32. <https://doi.org/10.1353/rhe.2014.0045>.
- Hicks, Diana, Paul Wouters, Ludo Waltman, Sarah de Rijcke, and Ismael Rafols. 2015. 'Bibliometrics: The Leiden Manifesto for Research Metrics'. *Nature* 520 (7548): 429–31.  
<https://doi.org/10.1038/520429a>.
- King, C Judson, Diane Harley, Sarah Earl-Novell, Jennifer Arter, Shannon Lawrence, and Irene Perciali. 2006. 'Scholarly Communication: Academic Values and Sustainable Models', 126.
- King, Diane, Sophia Krzys Acord, and Earl-Novell, Sarah. 2010. 'Assessing the Future Landscape of Scholarly Communication: An Exploration of Faculty Values and Needs in Seven Disciplines'. [https://www.academia.edu/4697918/Assessing\\_the\\_Future\\_Landscape\\_of\\_Scholarly\\_Communication\\_An\\_Exploration\\_of\\_Faculty\\_Values\\_and\\_Needs\\_in\\_Seven\\_Disciplines](https://www.academia.edu/4697918/Assessing_the_Future_Landscape_of_Scholarly_Communication_An_Exploration_of_Faculty_Values_and_Needs_in_Seven_Disciplines).
- Köster, Massimo, Agnes Moors, Jan De Houwer, Tony Ross-Hellauer, Inge Van Nieuwerburgh, and Frederick Verbruggen. 2021. 'Behavioral Reluctance in Adopting Open Access Publishing: Insights From a Goal-Directed Perspective'. *Frontiers in Psychology* 12: 1111.  
<https://doi.org/10.3389/fpsyg.2021.649915>.
- Latour, Bruno, and Steve Woolgar. 2013. *Laboratory Life*. Laboratory Life. Princeton University Press.  
<https://www.degruyter.com/document/doi/10.1515/9781400820412/html>.
- Liner, Gaines H., and Ellen Sewell. 2009. 'Research Requirements for Promotion and Tenure at PhD Granting Departments of Economics'. *Applied Economics Letters* 16 (8): 765–68.  
<https://doi.org/10.1080/13504850701221998>.
- Malsch, Bertrand. 2014. 'Journal Ranking Effects on Junior Academics: Identity Fragmentation and Politicization', 15.
- McGill, Monica M., and Amber Settle. 2011. 'Computing Faculty Tenure and Promotion Requirements at USA and Canadian Post-Secondary Institutions'. In *Proceedings of the 2011 Conference on Information Technology Education - SIGITE '11*, 133. West Point, New York, USA: ACM Press. <https://doi.org/10.1145/2047594.2047632>.
- McKiernan, Erin C, Philip E Bourne, C Titus Brown, Stuart Buck, Amye Kenall, Jennifer Lin, Damon McDougall, et al. 2016. 'How Open Science Helps Researchers Succeed'. Edited by Peter Rodgers. *ELife* 5 (July): e16800. <https://doi.org/10.7554/eLife.16800>.
- McKiernan, Erin C, Lesley A Schimanski, Carol Muñoz Nieves, Lisa Matthias, Meredith T Niles, and Juan P Alperin. 2019. 'Use of the Journal Impact Factor in Academic Review, Promotion, and Tenure Evaluations'. Edited by Emma Pewsey, Peter Rodgers, and Björn Brembs. *ELife* 8 (July): e47338. <https://doi.org/10.7554/eLife.47338>.
- Merton, Robert K. 1973. 'The Normative Structure of Science'. In *The Sociology of Science*, 267–80. Chicago: The University of Chicago Press.

