

technopolis_{|group|}

Science Europe Study on Research Assessment Practices

Final Report

Science Europe Study on Research Assessment Practices

Final Report

technopolis _{|group|} 27th December 2019

María del Carmen Calatrava Moreno

Katharina Warta

Erik Arnold

Brigitte Tiefenthaler

Peter Kolarz

Sandra Skok

For further information please contact the
Science Europe Office: office@scienceeurope.org

© Copyright Science Europe 2020. This work is licensed under a Creative Commons Attribution 4.0 International Licence, which permits unrestricted use, distribution, and reproduction in any medium, provided the original authors and source are credited, with the exception of logos and any other content marked with a separate copyright notice. To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/> or send a letter to Creative Commons, 444 Castro Street, Suite 900, Mountain View, California, 94041, USA.



Table of Contents

| | |
|---|-----------|
| Executive Summary | 1 |
| Established approaches to assess and select proposals and researchers | 1 |
| Challenges during the assessment process..... | 1 |
| Current developments in research assessment and alternative methods | 2 |
| 1 Introduction..... | 3 |
| 2 Objective and key dimensions of the study..... | 4 |
| 3 Methodological note..... | 5 |
| 4 The broader framing of research assessment | 6 |
| 5 Key findings | 7 |
| 5.1 Overall tendencies and well-established practices | 7 |
| 5.1.1 Multi-step applications and multi-stage evaluation process | 7 |
| 5.1.2 External reviewing as a research assessment standard | 9 |
| 5.1.3 Measures to prevent discrimination and bias | 10 |
| 5.2 Challenges | 12 |
| 5.2.1 Robust, transparent research assessment processes | 12 |
| 5.2.2 Scientific assessment and funding/promoting decision | 14 |
| 5.2.3 Cost and efficiency of research assessments | 15 |
| 5.2.4 Exhaustion of the pool of reviewers and their ‘fatigue’ | 16 |
| 5.3 Current developments | 17 |
| 5.3.1 Predominance of qualitative assessments | 18 |
| 5.3.2 Experimentation with assessment systems and tools | 19 |
| 5.3.3 Challenge-oriented research and societal objectives..... | 21 |
| 6 Conclusions..... | 24 |
| 6.1 Diversity of organisations with widely shared basic principles on research assessment | 24 |
| 6.2 Classical research assessment, high professionalism, and casewise integration of new dynamics | 24 |
| 6.3 Open questions for further research | 25 |
| 7 References..... | 27 |
| Appendix A Methodological details | 29 |
| Appendix B Organisations participating in this study..... | 31 |
| Appendix C Survey questions..... | 34 |
| Appendix D Interview guide..... | 58 |

Tables

| | |
|---|----|
| Table 1 Members of the Task Force on Research Assessment | 3 |
| Table 2 Usage and importance of author-level approaches/tools to assess research productivity | 18 |
| Table 3 Long-standing practices, changes and plans for changes in research assessments | 19 |
| Table 4 Aspects of research that reviewers are required to assess in research assessments..... | 22 |
| Table 5 Survey participation rate | 29 |
| Table 6 Organisations participating in the survey and interviews of this study | 31 |

Figures

| | |
|---|----|
| Figure 1 Approaches in use for the assessment of research proposals and promotions per type of organisation | 9 |
| Figure 2 Types of potential discrimination scrutinised by different types of organisations | 11 |
| Figure 3 Types of potential discrimination scrutinised by organisations of different sizes | 11 |
| Figure 4 Frequency of evaluations to test the robustness of research assessments | 13 |
| Figure 5 Implementation of strategies to enhance the robustness and transparency of research assessments | 13 |
| Figure 6 Importance of aspects of research for the organisations' understanding of quality | 21 |
| Figure 7 Distribution of invited and participating organisations in the online survey | 30 |

Executive Summary

This report explores practices used for the selection of research proposals in competitive research funding programmes and in the selection of researchers for promotion within research organisations. The findings of this study are based on the information provided by 31 research funding organisations (RFO), 4 research performing organisations (RPO) and 1 organisation with a dual function (research funding and performing organisation) through a questionnaire and semi-structured interviews. The following questions have guided the study:

1. What approaches are used to assess and select proposals and researchers in a robust, fair and transparent manner?
2. What are the challenges that research organisations face during the assessment processes?
3. What are the current developments in the assessment of research proposals and researchers?

These three questions are elaborated upon in the next subsections.

Established approaches to assess and select proposals and researchers

Although the organisations participating in this study are of diverse nature, have a different focus and implement a variety of programs, they have common well-established practices for the assessment of research and researchers, primarily the use multi-stage research assessment processes, external single-blind peer reviews and panel reviews. Other approaches such as rankings, external open reviews, and internal single-blind reviews are also used but to a lesser extent. The least common approach are double-blind reviews, although it is used by one participating RFO with satisfactory results to make the research assessment more objective.

Transparency has received considerable attention in the design of the research assessment processes of the participating organisations not only after the assessment process has concluded (i.e. by providing feedback from reviewers) but also prior to it (i.e. the publication of the assessment criteria, description of the process and actors) and during its implementation (i.e. through the introduction of rebuttal phases).

Challenges during the assessment process

The mandate to ensure that the assessment process successfully selects the best projects for funding and researchers for promotion was discussed with the participating organisations. Reliance on competitive systems, peer review, multi-stage evaluation processes, written assessment guidelines and qualitative evaluations were discussed by most participating organisations as the key elements for ensuring robust assessments in this regard. Additionally, measures to prevent and detect discrimination and bias are in place in most organisations. The potential biases that are most scrutinised are gender and discipline, followed by affiliation in the case of RFOs and seniority in RPOs. Generally, the regulations or guidelines for assessment established by the organisations raise awareness on this topic and 68% of the surveyed organisations form reviewer panels with diverse profiles in order to minimise potential discrimination or bias.

The limited research funds and positions set more pressure on the research assessment process. Particularly challenging is distinguishing and ranking proposals and candidates when they are of similar quality and worth funding/promoting.

The cost and efficiency of research assessment are also discussed, particularly in evaluations that do not rely on quantitative indicators. Moreover, the balance between the quality and cost of the research assessment is of critical importance not only for the organisations but also for the scientific community whose members are involved as reviewers and for the applicants. Approaches for improved efficiency for these three stakeholders were discussed by the participants.

Current developments in research assessment and alternative methods

Most organisations rely on a qualitative assessment of research, some of them in combination with quantitative approaches (i.e. the number of publications in high-ranking journals) but most of them give higher importance to the qualitative assessment than to any other quantitative approach. Some interview participants elaborated on recent updates on guidelines for assessment to inform reviewers of the importance of the qualitative assessment and to discourage the use of metrics.

Experimentation with alternative assessments systems and tools takes place in a rather incremental basis and small select programs. Drawing lots, sandpits, double-blind assessments are being piloted by some organisations, while in others these are already in place mostly for specific programs and purposes. Several organisations are considering the use of altmetrics, and some others do not use it but recognise a broad format of research outputs.

Although non-academic impact and significance are often not considered in large generic research funding programs and in promotion schemes, evidence was gathered on several RFOs creating mission-oriented funding schemes to prioritise such kind of research. These programs are adapting their research assessments with different or extended criteria and reviewers to better assess this kind of research.

The following sections of the report further elaborate on the above-mentioned findings with survey data and evidence from the interviews. The report concludes with a summary of common patterns, trends observed among the participating institutions and open questions for further research.

1 Introduction

Science Europe represents the major public research organisations who fund or perform scientific research in Europe. The association was founded 2011 in Brussels and provides a collective voice for its member organisations to advocate and shape science policy and funding. Science Europe’s membership spans 37 organisations from 28 European countries and consists of many of the most important public research organisations in Europe.

‘Ensuring the quality of science’ is one of the long-term objectives of Science Europe, which strives to continually improve the framework conditions for performing and funding high-quality research in Europe.

Research assessment lies at the core of the activities of Science Europe Member Organisations (SE MOs). Reflecting this, in late 2018, the Science Europe Governing Board (SE GB) mandated the Science Europe Office (SEO) to launch an activity focussing on research assessment practices and processes. In light of this mandate, a Task Force (TF) on Research Assessment was set up comprising 8 expert representatives from the Science Europe membership (see Table 1).

Table 1 Members of the Task Force on Research Assessment

| Task Force members | Affiliation |
|--|---|
| Stan Gielen (supported by Hans de Jonge) | Dutch Research Council (NWO), The Netherlands |
| Anke Reinhardt | German Research Foundation (DFG), Germany |
| Falk Reckling | Austrian Science Fund (FWF), Austria |
| Jordi Molas-Gallart | Spanish National Research Council (CSIC), Spain |
| Marta Łazarowicz | Foundation for Polish Science (FNP), Poland |
| Michael Hill | Swiss National Science Foundation (SNSF), Switzerland |
| Giorgio Chiarelli | National Institute for Nuclear Physics (INFN), Italy |
| Sarah Collinge | UK Research and Innovation (UKRI), United Kingdom |
| James Morris | Science Europe (SE), Belgium |
| Maud Evrard | Science Europe (SE), Belgium |
| Bonnie Wolff-Boenisch (Chair) | Science Europe (SE), Belgium |

This Task Force met for the first time in February 2019 and developed the parameters of this study between February and May 2019. Technopolis Group Vienna were selected via a competitive ‘call for tender’ process in July 2019, and were asked to implement and conduct the study on behalf of Science Europe under the oversight of-, and in close cooperation with the TF and SEO.

2 Objective and key dimensions of the study

This report presents the findings of the Study on Research Assessment Practices, commissioned by Science Europe and carried out by Technopolis, both working in close cooperation. The purpose of the study is to provide an overview and assessment of the existing mechanisms employed by Research Funding Organisations (RFOs) to conduct assessments of research proposals and by Research Performing Organisations (RPOs) to assess candidates for promotion. This dual focus on RFOs and RPOs is motivated by the heterogeneous nature of Science Europe's members.