- Migheli, Matteo, and Giovanni B. Ramello. 2014. 'Open Access Journals and Academics' Behavior'. *Economic Inquiry* 52 (4): 1250–66. <https://doi.org/10.1111/ecin.12131>.
- Mitroff, I. 1974. 'Norms and Counter-Norms in a Select Group of the Apollo Moon Scientists: A Case Study of the Ambivalence of Scientists'. <https://doi.org/10.2307/2094423>
- Morales, Esteban, Erin McKiernan, Meredith T. Niles, Lesley Schimanski, and Juan Pablo Alperin. 2021. 'How Faculty Define Quality, Prestige, and Impact in Research'. *BioRxiv*, April, 2021.04.14.439880. <https://doi.org/10.1101/2021.04.14.439880>.
- MoRRI,. 2018. 'The Evolution of Responsible Research and Innovation in Europe: The MoRRI Indicators Report D4.3'. Technopolis-Group. 2018. <https://www.technopolis-group.com/report/the-evolution-of-responsible-research-and-innovation-in-europe-the-morri-indicators-report-d4-3/>.
- Nederhof, Anton J. 2008. 'Policy Impact of Bibliometric Rankings of Research Performance of Departments and Individuals in Economics'. *Scientometrics* 74 (1): 163–74. <https://doi.org/10.1007/s11192-008-0109-0>.
- Niles, Meredith T., Lesley A. Schimanski, Erin C. McKiernan, and Juan Pablo Alperin. 2020. 'Why We Publish Where We Do: Faculty Publishing Values and Their Relationship to Review, Promotion and Tenure Expectations'. *PLOS ONE* 15 (3): e0228914. <https://doi.org/10.1371/journal.pone.0228914>.
- Nowick, Elaine Maytag. 2008. 'Academic Rank of Authors Publishing in Open Access Journals', 8.
- Nunez-Wolff, Charlotte N. 2007. 'A study of the relationship of external funding to medical school faculty success', 24.
- Owen, Richard. 2021. 'Organisational Institutionalisation of Responsible Innovation'. *Research Policy*, 13.
- Owen, Richard, Phil Macnaghten, and Jack Stilgoe. 2012. 'Responsible Research and Innovation: From Science in Society to Science for Society, with Society'. *Science and Public Policy* 39 (6): 751–60.
- Peekhaus, Wilhelm, and Nicholas Proferes. 2015. 'How Library and Information Science Faculty Perceive and Engage with Open Access'. *Journal of Information Science* 41 (5): 640–61. <https://doi.org/10.1177/0165551515587855>.
- Peter Viola, Frédéric João Maier, Niels Mejlgaard, Carter Bloch, Emil Madsen, Erich Griessler, Milena Wuketich, and Jack Stilgoe. 2018. 'Final Report – Summarising Insights from the MoRRI Project D13'. D13. <https://www.technopolis-group.com/report/final-report-summarising-insights-from-the-morri-project-d13/>.
- Pontika, Nancy, Petr Knoth, Matteo Cancellieri, and Samuel Pearce. 2015. 'Fostering Open Science to Research Using a Taxonomy and an ELearning Portal'. In *Proceedings of the 15th International Conference on Knowledge Technologies and Data-Driven Business*, 1–8. Graz Austria: ACM. <https://doi.org/10.1145/2809563.2809571>.
- Pride, David, and Petr Knoth. 2018. 'Peer Review and Citation Data in Predicting University Rankings, a Large-Scale Analysis'. In *Digital Libraries for Open Knowledge*, edited by Eva Méndez, Fabio Crestani, Cristina Ribeiro, Gabriel David, and João Correia Lopes, 11057:195–207. Lecture Notes in Computer Science. Cham: Springer International Publishing. [https://doi.org/10.1007/978-3-030-00066-0\\_17](https://doi.org/10.1007/978-3-030-00066-0_17).
- Rice, Danielle B, Hana Raffoul, John P A Ioannidis, and David Moher. 2020. 'Academic Criteria for Promotion and Tenure in Biomedical Sciences Faculties: Cross Sectional Analysis of International Sample of Universities'. *BMJ*, June, m2081. <https://doi.org/10.1136/bmj.m2081>.
- Rodriguez, Julia E. 2014. 'Awareness and Attitudes about Open Access Publishing: A Glance at Generational Differences'. *The Journal of Academic Librarianship* 40 (6): 604–10. <https://doi.org/10.1016/j.acalib.2014.07.013>.
- Ross-Hellauer, Tony, Stefan Reichmann, Nicki Lisa Cole, Angela Fessl, Thomas Klebel, and Nancy Pontika. 2021. 'Dynamics of Cumulative Advantage and Threats to Equity in Open Science - A

- Scoping Review'. SocArXiv. <https://doi.org/10.31235/osf.io/d5fz7>.
- Saenen, Bregt, Rita Morais, Vinciane Gaillard, and Lidia Borrell-Damián. 2019. 'Research Assessment in the Transition to Open Science', 48.
- Schimanski, Lesley A., and Juan Pablo Alperin. 2018. 'The Evaluation of Scholarship in Academic Promotion and Tenure Processes: Past, Present, and Future'. *F1000Research* 7 (October): 1605. <https://doi.org/10.12688/f1000research.16493.1>.
- Schomberg, René von. 2019. 'Why Responsible Innovation'. In *The International Handbook on Responsible Innovation. A Global Resource*. Cheltenham: Edward Elgar Publishing.
- Seipel, Michael M. O. 2003. 'Assessing Publication for Tenure'. *Journal of Social Work Education* 39 (1): 79–88. <https://doi.org/10.1080/10437797.2003.10779120>.
- Sutcliffe, Hilary. 2011. 'A Report on Responsible Research & Innovation', 34.
- Van Fleet, David D., Abigail McWilliams, and Donald S. Siegel. 2000. 'A Theoretical and Empirical Analysis of Journal Rankings: The Case of Formal Lists'. *Journal of Management* 26 (5): 839–61. <https://doi.org/10.1177/014920630002600505>.
- Vicente-Saez, Ruben, and Clara Martinez-Fuentes. 2018. 'Open Science Now: A Systematic Literature Review for an Integrated Definition'. *Journal of Business Research* 88 (July): 428–36. <https://doi.org/10.1016/j.jbusres.2017.12.043>.
- Vinyard, Marc, and Jaimie Beth Colvin. 2018. 'How Research Becomes Impact: Librarians Helping Faculty Use Scholarly Metrics to Select Journals'. *College & Undergraduate Libraries* 25 (2): 187–204. <https://doi.org/10.1080/10691316.2018.1464995>.
- Walker, Robin L., Lindsay Sykes, Brenda R. Hemmelgarn, and Hude Quan. 2010. 'Authors' Opinions on Publication in Relation to Annual Performance Assessment'. *BMC Medical Education* 10 (1): 21. <https://doi.org/10.1186/1472-6920-10-21>.
- Wang, Jian. 2014. 'Unpacking the Matthew Effect in Citations'. *Journal of Informetrics* 8 (2): 329–39. <https://doi.org/10.1016/j.joi.2014.01.006>.
- Wilsdon, James, Liz Allen, Eleonora Belfiore, Philip Campbell, Stephen Curry, Steven Hill, Richard Jones, et al. 2015. 'The Metric Tide: Report of the Independent Review of the Role of Metrics in Research Assessment and Management'. <https://doi.org/10.13140/RG.2.1.4929.1363>.
- Woolston, Chris. 2021. 'Impact Factor Abandoned by Dutch University in Hiring and Promotion Decisions'. *Nature*, June. <https://doi.org/10.1038/d41586-021-01759-5>.
- Youn and Price. 2009. 'Learning from the Experience of Others: The Evolution of Faculty Tenure and Promotion Rules in Comprehensive Institutions'. *The Journal of Higher Education* 80 (2): 204–37. <https://doi.org/10.1353/jhe.0.0041>.