The following dimensions are relevant when comparing research assessment practices:

- **Objects of assessment processes** can be either projects submitted for funding, or people applying for promotion. In addition, there are research entities or 'institutes', with a broad scope of definition. If a project is to be assessed, the key question is whether the idea and the approach are expected to enhance (scientific) knowledge; the track record of a person can indicate whether this is someone with the required expertise. In practice, the distinction is not perfectly clear and the two often interrelate, as project evaluation refers to team members' references, and personal funding often refers to the evaluation of a given project proposal of a specific person
- Evaluation criteria depend on **funding objectives** and there is a difference between discipline-based evaluation and problem-oriented evaluation.¹ Discipline-based evaluation tends to be exclusively competitive on scientific quality criteria, whereas problem-oriented evaluation includes both quality and relevance criteria
- The third distinction is between **ex-ante and ex-post evaluation**. The focus of this study lies on ex-ante assessments of individual projects or of individuals to be promoted. In some cases, ex-post elements are present, when it comes to performance-based funding of research entities. Here, a particular challenge lies in the identification of the right level of aggregation

We would also like to stress two distinctive steps in the selection process, namely the assessment on one hand, which is the judgement of quality and relevance, and the funding decision on the other. In most assessment processes, this study refers to quality assessment (often involving external experts) leading to a listing of projects or candidates, from least to most fundable. The funding decision may, however, allow possible interventions into the list to comply with other criteria, i.e. problem-related or context elements.

¹ European Commission. Directorate-General for Research and Innovation (2013). [Options for Strengthening Responsible Research and Innovation](#).

3 Methodological note

This study is comprised of the following methodological components, creating the evidence base on which the findings and conclusions rest:

- **Analysis of policy documents and documentation** specific to individual RFOs and RPOs. These include annual and final reports of funding actions, publications of calls for applications, regulations of the processes in research assessment exercises, and guidelines for reviewers participating in the assessments
- An **online survey** addressed to RFOs and RPOs covering their ‘generic competitive funding’ or ‘generic researcher promotion’ scheme. The survey provides a broad overview with particularly good coverage of funding organisations that are members of Science Europe, and additional information of some non-European funding organisations, as well as some RPOs. It was completed by 38 organisations (33 RFOs, 4 RPOs and 1 organisation that functions both as RFO and RPO), with an overall response rate of 86%.
- **In-depth semi-structured interviews** with 20 organisations invited to further discuss their research assessment experiences. These interviews allowed to deepen our understanding of selection processes referred to in the survey, and to address other processes, i.e. those implemented in smaller but more experimental programmes

Findings from the survey and interviews, completed with public information provided by RFOs and RPOs on their webpages, were analysed to identify overall tendencies and well-established practices among participants, the main challenges they face, as well as the most important changes that are taking place. Examples of current practices and policy recommendations were developed to address some of the key challenges and changes.

A more detailed description of the methodology followed in this study is provided in Appendix A, and a list of the participating organisations is presented in Appendix B.

The project has been overseen by an international Task Force whose members were nominated by Science Europe.

4 The broader framing of research assessment

The scientific system as a whole has been growing considerably in recent decades, with large increases both in the volume of research proposals needing assessment and in the number of articles submitted to a growing number of journals. Both of these trends put the community's peer review capacity under pressure, while the growth in proposal volume additionally translates into declining success rates, making further in-roads into the time the community could otherwise spend on doing research. Research funders and journal editors alike are therefore looking for ways to make these processes more efficient.

The primary objective of funders' research assessment processes is the evaluation of proposals according to a set of criteria that define the fundability of research. The choice and definition of the assessment criteria vary across organisations and funding/promotion schemes, and also evolve over time. Most members of Science Europe have their roots in a funding tradition that focuses on using scientific quality and track record as the sole assessment criteria. Increasingly, however, they need to apply other criteria in addition because the interactions between science and society are changing.

Leaving aside defence and certain other national missions, in Europe we can distinguish broad phases that reflect changing societal expectations on research, each with different implications for assessment. Although, exceptions exist, three distinct phases can be separated, and many research funders and performers now find themselves addressing more than one.

- The 'manifesto' for first-phase governance was *Science, the Endless Frontier* (Bush, 1945) and the relationship between society and science was based on 'blind delegation' (Braun, 2003): the scientific community was seen as being best placed to decide what research should be done, so they were allowed to do so by taking funding decisions in research councils or national science foundations. Here, assessment criteria focus essentially on scientific quality
- The second phase was triggered by a backlash that started in the 1960s, partly led by the OECD, arguing that society needed 'science policy' to direct research towards national, socially determined goals. It triggered the idea of research and innovation taking place in 'national innovation systems' (Freeman, 1987) (Lundvall, 1992) (Nelson, 1993) and underpinned the creation of the first 'innovation agencies' from the late 1960s, working alongside the more traditional research councils. Here, assessment criteria focus on a combination of societal relevance and scientific quality
- Since about 2000, in the developing third phase, there has been a growing concern in Europe about the 'societal challenges' (climate change, ageing population, and so on). Key triggers at the EU level included a 'manifesto' published in *Nature* (Georghiou, 2008) and the 'Lund Declaration',² which triggered the inclusion of the societal challenges in the EU Framework Programme. Addressing societal challenges appears to involve going beyond responding to the demands of the research and industrial communities and devising strategies that change socio-technical systems in socially desirable or necessary directions.³ Some funders are experimenting with new instruments such as 'challenge-driven' programmes and 'missions' where assessment criteria extend beyond scientific quality and industrial relevance to encompass the fit of individual projects with the higher-level strategy

Since all Science Europe members work with first-phase programmes, their assessment needs are well covered in this survey. Quite a number of members need already to deal with second-phase criteria. Third-phase criteria are still not standard, but it is reasonable to expect that many of the Science Europe members that are not already considering such criteria, will do so as this phase matures.

² This appears not to have been formally published, but is widely available, including from the Swedish Research Council <http://www.vr.se/download/18.7dac901212646d84fd38000336/>

³ The most obvious example is the need to de-carbonise the production and use of energy, which imposes a particular 'directionality' on research, innovation and implementation

5 Key findings

5.1 Overall tendencies and well-established practices

Despite the high diversity of profiles of the participating institutions (i.e. in terms of activity, focus, approaches, kind of funding/promotion schemes), their research assessment processes share some common integral characteristics that are reflected in well-established practices in a high proportion of participants, namely the organisation of research assessment exercises in multiple phases with the involvement of external reviewers. In addition, there are also aspects that have been receiving increasing attention in the last years, as it is the case of the prevention and awareness of discrimination and bias.

5.1.1 Multi-step applications and multi-stage evaluation process

All RFOs and most RPOs interviewed appear to use a multi-stage research assessment process for their generic programme. These stages generally consist of an external review of application documents, followed by a review by a panel or committee, and occasionally interviews with applicants (mainly particularly in promotion processes, and funding schemes for individual early-career researchers as they might not have an extensive track of records to be assessed). In addition, prior to the assessment stages, preliminary formal checks are usually conducted by the staff of the organisation to ensure that the application fulfils the administrative requirements of the call for applications. In some cases, a screening beyond purely administrative requirements may also be conducted as part of the preliminary checks to filter applicants that are clearly not good enough to participate in the assessment. For instance, EMBO conducts this preliminary filtering in its long-term-fellowship programme for post-doctoral researchers. However, very few applications are filtered at this stage (undertaken by members of staff with research experience, e.g. doctoral degrees).

The multi-stage evaluation process at the Swiss National Science Foundation (SNSF)

Among the organisations interviewed, the SNSF program ‘Ambizione’⁴ is an example of a research assessment exercise with a high number of stages and including interviews with applicants. This program targets young doctorate holders who wish to conduct, manage and lead an independent project at a Swiss higher education institution. Their assessment exercise consists of the following stages:

4. Evaluation by two referees: Each proposal is assessed by two referees. They are typically members of the evaluation commission, which is mostly formed by researchers from Swiss research institutions who serve for several years. Referees evaluate the proposal and the adequacy of the context where the future research would take place, according to evaluation criteria and guidelines provided by SNSF. The first referee assesses the reviews, writes a report and gives a rating.
5. Panel discussion: Based on the referees’ assessment, a panel meets to discuss the reports and ratings. The panel ranks the proposals and selects applicants to be invited for an interview.
6. External reviews: International experts are selected to conduct a single-blind review of the research proposals of those applicants invited to the interviews. The main referee writes/updates the report of the first stage to include the assessment of the external peer reviewers.
7. Interview: Applicants are invited to present their project in person before an evaluation commission and answer questions. The evaluation commission provides a recommendation for funding or rejection.
8. Overall assessment: The evaluation commission’s overall assessment of the candidate is then forwarded to the Specialised Committee Careers (composed of representatives of all divisions of the Research Council) together with a recommendation to either approve or reject the application.
9. Decision: The Specialised Committee Careers discusses the applications and makes a provisional decision on each application. Then, the Presiding Board of the Research Council endorses the provisional decision provided that the procedures have been correctly applied and the budget and other conditions complied with.

According to SNSF, interviews play a decisive role in the assessment exercise of this particular programme. Although it is very resource-intensive, it is deemed worthwhile because the personal interaction provides rich information for the assessment. The quota of invited applicants is based on the number of days available, the number of panellists and the number of applications received.

⁴ Swiss National Science Foundation (visited in December 2019). [Ambizione](#)

Some organisations facing a high number of applications have opted not only for a multi-stage evaluation process but also a multi-step application process. The first stage of the assessment exercise consists of a preliminary assessment that goes beyond administrative conformity checks, for which they require the submission of shorter applications, which are typically reviewed by external experts. The French national research agency recently introduced a panel meeting to increase the robustness of the selection already in this first step. Short applications meeting the call's eligibility criteria are then invited to submit the full proposal. While this pre-selection procedure reduces the workload of the reviewers at later stages of the assessment process, a participant explained that the criteria used in such preliminary assessments may be subject to less transparency (especially if the pre-assessment goes beyond administrative checks) than in the later stages of the assessment. It is important for RFOs to ensure that short applications still contain enough information to assess the proposed research, otherwise, there is a risk that the profile of the applicant may be given too much weight in the research assessment. According to an interview partner having introduced this two-step process in recent years, it has strengthened the acceptance in the researcher community, as the workload also decreased on their side, and the second stage assessment received more time and attention by experts and in the panel discussions.