## 9. Annex

### 9.1. General instructions for the policies collection

<b>General instructions - Read before reviewing the policies</b>	
1	Before you start reading the policy itself, read all the questions and instructions in the spreadsheet, as you will have to keep them in mind as you go through the policy.
2	Name the entire Sheet as "PoliciesCountry" (e.g. PoliciesGermany).
3	Next, make one sheet for each policy, and name each page with the policy index as name.
4	Don't consider other policies (gender, ethics, research integrity...) from the same institution, even if they are mentioned in the policy you are reviewing.
5	If the policy links to another document/ homepage that lists the evaluation criteria to be applied for the policy at hand, use it.
6	Don't look for specific terms, but the concept we mean, e.g. Gender equality could also be equal opportunities, and societal impact could be knowledge transfer, third mission, outreach...
7	When you think you are done and haven't found some of the indicators, do a quick search (Ctrl+F) for these indicators (in the language of the policy!), and if you don't find it put 0 for doesNotApply.
8	Please copy+paste the parts of text that mention the indicator in the column CopyPasteSnippetOfText. If the policy is written in full sentences: Copy + paste the full sentence that mentions the indicator. Include the sentence before and after to provide contextual information. If the policy lists bullet points, list the point before and after, and list the heading of the bullet point list.

## 9.2. Scree plot of principal component analysis

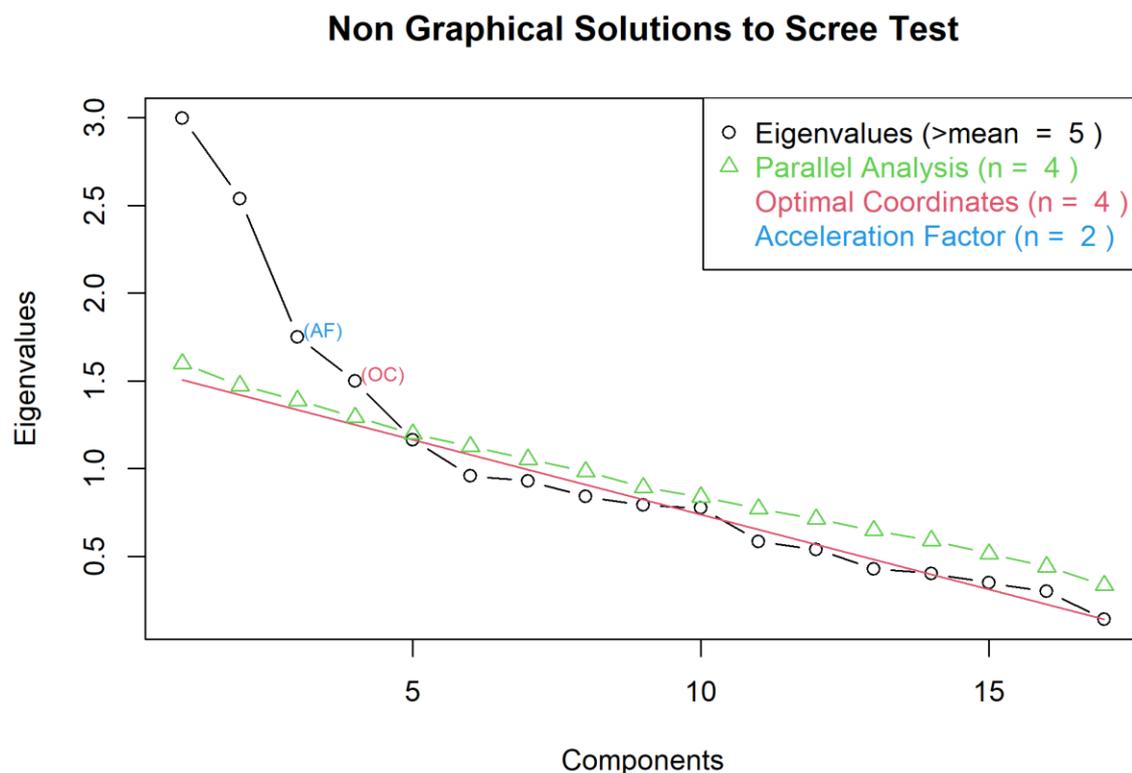


Figure A1: Scree plot and parallel test of indicators

## 9.3. Survey on Understanding academic researchers' views on career progression

## Understanding academic researchers' views on career progression

We are conducting an international survey to better understand the **criteria related to research activities** used to assess researchers in promotion processes at higher education institutions. This survey is part of the Horizon 2020 project ON-MERRIT (<https://on-merrit.eu>).