Three approaches to pre-proposals

- **Generic Call for Proposals 2020 of the French National Research Agency (ANR)⁵:**
The pre-proposal requested by ANR includes a form to be filled and submitted online, a document describing the project (max. 4 pages including bibliography) and the CV of the coordinator, partners or technical leaders. All pre-proposals are individually evaluated by two members of the Scientific Evaluation Panel, who are appointed after ANR has checked that no conflict of interest arises with the allocated pre-proposals. Upon the request of the two panel members, a third panel member may be invited for cross- or interdisciplinary projects. Pre-proposals are evaluated against two criteria: (i) Quality and scientific aims, and (ii) organisation and implementation of the project – each with different sub-criteria for each funding instrument.
- **Funding program for young researchers of the Dutch Research Council (NWO)⁶:**
The program “Veni” of NWO current has a two-stage application procedure. Along with the short proposal, the CV and track of records of the applicants are requested in a pre-selection phase. NWO assesses whether the applicants’ CV and track of records match the proposed research, avoiding simplistic metrics but taking into account the full breadth of research according to the San Francisco Declaration on Research Assessment (DORA). Although some applicants disapprove of this approach (e.g. those considering their idea better than their CV in a specific topic), for the funding organisation it has proven to work very well. The full implementation of this approach is still an on-going process, and recently a pilot in social sciences and humanities reduced the assessment time of reviewers by 25%, as well as the time invested in proposal writing.
- **Frontiers for the Future Program of the Science Foundation Ireland (SFI)⁷:**
Frontiers for the Future Program (FFP) is a new funding scheme launched in 2019. In the pre-proposal phase applicants are asked to submit a (i) CV accompanied by information on their publications and experience, (ii) the main body of the pre-proposal (keywords, a scientific abstract, a lay abstract, a research program, references and impact statements), (iii) budget, and (iv) letters of support from the host research body of the lead applicant and co-applicant. This information is assessed by international peers, and the best pre-proposals are invited to develop a full proposal. The evaluation and selection of projects was ongoing at the time of the interview with SFI. Once it concludes it will be reviewed by SFI and perhaps adapted for future calls.

⁵ ANR (October, 2019). [Work Programme 2020 – Generic Call for Proposals. AAPG 2020 Guide – Submission, Evaluation, Selection and Funding Guidelines.](#)

⁶ NWO (June, 2018). [Pre-proposals Veni Scheme Social Sciences and Humanities, Applied and Engineering Sciences open for application.](#)

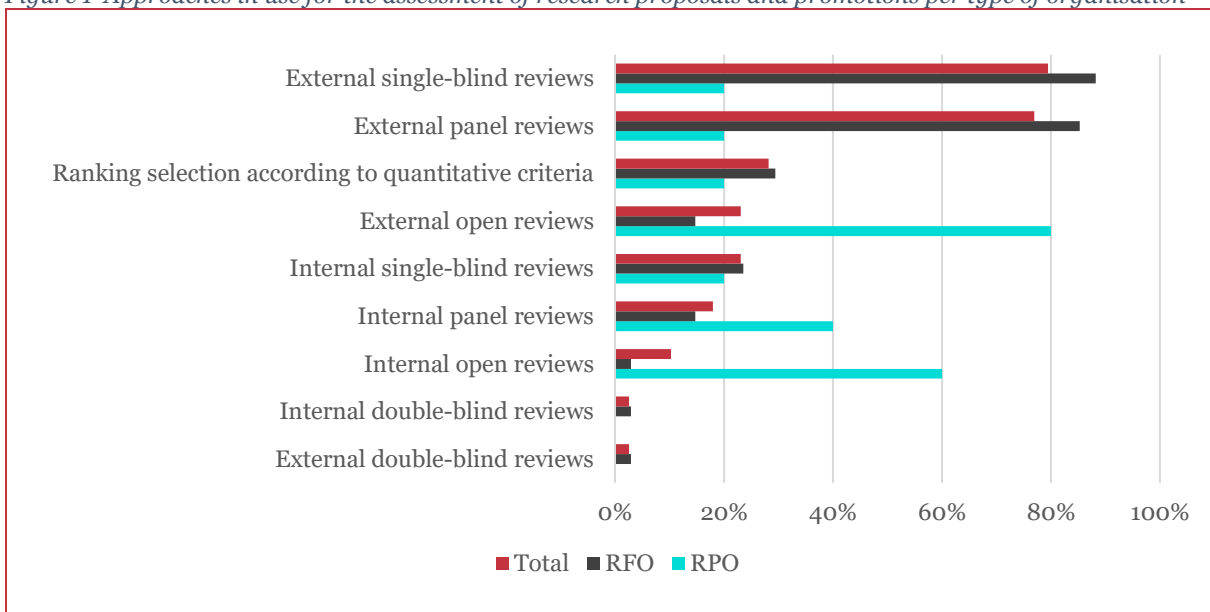
⁷ SFI (March, 2019). [Pre-proposal Handbook](#)

Another strategy, this time implemented by RPOs, requires researchers applying for funding to RFOs that their proposals undergo internal scrutiny prior to submission. The proposal is only sent to the RFO once the proposal is endorsed by the research institution, certifying that the proposal has been properly reviewed, is complete and accurate, has the appropriate prior approvals and meets the requirements of the RFO.

5.1.2 External reviewing as a research assessment standard

Among the RFOs participating in the survey, the most common system implemented in the assessment of full research proposals is external single-blind review, followed by external panel review and ranking selection according to quantitative criteria (see Figure 1). Among the five RPOs in contrast, the most common approaches in promotion assessments are internal panel review and external open review.⁸

Figure 1 Approaches in use for the assessment of research proposals and promotions per type of organisation



Source: Technopolis Group based on the survey answers of the organisations participating in this study (number of RFO=34 and RPO=5).

Overall, the reliance on external expert reviews is well-established among RFOs, as this is considered the most reliable approach to assess research. It should be noted that different approaches may be used in different phases of the research assessment process. The most common combination among the participating organisations is external single-blind reviews and external panels of experts. This approach is used by 26 out of 38 participants.

Single-blind is the most used form of review for research proposals – particularly in Western Europe, where all organisations implement it. Conversely, the double-blind review of proposals is the least used approach by the participants in this study (only two out of 38). The explanation given by two interviewed organisations is straightforward: as a publication is a finished product and its assessment should focus exclusively on the content of the publication and should minimise any potential bias. In contrast to this, in a research proposal, the feasibility of the research is not guaranteed nor the success of the results. Therefore, trust plays a role and the profile of applicants is scrutinised in terms of their previous research, the composition of the team, access to technology, management support, etc.

⁸ Open reviews are here understood as assessment processes where the identity of the reviewers is known by all applicants.

Open reviews – where the identity of the reviewers is known by all applicants – have been implemented by seven participants and, at least for two of them, it has been a well-established system for several years. Yet, the implementation seems to vary significantly among institutions. For instance, at the Weizmann Institute of Science in Israel, three institutes and 10-12 scientists are reviewed by an international board of researchers, while the general report is presented to the entire institution, the review of individuals is only read by the president, and if a candidate for promotion is reviewed, this part is also read by a council of professors. The open-review approach of promotion assessments in all of Spain involves public presentations of the candidates to the review panel and closed discussions of the panel which are not disclosed. The final score of the candidates for promotion can be accessed by the applicants.

The Danish National Research Foundation's (DNRF) assessment of centres of excellence provides an example of open reviews in an RFO. Each proposal received by the DNRF is sent to three international experts within the relevant research area(s) for external peer review. Each applicant may submit the names of three experts, one of whom will be chosen by the DNRF to serve on the panel of reviewers who will assess the proposal. The DNRF chooses the other two reviewers based on recommendations from external or internal sources, but the applicant is given the opportunity to comment on the list of proposed reviewers and their professional complementarity before the foundation assembles the final panel.

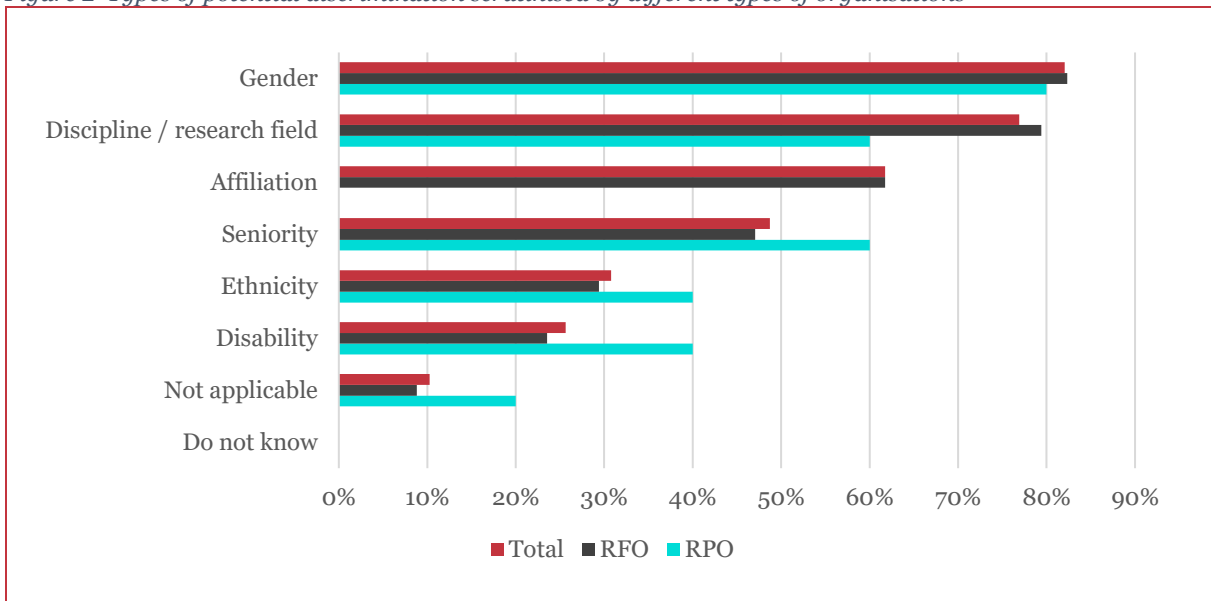
In general, the above-mentioned research assessment systems have been used by most of the participating RPOs and RFOs for a long time. Therefore, these systems are very well-established, and their overall design and process are rather stable, with only minor adaptations based on the feedback of the reviewers and internal monitoring activities.