You will be asked questions relating to the promotion policies of your institution, faculty, department, college, etc. Please answer all questions according to your knowledge and views of the policies related to your current career stage. Some questions will ask for your perception of what your institution values in this respect, while others will ask for your personal opinion of what should be important.

By participating in this survey, you have an opportunity to help us better understand this landscape and shape policy recommendations. These will be communicated to a range of stakeholders, including funders and higher education institutions.

The estimated completion time for this survey is 10 - 15 minutes.

There are 37 questions in this survey.

## Participant information sheet and consent form

### Participation

Please read the following information before deciding whether to participate in our study. Please ask us any questions you may have about the process or project before completing the consent form (see contact details below).

### Informed Consent

You are invited to participate in this study on a voluntary basis and you are free to withdraw from the study at any time without providing any reason for doing so, before completing the survey.

You won't be asked to provide any personally identifying information. All the information you provide will be anonymised and treated confidentially and will be used for research purposes. It will not be used in a manner which would allow identification of you as an individual. This applies to all outputs that might stem from the project, including academic papers and other reports, conference presentations and published datasets. The data and the survey itself will be stored on the internal servers of [Know-Center](#) GmbH (Austria). All data will be deleted five years after project completion.

Contact: [nancy.pontika@open.ac.uk](mailto:nancy.pontika@open.ac.uk), Open University, UK.

\* To save the survey in case you want to continue at a later time, please use the **"Resume later"** button, located on the top right hand side of each survey page.

I hereby consent to the processing of my given data for the selected purposes.

{if(((Q0\_SQ001=="2") or (Q0\_SQ002=="2") or (Q0\_SQ003=="2") or (Q0\_SQ004=="2")), "WARNING: You need to agree to all four statements, otherwise you will not be able to continue with the survey.")

Please choose the appropriate response for each item:

	Yes	No
I confirm that I have read the participant information		
I understand that my participation in this survey is voluntary and all the information will be anonymised		
I agree that any data collected may be published in anonymous form in books, reports or journals and shared in presentations		
I agree to take part in this survey		

## Current research status

Are you conducting research as part of a contract at a higher education institution?

\*Please choose only one of the following:

- Yes
- No

## Institutional context

We want to understand your **institutional context** as well as **your familiarity** with your employers' promotion policies in relation to research.

Not all items may be of relevance to you and your research - if so, use the "Not applicable" option.

In which country is your affiliated institution based? \*

Choose one of the following answers

Please choose **only one** of the following:

- Afghanistan
- Albania
- Algeria
- Andorra

- Angola
- Antigua and Barbuda
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- The Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Benin
- Bhutan
- Bolivia
- Bosnia and Herzegovina
- Botswana
- Brazil
- Brunei
- Bulgaria
- Burkina Faso
- Burundi
- Cabo Verde
- Cambodia
- Cameroon
- Canada
- Central African Republic
- Chad
- Chile
- China
- Colombia
- Comoros
- Congo, Democratic Republic of the
- Congo, Republic of the
- Costa Rica
- Côte d'Ivoire
- Croatia
- Cuba
- Cyprus
- Czech Republic
- Denmark
- Djibouti
- Dominica

- Dominican Republic
- East Timor (Timor-Leste)
- Ecuador
- Egypt
- El Salvador
- Equatorial Guinea
- Eritrea
- Estonia
- Eswatini
- Ethiopia
- Fiji
- Finland
- France
- Gabon
- The Gambia
- Georgia
- Germany
- Ghana
- Greece
- Grenada
- Guatemala
- Guinea
- Guinea-Bissau
- Guyana
- Haiti
- Honduras
- Hungary
- Iceland
- India
- Indonesia
- Iran
- Iraq
- Ireland
- Israel
- Italy
- Jamaica
- Japan
- Jordan
- Kazakhstan
- Kenya
- Kiribati
- Korea, North
- Korea, South
- Kosovo
- Kuwait

- Kyrgyzstan
- Laos
- Latvia
- Lebanon
- Lesotho
- Liberia
- Libya
- Liechtenstein
- Lithuania
- Luxembourg
- Madagascar
- Malawi
- Malaysia
- Maldives
- Mali
- Malta
- Marshall Islands
- Mauritania
- Mauritius
- Mexico
- Micronesia, Federated States of
- Moldova
- Monaco
- Mongolia
- Montenegro
- Morocco
- Mozambique
- Myanmar (Burma)
- Namibia
- Nauru
- Nepal
- Netherlands
- New Zealand
- Nicaragua
- Niger
- Nigeria
- North Macedonia
- Norway
- Oman
- Pakistan
- Palau
- Panama
- Papua New Guinea
- Paraguay
- Peru

- Philippines
- Poland
- Portugal
- Qatar
- Romania
- Russia
- Rwanda
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and the Grenadines
- Samoa
- San Marino
- Sao Tome and Principe
- Saudi Arabia
- Senegal
- Serbia
- Seychelles
- Sierra Leone
- Singapore
- Slovakia
- Slovenia
- Solomon Islands
- Somalia
- South Africa
- Spain
- Sri Lanka
- Sudan
- Sudan, South
- Suriname
- Sweden
- Switzerland
- Syria
- Taiwan
- Tajikistan
- Tanzania
- Thailand
- Togo
- Tonga
- Trinidad and Tobago
- Tunisia
- Turkey
- Turkmenistan
- Tuvalu
- Uganda
- Ukraine

- United Arab Emirates
- United Kingdom
- United States
- Uruguay
- Uzbekistan
- Vanuatu
- Vatican City
- Venezuela
- Vietnam
- Yemen
- Zambia
- Zimbabwe
- Other

What is the name of your institution? (Not a required field).

Please write your answer here:

Are you on a limited-term contract?

\*Choose one of the following answers

Please choose only one of the following:

- Yes
- No
- I don't know
- Other

Do you see yourself working at the same institution in 5 years?

\* Choose one of the following answers

Please choose only one of the following:

- Yes
- No
- I don't know
- Not applicable
- Other

Do you intend to apply for a promotion within the next 5 years?

\* Choose one of the following answers

Please choose only one of the following:

- Yes
- No
- I don't know
- Not applicable
- Other

\* For each of the statements below provide your personal level of agreement or disagreement:

Please choose the appropriate response for each item:

	Compl etely agree	Agree	Neithe r agree nor disagre e	Disagr ee	Compl etely disagre e	I don't know	Not applica ble
I know where to find the promotion policy relevant to my current career stage as a researcher (e.g. institution's website, intranet or handbook)							
I am familiar with the promotion policy that applies to my current career stage							

### Organisational attitudes

With the following list of questions, we are interested in your organisation's research assessment policies that apply to your current career stage. Please answer to the best of your knowledge. Not all items may be of relevance to you and your research - if so, use the "Not applicable" option.

\* According to your institutional policies, how important are the following research activities in making promotion decisions in relation to your current career stage?

Please choose the appropriate response for each item:

	Very import ant	Some what import ant	Neithe r import ant nor unimp ortant	Somew hat unimp ortant	Very unimp ortant	I don't know	Not applica ble
Publishing a large number of research articles							
Generating a large number of citations							
Generating high-quality publications, as assessed by independent qualitative assessment (e.g. peer review)							

Publishing in highly regarded journals or conferences (as measured by e.g. journal impact factor, conference rank, etc.)							
Openly sharing research articles (by publishing in Open Access or depositing in repositories)							
Openly sharing research data							
Openly sharing research code or creating research software							
Engaging with the public (e.g. uptake by non-academic groups, citizen science, science communication)							
Developing industry collaborations							
Creating intellectual property (including patents)							
Engaging policy makers							
Giving invited talks and keynotes							
Contributing to peer review							
Networking activities (e.g. organising or participating in conferences)							
Being collegial, helpful and respectful							

Mentoring PhDs and postdocs							
Generating funding							
Receiving awards							
Leading projects							

Are there any research activities not included in the previous sections that you believe should be recognised in assessment activities by your institution that currently are not?