5.1.3 *Measures to prevent discrimination and bias*

One potential problem of research assessment is the possibility of various forms of bias. As part of the commitment for fair research assessments, most organisations participating in the study have developed mechanisms to analyse, raise awareness or reduce the impact of unconscious bias. In fact, among the organisations that do not scrutinise any form of bias, such scrutiny was often not applicable to their 'generic programme'. For instance, gender, ethnicity or disability are not scrutinised in the assessments of research institutions. Similarly, discipline and seniority bias are not scrutinised in discipline-specific programmes or those targeting applicants at particular career levels.

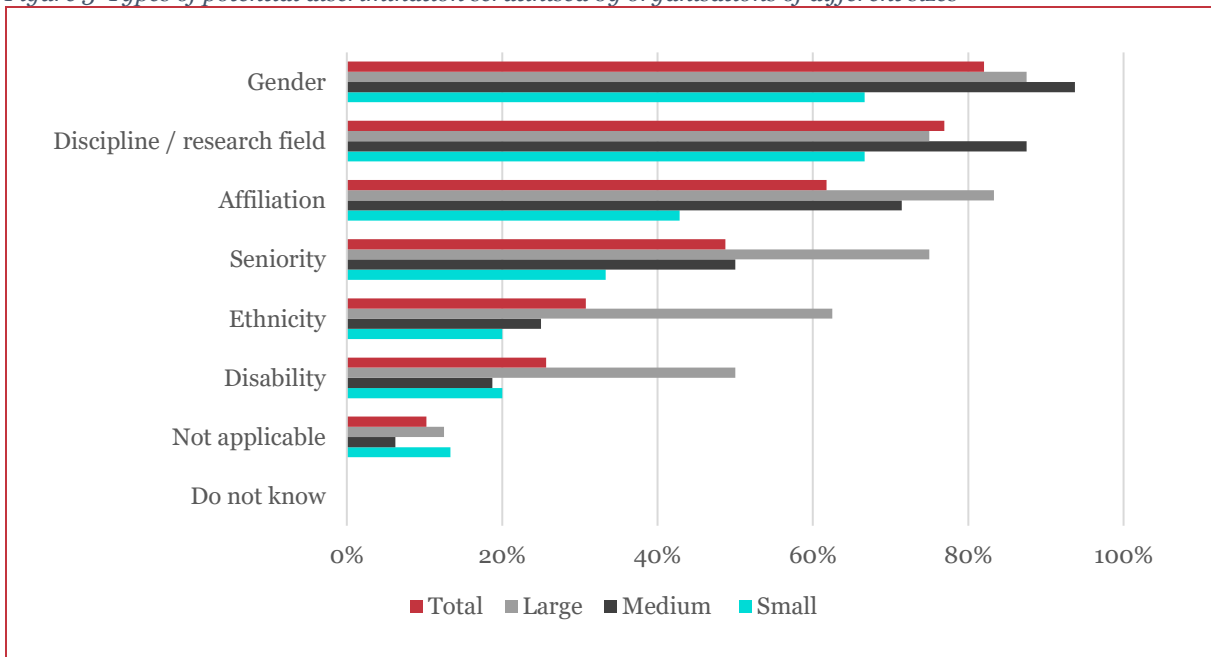
As shown in Figure 2, the potential biases that are most scrutinised are gender and discipline, followed by affiliation in the case of RFOs (this survey answer option was not applicable for RPOs), and seniority for RPOs. Interestingly, ethnical and disability discrimination are significantly less scrutinised by RFOs than by RPOs. Further differences were observed in relation to the size of the organisations, where large and medium organisations seem to be more reactive than small ones against each of the types of bias addressed in the survey (see Figure 3).

Figure 2 Types of potential discrimination scrutinised by different types of organisations



Source: Technopolis Group based on the survey answers of the organisations participating in this study (number of RFO=34 and RPO=5).

Figure 3 Types of potential discrimination scrutinised by organisations of different sizes



Source: Technopolis Group based on the survey answers of the organisations participating in this study (number of large organisations=8, medium=16 and small=15).

Among the most common strategies to raise awareness of potential biases is to cover the topic in the regulations or guidelines for assessment. UK Research and Innovation (UKRI) reinforces this by engaging expert psychologists for advice on good practice around unconscious bias and good decision-making. Enforcing anti-discriminatory guidelines remains the responsibility of the reviewers, although in some cases, as in the National Science Centre in Poland, it is also enforced by the ‘scientific coordinators’ during the selection process of experts, reviewer assessments and panel meetings. In addition, panel members are asked to report on ethical issues. Moreover, the NCN also has an ‘Ethical Commission’ which is responsible for discriminatory issues.

The introduction of groups of reviewers with diverse profiles is also a somewhat widespread practice among RFOs, used by 68% (23) of the survey participants. For instance, UKRI, NWO, and the Irish Research Council endeavour to have gender balance in panel membership, and the Estonian Research Council (ETAG) has reported that the inclusion of female members in panels is being key to reduce existing gender bias. Among the RPOs in our sample only 1 out of 4 use this approach.

The introduction of quotas to balance the selection of candidates with a certain profile is only used by 13% (5) of RFOs, but not by any of the participating RPOs. Often, these are mechanisms to ensure approximately equal success ratio between different fields of research. Another strategy used only by 32% (11) of the participating RFOs – and none of the RPOs – is the implementation of policies to give priority to the selection of candidates with underrepresented profiles when the quality of their academic output is as high as that of the other candidates. Yet another approach is that of the Spanish nation-wide system for promotions, which reserves some positions exclusively for people with disabilities.

Furthermore, diversity is also considered by some RFOs in their research assessment exercises, particularly those in the field of health. For instance, the Swedish Research Council for Health, Working Life and Welfare (FORTE) includes ‘gender and diversity perspectives in the content of the research’ as one of the four sub-criteria of the high-level criterion “scientific quality”. Another example is the National Institutes of Science (NIH) in the US, that recently updated their guidelines on the inclusion of sex/gender, race, ethnicity and age in clinical research.⁹

5.2 Challenges

A broad set of challenges are both mentioned in the survey and underlined in interviews, which cluster around concerns on the accountability of the overall research assessment and the funding/promotion decision, its efficiency and operational aspects involving external reviewers.

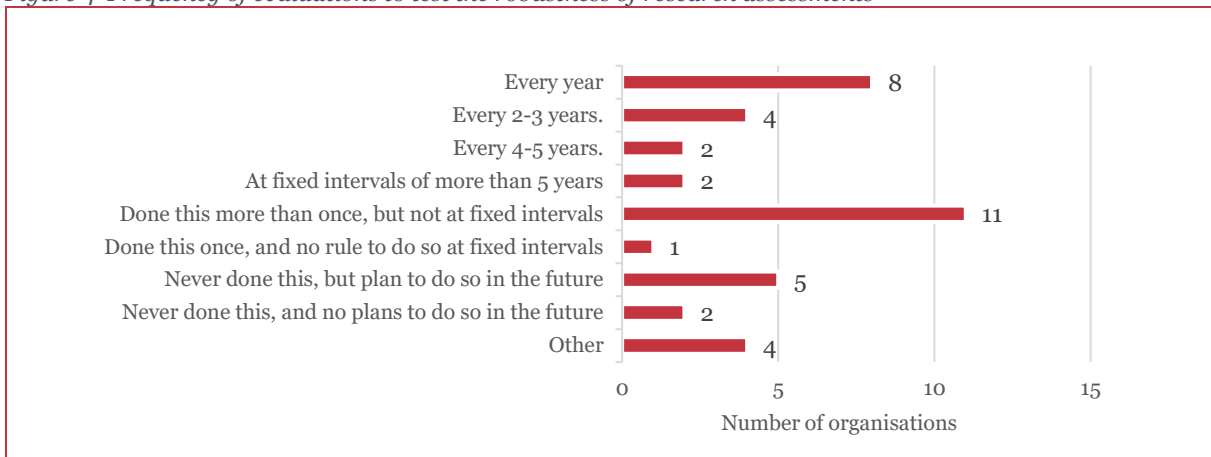
5.2.1 Robust, transparent research assessment processes

The mandate to conduct robust research assessment is ever-present in the organisations interviewed, as several of them reflected on this without being prompted. Robustness is understood as a fundamental characteristic of their research assessment exercises, to select high-quality research proposals or researchers. The following aspects were discussed as key to ensure the robustness of research assessments: (i) competitive selection processes, (ii) reliance on the knowledge and judgement of external experts, (iii) careful selection of experienced reviewers in the research topics of the applications under assessment, (iv) prevention and management of conflicts of interest, (v) qualitative assessment of research outputs, (vi) supervision of the research assessment process by members of staff to ensure adherence to the assessment guidelines/regulation.

Evaluations testing the robustness of the research assessments have been conducted at least once by 72% of the surveyed organisations, and at fixed intervals by 41% of them (see Figure 4). Nonetheless, there exist wide differences in the understanding of the nature and objectives of such assessments – from monitoring, to the publication of the results of the assessment exercise (e.g. number of applications, successful applications, etc.), to ex-post evaluations of the scientific outcomes of completed funded projects. Such evaluations typically focus on the results of the research assessment, rather than on the actual mechanisms of the research assessment. Given the broad interpretation of this subject and the many possibilities in terms of methodologies and data, further discussions and exchange among RFOs and RPOs would be recommended.

⁹ NIH (March 2019). [Guidelines for the Review of Inclusion on the Basis of Sex/Gender, Race, Ethnicity, and Age in Clinical Research](#)

Figure 4 Frequency of evaluations to test the robustness of research assessments

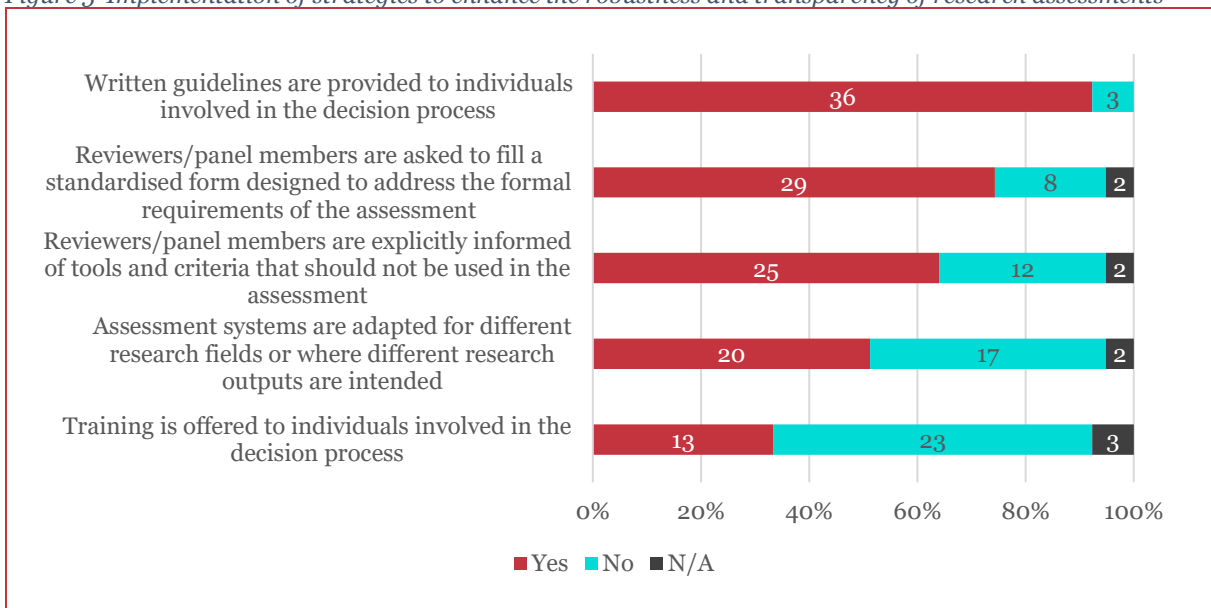


Source: Technopolis Group based on the survey answers of the organisations participating in this study (n=39).

There is a clear tendency for the pursuit of higher transparency in research assessment processes. Most funding and promotion schemes reviewed in this study explain their selection criteria in programme materials that are available on public websites. Nevertheless, the workings of the processes taking place in the reviewing assessment are often opaque. Moreover, there is an added layer of ex-ante ‘opacity’ when only the higher-level criteria are defined but the decision on what and how to assess research is up to the reviewers, who may add ex-post transparency if they provide informative and constructive reviews.

Also in relation to transparency, it is important to note that some organisations define only the overarching criteria that can be applied in research assessments in all research fields, leaving to the reviewers the decision on what and how to conduct the assessment in their respective fields. Some of the interviewed organisations explained that this approach is necessary because different fields require different criteria for assessment. Therefore, although the provision of assessment guidelines to reviewers is a wide-spread practice (see Figure 5), such guidelines have different degrees of abstraction according to the freedom of assessment provided to the reviewers. Similarly, the ‘adaptation’ of the assessment criteria to the different fields is also communicated with varying levels of transparency to the applicants.

Figure 5 Implementation of strategies to enhance the robustness and transparency of research assessments



Source: Technopolis Group based on the survey answers of the organisations participating in this study (n=39).

The introduction of a rebuttal phase is a strategy implemented by a few organisations (e.g. Research Foundation Flanders (FWO), NWO, UKRI, UEFISCDI in Romania) to increase transparency and perceptions of fairness. For FWO, this is a 2-week phase during which applicants are invited to react to the comments of reviewers with a document of up to three pages. This document should not propose different or additional ideas but rather clear up misunderstandings or counter unfounded assessments. UEFISCDI introduced the rebuttal with the aim of reducing the number of complaints filed by unsuccessful applicants to funding calls that are not offered on a regular basis. Uncertainty about the next funding opportunity led to a high number of complaints by applicants hoping to get their proposals re-assessed. Assessing and answering those complaints was a costly exercise for the funding agency. Implementing the rebuttal phase and providing applicants with informative review reports has seen the number of complaints reduced significantly. It is noted that consideration must be given to the time and effort effects of implementing a rebuttal procedure, and also the potential legal challenge implications associated with such a process.

FWO, NWO and UEFISCDI regard the introduction of the rebuttal as a good decision, as it provides to applicants with an opportunity to be part of the evaluation, which gives them a sense of participation that enhances the sense of fairness, even if the application is not successful. The answers of the applicants and the reviewers' report are typically assessed in a panel meeting.

To increase the transparency of the assessment, several institutions write a feedback report for applicants based on the assessment reports provided by reviewers. Such information is particularly important for unsuccessful applicants, not only to improve their application for the next round but also to minimise the perception of futile investment of time and effort.

A common point among all organisations interviewed is the establishment of mechanisms to identify potential conflicts of interest, as well as to react if conflicts of interest are detected at any stage of the research assessment process. Such mechanisms are generally implemented by the organisations in collaboration with the reviewers, but in some cases, applicants are also invited to review the composition of the panels and report potential conflicts. Perceived and potential conflicts of interest are higher in small countries and in research fields with small communities. This problem is generally tackled by relying on international reviewers, although this may pose additional complications when English is not commonly used in the research field.

5.2.2 *Scientific assessment and funding/promoting decision*

The allocation of limited budgets in RFOs and the low number of open positions to be covered in RPOs sets pressure on the research assessment process in different ways. In many cases, the challenge is to select the most promising applicants among projects/candidates with similar reviews. While more exhaustive and qualitative assessments may be helpful to some extent, this issue seems to remain and is then tackled with strategic decisions, such as:

- **Discussion until agreement:** The nationwide strategy used in promotion assessments in Spain is based on discussion among the panel members until an agreement on the selected applicant is found.
- **Pre-classification of proposals into groups according to their quality:** The European Research Council (ERC) classifies projects into A (recommended for funding if sufficient funds are available) and B (meets some but not all elements of the ERC's excellence criterion and will not be funded). The proposals scored A are ranked, which is a challenging task because the pre-selected proposals are typically very good. The panels find it relatively easy to identify the best proposals in each call, but the others involve a lot of discussion until consensus – meaning common agreement instead of voting - is reached. In some occasions, the panel members vote. Approx. 50% of the "A" proposals receive funding.
- **Rejection of proposals close to the funding threshold with the possibility of re-submission:** DFG has implemented a mechanism to identify and thoroughly discuss proposals that are close to the funding

threshold. Rather than creating the category ‘approved but not funded’, in the current approach, all rejected proposals receive the reviewer’s comments and the panel minutes and are eligible to re-submit, usually at any time.

- Repechage of proposals: This is implemented by FWO. Each panel selects 2 projects that are added to a ‘reserve’ list, from which a selection of projects will be funded with remaining available funds once the main research assessment exercise has concluded.

The research assessment and the funding decision may also be implemented as separate processes conducted by different stakeholders. An example of such an approach is the research assessment of R&D units conducted by the Portuguese Foundation for Science and Technology (FCT). This is an assessment conducted every 5 years to distribute funding to research units (i.e. research groups associated with a university or joint research group from several universities but common goals). The research assessment is conducted by review panels according to the general criteria defined by the ministry, which are adapted to the specific areas by the reviewers. The panel makes the recommendation for funding, but the distribution of the limited funds is decided by FCT and the ministry. At this point, R&D policy considerations are taken into account (e.g. ensuring that key fields of science are not left without funding). Further investigations would be needed in order to determine whether the decoupling of research assessments and the funding decisions may affect the transparency of the overall exercise, even when the research assessment part is conducted with high standards of transparency.

5.2.3 *Cost and efficiency of research assessments*

The assessment of research is a costly exercise both for RFOs and RPOs. Balancing the quality and the cost of the research assessment is of critical importance for the organisations.

The costs of evaluation are particularly high in competitive research assessment programmes that do not rely on quantitative indicators but on qualitative evaluations of the applicants’ research outputs. Additional costs are incurred when international reviewers are invited to participate in panels that meet in person. Most organisations participating in the study rely on both national and international pools of experts as reviewers. This is particularly the case of RFOs, but not necessary for the promotion assessments in RPOs. The National Institute for Nuclear Physics (INFN) in Italy has national selection boards, whereas in Italian research institutions promotions are generally assigned by the given departments. The Spanish promotion assessment system also relies on a national pool of experts. By contrast, in the Weizmann Institute of Science promotions are assessed both by external experts and an internal committee.

International reviewers are sought to avoid conflict of interests, to have a larger pool of potential reviewers, to network national researchers with international researchers, etc. Although online conferencing systems may lower the costs of organising review panels with international reviewers, institutions, in general, opt for in-person meetings to conduct their research assessments. Similarly, when the focus of the evaluation is on research institutions, reviewers may be invited to visit the institution in person to interview its management and other levels of staff and assess the laboratories and facilities. This is the case in the evaluation of research institutions conducted by FCT, NWO or of the Czech Academy of Sciences (CAS).

In addition to the costs supported by RFOs and RPOs, the research community also bears significant costs related to peer reviews. Reviewers may receive some honoraria, but often peer-reviewing relies on the volunteered time and effort of reviewers. Even when no direct costs are associated to the volunteered peer review activity, there are considerable opportunity costs to the entire research system, for the time they could dedicate to other activities if they were not serving as reviewers. Therefore, designing an efficient reviewing process is of paramount importance, especially when the number of applications is high.