Please write your answer here:

How do you feel overall about the relevant research assessment indicators used in promotion processes at your institution?

Please write your answer here:

\* At your institution, is it the case that:

Please choose the appropriate response for each item:

	Compl etely agree	Agree	Neithe r agree nor disagre e	Disagr ee	Compl etely disagre e	I don't know	Not applica ble
Where two candidates are equally qualified, candidates from underrepresented groups are preferred (e.g. women/men or minority groups) for promotion							
Where possible, promotion committees include representative numbers of women and minorities							

Are there other factors (social, political, performance-based, etc.) that are not officially used as promotion criteria, but that you nonetheless believe are important to getting promoted at your institution?

Please write your answer here:

### Attitudes to research assessment and promotion decisions

Having understood your organisational context, we are now interested in understanding what you feel should be valued in research assessment in the context of promotion decisions.

Not all items may be of relevance to you and your research - if so, use the "Not applicable" option.

\* In your own personal opinion, how important should the following research activities be when making promotion decisions?

Please choose the appropriate response for each item:

	Very important	Somewhat important	Neither important nor unimportant	Somewhat unimportant	Very unimportant	I don't know	Not applicable
Publishing a large number of research articles							
Generating a large number of citations							
Generating high-quality publications, as assessed by independent qualitative assessment (e.g. peer review)							
Publishing in highly regarded journals or conferences (as measured by e.g. journal impact factor, conference rank, etc.)							
Openly sharing research articles (by publishing in Open Access or depositing in repositories)							
Openly sharing research data							
Openly sharing research code or creating research software							

Engaging with the public (e.g. uptake by non-academic groups, citizen science, science communication)							
Developing industry collaborations							
Creating intellectual property (including patents)							
Engaging policy makers							
Giving invited talks and keynotes							
Contributing to peer review							
Networking activities (e.g. organising or participating in conferences)							
Being collegial, helpful and respectful							
Mentoring PhDs and postdocs							
Generating funding							
Receiving awards							
Leading projects							

\* In your personal opinion, to what extent do you agree or disagree with the following:  
Please choose the appropriate response for each item:

	Compl etely agree	Agree	Neithe r agree nor disagre e	Disagr ee	Compl etely disagre e	I don't know	Not applica ble
--	-------------------------	-------	--	--------------	--------------------------------	-----------------	-----------------------

Where two candidates are equally qualified, candidates from underrepresented groups should be preferred (e.g. women/men or minority groups) for promotion							
Promotion committees should where possible include representative numbers of women/men and minorities.							

### Practices

We are interested in understanding your personal and organisational practices with regards to activities which could be taken into account in assessing research contributions. Not all items may be of relevance to you and your research - if so, use the "Not applicable" option or enter a zero (0).

In the last 3 years, how many research articles (including books, book chapters, etc.) did you publish approximately?

Only numbers may be entered in this field.

Please write your answer here:

- 

Approximately, how many of the papers you published in the last 3 years are Open Access (either on the publisher website or in a repository - institutional or disciplinary)?

Only answer this question if the following conditions are met:

Answer was greater than '0' at question '16 [Q10]' (In the last 3 years, how many research articles (including books, book chapters, etc.) did you publish approximately?)

Only numbers may be entered in this field.

Please write your answer here:

- 

What, if anything, would incentivise you to make more research articles Open Access (please list up to 3 things).