Optimising the assessment of a high number of candidates for promotion

The promotion assessment of one of the RFOs participating in the study is an example of an assessment process that has been recently optimised to deal more efficiently with the high number of applications it receives. For instance, for the call to promote/hire researchers to associate professors, the RFO assesses the research outputs of approx. 250 applicants, of which 80-100 are invited to an interview. In the past years, the selection committee was asked to write a summary of each candidate in writing. The problem with this approach was that the comparison of the summaries was very complicated, particularly when candidates have a very similar curriculum.

In the last year, the RFO introduced a scoring system that translates the qualitative assessment to a quantitative scale that facilitates the ranking of candidates. The scoring is done according to different criteria (and sub-criteria), where each criterion (and sub-criterion) has a fixed range, sub-criteria evaluations are aggregated into criteria evaluations, and the aggregate total is fixed to a maximum. According to the RFO, this approach, although helpful, still needs refinement. One of its deficiencies is that exceptional performance in a sub-criterion has only a limited effect on the evaluation of the corresponding criterion. Therefore, the system favours 'all-round' researchers, rather than those with exceptional specific skills or expertise. As a remedy, it is being considered to only assign a fixed score to criteria, but not to sub-criteria. This way, the evaluator would have the choice to distribute unrestricted scores for the sub-criteria. With further adaptations to the scoring system in subsequent calls for applications, the RFO aims to make the research assessment more efficient, based on qualitative assessments (without author or journal-based indicators) of the merits of the applicants.

Lastly, the investment of time and effort of the applicants needs to be considered. Multi-stage evaluation processes, as discussed in Section 5.1.1, significantly reduce the resources invested by the applicants. In addition, some RFOs (UKRI, for instance) are streamlining information on funding schemes and standardising application processes with the goals to make it straightforward for researchers to select the right program, and to facilitate the efficient submissions of applications across programs. For instance, the German Research Foundation (DFG), Austrian Science Fund (FWF), UKRI and NWO used to have a broad spectrum of funding programmes, so it was not easy for researchers to select one. To address this problem, the funding agency bundled the programmes so that potential applicants easily identify the set of programs to which they are eligible them according to their career stage, the number of proposed investigators (e.g., for individual researchers, research groups, research institutes), etc. In addition, DFG is working to make procedures across programmes more similar to each other, although the criteria of their assessment might differ according to the objectives of the programmes. Such streamlining not only responds to the demands of the scientific community but also aims to have a positive impact on the operative efficiency of the programmes.

Economic analyses on the costs of evaluation based on robust cross-organisational data would be necessary to assess the true operative costs of research assessments.¹⁰ This should comprise not only the administrative costs borne by RFOs and RPOs to coordinate the research assessments but also the costs of the reviewers and if possible that of the applicants. The difficulty of gathering such data may not only be that such costs are burdensome to estimate in an accurate fashion, but also that costs may be calculated in different ways. Therefore, the elaboration of guidelines for its calculation would be highly recommended.

5.2.4 Exhaustion of the pool of reviewers and their 'fatigue'

Organisations follow different methods to recruit reviewers with the expertise needed to assess applications received by the organisations: nominations based on searches by members of staff, recommendations from panel chairs, suggestions from applicants, open calls, etc.

Certainly, reviewers are selected according to their knowledge of the subject under assessment. The pool of reviewers is normally reduced to researchers with recognised expertise in ever more complex topics and with a certain level of seniority (e.g. full professors, less often associate professors), and depending on the call for applications, reviewers with specific profiles are sought (e.g. interdisciplinary background for cross-cutting research). For instance, for the evaluation of research proposals written in Swedish,

¹⁰ This kind of analysis was commissioned at national level by Research Councils UK in 2006. The title of the published report is 'Analysis of the External Costs of Peer Review'.

FORTE engages national reviewers as well as reviewers with Swedish language skills (mainly from other Nordic countries), which is challenging because of the reduced number of eligible reviewers. Conversely, SFI relies exclusively on international reviewers, which is also an opportunity to disseminate Irish research among international reviewers. Another approach is that of the Weizmann Institute of Science, which is based on research excellence: engaging only ‘excellent researchers’ (i.e. leaders in their respective disciplines) to assess whether candidates for promotion conduct excellent research.

The challenge of finding the right reviewers for the research assessment becomes an even greater problem with the growing ‘fatigue’ among researchers asked to serve on numerous funding/promotion assessments, not only in their own countries but worldwide, in addition to their other services for the research community, such as reviewing scientific publications. This is aggravated by a concentration of the reviewing demand placed on more high-profile research nations. This is a systemic problem, which mostly (but not only) affects the activity of RFOs, and against which they have limited tools to counteract.

Measures to make peer review less burdensome are for instance clearly defined guidelines for reviewers on how to review, streamlining research assessment processes to be efficient for the reviewers, or a reduced number of full applications to be reviewed with preliminary selections of short applications. Given the growing variety of research funding schemes, research proposals and candidates for promotion to be assessed by peers, such measures remain scant.

Means to incentivise reviewers could be implemented, for instance, in a similar way that the academic research community encourages researchers to participate in peer-reviewing of scientific publications. The reviewing of proposals or promotions could receive higher appreciation by RFOs and RPOs.¹¹ Only two examples of appreciation beyond monetary incentives were discussed during the interviews, both with EMBO (in Germany): *Publons* as a tool that tracks and keeps the history of peer reviews conducted of academics, and the preparation upon request of letters certifying the good work of reviewers in the research assessment. According to the survey results, among the European institutions participating, 15 RFOs and four RPOs assess the services of applicants and candidates for the scientific community in general. However, the importance given to this aspect in the overall track record of the applicant/candidate is moderate to low.

The above-mentioned challenges of sustaining peer review refer exclusively to reviewers with a scientific background, but reviews may also be conducted by non-scientific individuals. As an example, FORTE invites two representatives of non-academic public institutions as members of assessment panels. They represent society and assess the societal relevance of the research. Such an approach is also a common practice for NWO when the societal impact is relevant for the funding scheme.

5.3 Current developments

The survey responses and interviews provide evidence on the predisposition of several organisations to reflect and adapt their mechanisms to better support their public research. Study participants were asked about the longstanding practices, recent changes and potential future changes under consideration, as well as the trends and shifts they observe. Changes and adaptations of technical issues (e.g. changes in communication procedures, timeframes, etc.) were mostly motivated by the results of monitoring exercises, as well as by the feedback of stakeholders involved in the research assessments, such as reviewers, applicants and, to a lesser extent, universities. The more strategic shifts are often the result of discussions with ministry units and international developments. There is less evidence of changes motivated by learning dynamics between organisations, although several organisations elaborated on the importance of the information exchanges with foreign peer institutions and on the constructive discussions and visits among them.

¹¹ A recent report published by Publons includes a survey of what reviewers would most value as incentives. See Publons (October 2019). [Grant Review in Focus – Global State of Peer Review Series](#)

5.3.1 Predominance of qualitative assessments

Most participating organisations rely on qualitative assessments of research. This is, in fact, the most widespread approach to evaluate previous research by research funding applicants, candidates for promotion and even research institutes. Moreover, those organisations conducting qualitative assessments consider these to be very important in their research assessment processes (see Table 2).

Table 2 Usage and importance of author-level approaches/tools to assess research productivity

| | Currently using | Used in the past | Never used but considering using in the future | Never used and not considering using in the future | For organisations that have used or are using the approach/ tool: | | |
|---------------------------------|-----------------|------------------|--|--|---|----------------------|----------------|
| | | | | | Very important | Moderately important | Less important |
| Cumulative no. citations | 10 (31%) | 5 (16%) | 1 (3%) | 16 (50%) | 5 (33%) | 5 (33%) | 0 (0%) |
| H-Index | 11 (34%) | 7 (22%) | 0 (0%) | 14 (44%) | 6 (33%) | 3 (17%) | 2 (11%) |
| No. highly cited publications | 14 (40%) | 5 (14%) | 2 (6%) | 14 (40%) | 9 (47%) | 5 (26%) | 0 (0%) |
| No. pubs. high-ranking journals | 17 (50%) | 8 (24%) | 0 (0%) | 9 (26%) | 12 (48%) | 5 (20%) | 0 (0%) |
| Altmetrics scores | 2 (7%) | 0 (0%) | 9 (30%) | 19 (63%) | 1 (50%) | 0 (0%) | 1 (50%) |
| Qual. assess. research output | 26 (81%) | 0 (0%) | 2 (6%) | 4 (13%) | 21 (81%) | 4 (15%) | 1 (4%) |

Source: Technopolis Group based on the survey answers of the organisations participating in this study (n=39).

Qualitative assessments are typically conducted by external reviewers, in some cases in combination with the use of quantitative indicators, as is the case with CAS, the Weizmann Institute of Science, or the NIH, among others. Some use solely qualitative evaluations, as it is the case of DFG. Others use qualitative assessments that are later translated into scores, such as INFN or FCT. The use of scores is intended to facilitate the ranking of applications/candidates. The scores are produced either in accordance with ‘mechanically’ followed rules or in agreement with a panel or committee that judges, compares and discusses to produce a ranking.

The use of qualitative assessment seems not only an extended practice among the participants but also gaining importance, as the use of quantitative tools, such as journal-based metrics, is being reduced. Organisations participating in this study were asked to indicate whether their organisation has implemented changes in the way research proposals or candidates for promotion are assessed. As shown in Table 3, for most organisations the assessment of the research content of scholarly publications is either a long-standing practice, a recent change or a planned change. The broadening of the range of quantitative tools used to assess research is considered by a significantly lower proportion of organisations. In fact, most organisations have reduced or are planning to reduce the use of journal-based metrics. However, it is difficult for RFOs and RPOs to verify whether reviewers do not use quantitative tools or criteria in their assessment.