Please write your answer here:

In the last three years, my choice of publication venue (journal, book publisher, conference, etc.) was influenced by the promotion criteria of my university:

\* Choose one of the following answers

Please choose only one of the following:

- Very often
- Often
- Neither often nor rarely

- Rarely
- Very rarely
- I don't know
- Does not apply

In the last three years, how many research datasets did you approximately produce?

\* Only numbers may be entered in this field.

Please write your answer here:

- 

Of the research datasets that you produced in the last three years, approximately how many of them did you openly share (via repositories or data journals)?

\* Only answer this question if the following conditions are met:

Answer was greater than '0' at question '20 [Q10d]' (In the last three years, how many research datasets did you approximately produce?)

Only numbers may be entered in this field.

Please write your answer here:

- 

What, if anything, would incentivise you to make more datasets openly available (please list up to 3 things).

Please write your answer here:

In the last three years how many peer reviews did you approximately carry out?

\* Only numbers may be entered in this field.

Please write your answer here:

- 

Of the peer reviews that you have carried out in the last three years, how many approximately were open peer reviews where the review was published alongside the article?

\* Only answer this question if the following conditions are met:

Answer was greater than '0' at question '23 [Q10g]' (In the last three years how many peer reviews did you approximately carry out? )

Only numbers may be entered in this field.

Please write your answer here:

- 

What, if anything, would incentivise you to do more open peer review (please list up to 3 things).

Please write your answer here:

How important, for the success of your research, is it to engage with the public (e.g. uptake by non-academic groups, citizen science, science communication)?

\* Choose one of the following answers

Please choose only one of the following:

- Very important
- Important
- Neither important nor unimportant
- Unimportant
- Very unimportant
- I don't know
- Not applicable

What, if anything, would incentivise you to engage more with the public (please list up to 3 things).

Please write your answer here:

How important, for the success of your research, is it to engage with industry?

\* Choose one of the following answers

Please choose only one of the following:

- Very important
- Important
- Neither important nor unimportant
- Unimportant
- Very unimportant
- I don't know
- Not applicable

What, if anything, would incentivise you to engage more with industry (please list up to 3 things).

Please write your answer here:

How important, for the success of your research, is it to engage with policy makers?

\* Choose one of the following answers

Please choose only one of the following:

- Very important
- Important
- Neither important nor unimportant
- Unimportant
- Very unimportant
- I don't know
- Not applicable

What, if anything, would incentivise you to engage more with policy-makers (please list up to 3 things).

Please write your answer here:

**Demographics**

What is your gender?

\* Choose one of the following answers

Please choose only one of the following:

- Female
- Male
- Non-binary
- Prefer not to say

What is your academic role?

\* Choose one of the following answers

Please choose only one of the following:

- Doctoral researcher
- Post-doctoral researcher (up to 5 years post-PhD)
- Lecturer / Assistant Professor / Research Fellow
- Senior Lecturer / Associate Professor / Senior Researcher
- Professor
- Other

Which year did you publish your first academic publication (journal article, book, conference proceedings, etc.)?

\*Only numbers may be entered in this field.

Please write your answer here:

- 

How would you characterise your institution?

\* Choose one of the following answers

Please choose only one of the following:

- Research intensive
- Teaching intensive
- Both research and teaching intensive
- Other

Select the subject topic of your research:

\* Choose one of the following answers

Please choose only one of the following:

- Agriculture
- Archeology
- Arts
- Astronomy
- Biology
- Business
- Chemistry
- Climate
- Communications

- Computer Science
- Economics
- Education
- Engineering
- Environmental Science
- Geography
- Geology
- Health
- History
- Law
- Library Science
- Life Sciences
- Linguistics
- Materials Science
- Mathematics
- Medicine
- Philosophy
- Physics
- Political Science
- Psychology
- Public Health
- Sociology
- Statistics
- Other

Is there anything else you would like to share with us regarding this survey?

Please write your answer here:

Thank you very much for your time. If you have any questions contact [nancy.pontika@open.ac.uk](mailto:nancy.pontika@open.ac.uk).

Submit your survey.

Thank you for completing this survey.