Table 3 Long-standing practices, changes and plans for changes in research assessments

| | Long-standing practice | Made this change | Planning to make this change | Not made this change and is not planning to do so in the future | Do not know | Not applicable |
|---|------------------------|------------------|------------------------------|---|-------------|----------------|
| Reducing the use of journal-based metrics | 8 (21%) | 13 (33%) | 3 (8%) | 7 (18%) | 4 (10%) | 4 (10%) |
| Eliminating the use of journal-based metrics | 6 (15%) | 9 (23%) | 4 (10%) | 9 (23%) | 6 (15%) | 5 (13%) |
| Broadening the range of non-publication research outputs required to assess | 4 (10%) | 14 (36%) | 5 (13%) | 8 (21%) | 5 (13%) | 3 (8%) |
| Broadening the range of quantitative tools that are used to assess research impact | 1 (3%) | 6 (15%) | 6 (15%) | 14 (36%) | 7 (18%) | 5 (13%) |
| Considering qualitative indicators of research impact, such as influence on policy and practice | 6 (15%) | 10 (26%) | 5 (13%) | 11 (28%) | 5 (13%) | 2 (5%) |
| Considering the research content of the scholarly publications | 17 (44%) | 7 (18%) | 6 (15%) | 3 (8%) | 3 (8%) | 3 (8%) |
| Being explicit about the criteria used in the assessment | 29 (74%) | 2 (5%) | 4 (10%) | 1 (3%) | 2 (5%) | 1 (3%) |

Source: Technopolis Group based on the survey answers of the organisations participating in this study (n=39).

The shift towards more qualitative assessments and less reliance on metrics were, at least to some extent, motivated by community discussions and heightened awareness raised by declarations on research assessments, such as the San Francisco Declaration on Research Assessment (DORA). In the sample of survey participants, 21 organisations (55%) are signatories of DORA, two (5%) are in the process of signing and another two are developing measures to be compliant before signing. Yet, compliance with DORA may not always imply compliance with the spirit of DORA. For instance, some organisations have reduced or eliminated the use of journal-based metrics but continue to place emphasis on where scientific publications are published rather than on the overall track records of accomplishment (i.e. by creating lists of reputed journals). Further discussions and exchanges on research assessment practices to fully comply with DORA should take place with stakeholders as the community’s commitment to the principles and practice of DORA grows.

Among those survey participants that have not signed DORA or a similar declaration, one has an internal policy prohibiting signature to any external declaration, as metrics are an important check and balance in its evaluative process. Nine other organisations have not considered it yet, either because (i) they want to retain the autonomy to implement metrics (three organisations), (ii) they decided to keep their assessment under review rather than signing a fixed statement (2 organisations), (iii) they developed a responsible approach to use metrics (one organisation), or the respondents simply did not know about DORA or any other similar initiative (two organisations).

5.3.2 Experimentation with assessment systems and tools

Most organisations regularly revise and refine small aspects of their research assessment methods on a more-or-less incremental basis. Experimentation with novel, alternative or radically different methods and tools is rather unusual, and it tends to take place in small select programmes, i.e. as a testbed.

An experiment with drawing lots (or lotteries) has been conducted by SNSF and will soon be tested in a new programme of the FWF. Drawing lots are appealing because of their low transaction costs, although

the random selection does not distinguish scientific quality. Therefore, it tested as a system to be used for the allocation of funding to a small share of applications of similar quality equally worthy of funding, where no further differentiation is possible. Whether drawing lots will be actually implemented by SNSF or FWF as a part of the research assessment of any funding scheme is still an open question.

Experiments with double-blind assessments of proposals have been implemented by the Slovak Research and Development Agency (APVV) with very satisfactory results. FWF has also recently implemented it into a small pilot scheme¹².

Double-blind research assessment of APVV

Within the sample of surveyed and interviewed organisations, the Slovak Research and Development Agency is the only one that reported experiences with double-blind reviews, which are used in their general call for research proposals. The research assessment consists of two phases:

1. Double-blind peer review: Each proposal is evaluated by two external experts, one from Slovakia and the other from abroad. The system used to choose reviewers is random (within the discipline/specialization of the proposal) from a database of approx. 7000 potential reviewers maintained by APVV. This selection procedure is intended to enhance the fairness of the process, which cannot be manipulated because it is done via an IT system.
2. Panel assessment: Once the reviews are completed, the agency forms 6 panels (one per field of research). These are composed by academics in Slovakia. The panellists have access to information on the affiliation and scientific fields of the candidates, but they do not see the names from the applicants.

The double-blind reviews are intended to make the research assessment more objective, particularly the evaluations from national reviewers. Since Slovakia is a small country, researchers often know each other, which could affect the objectivity of their assessment. Furthermore, as a recent change, APVV is inviting only foreign reviewers to assess proposals in 4 of the 6 fields covered by their calls for funding. Only social studies and humanities will continue to have national reviewers, given that those fields require knowledge of the Slovak language and society.

Another novel approach is the use of sandpits,¹³ which are interactive workshops held over several days involving 20-30 participants (in addition to a director, a team of experts and a number of independent multidisciplinary stakeholders). Sandpits involve a discussion forum where free thinking is encouraged with the aim to propose innovative projects or solutions, peer-reviewing them collectively as they develop and make funding decisions at the end of the workshop. Sandpits, although novel for most organisations, is an established practice for two institutions in the sample of participants. Sandpits have been developed by the Engineering and Physical Science Research Council (EPSRC, part of UKRI) and implemented since 2016 by the Research Council of Norway (RCN). Currently, NWO and FWF are also experimenting with this.

Leaving assessment systems aside, and considering assessment tools, nine organisations participating in the study are considering experimenting with altmetrics scores, and two organisations (the Spanish National Research Council (CSIC) and NIH) are already using them. It remains to be assessed whether their use of altmetrics leads to broadening the range of quantitative indicators, or to consider the value of all research outputs beyond scientific publications, or to experiment with efficient ways to capture research activity. Furthermore, if the use of altmetrics spreads among RFOs and RPOs attention should be given on whether it is used for quantitative evaluations, or rather as support for qualitative expert assessment.

Another approach is that of DFG, Wellcome in the UK, FWF and many others, which recognises a broad format of research outputs, as altmetrics proposes, but in a qualitative way rather than using the metrics. For instance, FWF asks applicants to provide lists of both academic publications and additional research achievements. The latter includes “awards, conference papers keynote speeches, important research

¹² FWF 1000 Ideas Programme (launched in November 2019) (visited in December 2019) <https://www.fwf.ac.at/en/research-funding/fwf-programmes/1000-ideas-programme/>

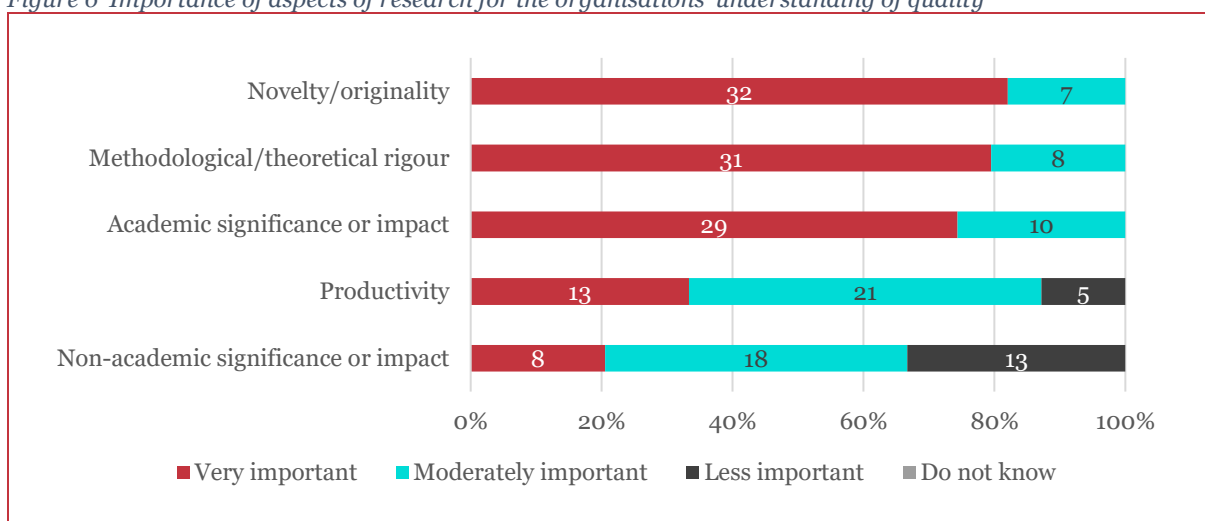
¹³ See for a definition of sandpits and some case studies <https://epsrc.ukri.org/funding/applicationprocess/routes/network/ideas/whatisasandpit/>

projects, research data, software, codes, pre-prints, exhibitions, knowledge transfers, science communications, licenses or patents”.¹⁴

5.3.3 Challenge-oriented research and societal objectives

Any assessment practice in research funding has to deal with quality criteria, linked to the object and the objective of funding or promotion. However, the understanding of quality and its characteristics differ among organisations. The survey results show that the following aspects are the most important for the understanding of research quality: First, novelty and/or originality, then methodological and/or theoretical rigour, and third, academic significance or impact. As shown in Figure 6, the non-academic significance is given considerably less weight by most, but not all participants.

Figure 6 Importance of aspects of research for the organisations’ understanding of quality



Source: Technopolis Group based on the survey answers of the organisations participating in this study (n=38).

Criteria that organisations require reviewers to assess reflect these priorities. Aspects such as the potential economic and societal impact, potential knowledge or technology transfer and commercialisation, as well potential contribution on public policies, are required in slightly more than half of the ‘generic funding/promotion schemes’ of the participating organisations with rather moderate importance (see Table 4). This might be surprising as research policy is increasingly considering the need to stimulate research in directions that provide knowledge relevant to tackle societal challenges. In fact, the ‘generic programmes’ organisations participating in this survey referred to mainly focus on scientific criteria and have a high level of stability of assessment criteria, as not many changes have taken place in the past, nor are considered for the future.

¹⁴ FWF (visited in December 2019). [Checklist for the complete application \(Stand-Alone Publications\) – new digital publication formats.](#)

Table 4 Aspects of research that reviewers are required to assess in research assessments

| | Currently using | Used in the past | Never used but considering using in the future | Never used and not considering using in the future | For organisations that are using or have used the respective aspects: | | |
|--|-----------------|------------------|--|--|---|----------------------|----------------|
| | | | | | Very important | Moderately important | Less important |
| Soundness of the proposed methodology | 32 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 29 (91%) | 1 (3%) | 0 (0%) |
| Feasibility of the proposed research | 33 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 29 (88%) | 2 (6%) | 0 (0%) |
| Resource allocation in line with objectives | 31 (97%) | 0 (0%) | 0 (0%) | 1 (3%) | 17 (55%) | 11 (35%) | 1 (3%) |
| Feasibility of research in relation to applicants' expertise | 33 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 27 (82%) | 4 (12%) | 0 (0%) |
| Complementary expertise of researchers | 28 (97%) | 0 (0%) | 1 (3%) | 0 (0%) | 16 (57%) | 11 (39%) | 0 (0%) |
| Dissemination plan | 28 (88%) | 1 (3%) | 1 (3%) | 2 (6%) | 11 (38%) | 13 (45%) | 3 (10%) |
| Novelty of the research question | 33 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 24 (73%) | 7 (21%) | 0 (0%) |
| Potential econ. and soc. Impact | 22 (69%) | 1 (3%) | 2 (6%) | 7 (22%) | 6 (26%) | 14 (61%) | 1 (4%) |
| Potential transfer/commerc. | 19 (59%) | 2 (6%) | 2 (6%) | 9 (28%) | 2 (10%) | 13 (62%) | 3 (14%) |
| Potential contribution to public policies | 17 (55%) | 2 (6%) | 2 (6%) | 10 (32%) | 4 (21%) | 10 (53%) | 2 (11%) |
| Ethical considerations | 32 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 25 (78%) | 5 (16%) | 1 (3%) |

Source: Technopolis Group based on the survey answers of the organisations participating in this study (n=39).

Although non-academic impacts are not always considered in large generic research funding programmes, the interviews provided evidence on dedicated mission-oriented funding schemes being created to prioritise such kind of research. For instance, the generic funding scheme of FWO (and several other funding agencies) focuses on fundamental research, while their so-called ‘strategic basic research’ programme focuses on research to create prospects for economic or societal applications. In this case, the latter has a larger maximum funding allocation per project in order to cover the expenses of larger teams of researchers and stakeholders necessary for such projects (e.g. inclusion of end-users for collecting feedback and guiding research, interdisciplinary teams, etc.).

Some RFOs mentioned dedicated budgets defined by the financing ministry for specific problem-oriented calls, which are managed at the process-level more or less in the same way as thematically open projects, but with different panel compositions, notably more interdisciplinary and also including other non-academic stakeholders and community representatives. The inclusion of the latter two aims to ensure a broader evaluative perspective that also encompasses the point of view of the industry and the society in general. This is a current practice of FORTE as well as NIH, and has been discussed by ETAG as a possible future adaptation which did not receive wide support. Alternatively, the above-mentioned

sandpits are a radically different approach to selection, and also address specific research objectives which can relate to societal challenges or missions.

The assessment of mission-oriented research requires some adaptations, such as a different or extended set of evaluation criteria, and reviewers with different disciplinary and/or professional background, such as industry or policy experts as well as practitioners.

Moving the focus of funding to impact

One interesting example in the reorientation of funding policy is Wellcome, a politically and financially independent foundation based in London, UK, offering grants across biomedical science, population health, medical innovation, humanities and social science, and public engagement. 5-6 years ago, Wellcome moved the focus: previously, the objective was to fund people, the brightest minds, the best ideas. This was changed into the objective of improving health. Logistically this has not changed what they do, but the emphasis of what they are trying to achieve: The organisation has become more outcome-focused. The success framework of Wellcome is based less on how they are funding but on the purpose: they started to think differently about the reasons why they are funding. At present, they are engaged in a broad exercise of doing research on research: They are about to embark on an extensive analysis of how they take decisions, whom and how they funded so far. “What are the decisions we make and who makes them... how we do it... who is involved... are the decisions we are actually making the same as we think we are making...”

6 Conclusions

6.1 Diversity of organisations with widely shared basic principles on research assessment

This study covers a large diversity of organisations: not only in terms of their main activity – funding research in RFOs and conducting research in RPOs – but also regarding their mission, size, resources, etc. Furthermore, even organisations with similar characteristics may implement funding/promotion schemes that are very different in nature and purpose. For instance, among the ‘generic funding scheme’ that RFOs were asked to describe, we find programmes for individual researchers, for research projects in general (conducted by one or more researchers), and for research institutions (and networks of research institutions). Additionally, the experiences and experimentations of the different organisations vary considerably, such that practices that are novel for some, for others are standard practices. This is a diverse landscape with organisations aiming to carry out different roles in the system.

Nonetheless, there are common patterns of well-established practices as well as incipient trends:

- Split of the application and/or assessment process into several stages
- Involvement of external peer reviews and panel selection practices
- Shared view on challenges (i.e. robust and transparent assessments, efficiency, exhaustion of the pool of reviewers, assessment of proposals of similar high quality)
- Increased attention to avoiding biases, notably with regard to gender
- High relevance of qualitative assessments, partially catalysed by the volume and prestige of its adopters, as is the case with DORA
- Gradual introduction of changes to avoid drastic shifts from year to year, but experimentation and piloting with new assessment systems and tools
- Consideration of societal objectives through the creation of specific challenge-oriented calls for applications, or adaptation of existing ones with new evaluation criteria and non-academic reviewers.

In light of diversity and the increased (cost and time) pressure on peer review processes, RPOs and RFOs should be guided and encouraged to take steps towards improving and standardising the collection of relevant data for the analysis and monitoring of their research assessment strategies, in order to facilitate robust comparisons, exchange of experiences and cross-national learning.¹⁵

6.2 Classical research assessment, high professionalism, and casewise integration of new dynamics

Evidence from the survey and interviews shows that RFOs and RPOs addressed in this study are anchored in what has been described as **first-phase research policy** (see chapter 4), and assessment practices mainly relate to scientific quality to be best judged by peers. When talking about the adaptation of assessment processes, they rather address the balance between written assessments and panel discussions. Avoiding biases also receives increased attention, either related to specific disciplines or multidisciplinary research, or to gender.

Most organisations give a lot of **attention to process details and seek to optimize** them after variation and evaluation, showing high professionalism. This concerns for instance scoring, selection of peers, process design, or non-discrimination rules. In principle, the societal and economic impact could be considered in any of these elements. Similarly, for the definition of assessment criteria, the majority of organisations choose to take into account different characteristics of research – such as novelty, academic significance, non-academic significance, etc. – as well as academic activities (e.g. teaching,

¹⁵ An example of an initiative that aims to join forces of different research stakeholders is ‘[Research on Research](#)’. This initiative aims to build an international consortium of funders, academics and technologists for the development of theoretical frameworks, standardisation of methods, strengthening of networks and transferability of approaches in the topic of research on research, also called meta-research.

scientific communication, technology/knowledge transfer). Only a few organisations have decided to select a very reduced set of high-level criteria or even just one. For instance, scientific excellence for the Weizmann Institute of Science, and the same criterion plus ‘high-risk/high-gain’ research for the ERC.

One key question of this study relates to the use of **quantitative indicators in research assessment**. The survey and interview data collected show a decrease of the importance of quantitative assessments, such as pure scoring and the use of bibliometric indicators, and the high relevance of different forms of qualitative assessments (e.g. panel discussion, qualitative expert reviews). Since qualitative assessments are more resource-intensive than quantitative approaches, there is a higher sensibility for the time spent on selection activities and efficiency considerations and adaptations are gradually introduced into research assessment exercises over time based on the feedback provided by stakeholders in the assessment processes.

There are smaller **experimental settings**, like drawing lots, ideas labs, panels with experts on societal challenges rather than scientific disciplines, etc. It would be good to observe how the community of research funding and research performing institutions organises the upscaling of such pilot projects and the exchange on experience. These dynamics deserve closer examination. We will most probably face new ways of publishing and sharing knowledge, new paths and criteria in the assessment of the quality of research, possibly leading to a new positioning of science in society.

New dynamics characterised by the **inclusion of societal challenges** in research policy (‘third phase’), are also entering this community of organisations, however rather at the margin. This study provides evidence that the majority of programs already ask reviewers to consider the potential economic or societal impact in their assessment. However, only a minority ranks this as highly important (see Table 4). We also know from interviews that tools to assess potential societal impact in a robust way are still lacking or under development. Particularly in basic research, it is a challenging exercise as many applications of basic research take significant time to have an impact or happen in fields that the research did not intend. Consequently, experience with more drastic changes that fully take into account third-phase requests, prioritising those scientific research activities that contribute to meeting societal challenges, is the exception. Not surprisingly, these efforts seem to go hand in hand with opening selection processes to new actors, such as industry stakeholders and civil society.

6.3 Open questions for further research

The approach of this study – notably asking organisations to report in the survey on their assessment practices in a generic programme – led to a focus on core activities. Interviews broadened this focus, but the information collected still mainly treats dominant ways of assessment, operational reforms, and challenges. This allowed collection of insights on how research organisations ensure the robustness of their selection processes in a fair and transparent manner. It also yielded information on the tools that are used to assess researchers and proposals, the outputs that are assessed, and the challenges that research organisations face during the assessment processes.

Another question discussed in this study is the **alternative methods** that research organisations have piloted or experimented with to assess research proposals and researchers, and which either complement or replace traditional research assessment processes. This topic would benefit from further investigation and calls for a specific effort. This study indeed shows evidence that RFOs and RPOs are discussing or even considering new approaches, which merit additional research and exchange of experience, in particular:

- Approaches to promote open science¹⁶
- Approaches to increase chances for risky, radically new projects, possibly by newcomers.

¹⁶ A recent report covers describes open access and open science policies of European Funders: Sparc Europe (September, 2019). [Insights into European research funder Open policies and practices.](#)

There are of course communities of practice, networking effects, and – notably in open science – conferences that bring together practitioners with researchers. Still, the specific focus on experiences in Science Europe member organisations beyond their established generic programmes is not analysed so far. Moreover, discussions on what constitutes success in research assessments should take place in order to guide future discussions on the subject.

7 References

- Braun, D. (2003). Lasting tensions in research policy-making – a delegation problem. *Science and Public Policy*, 30(5), 309-322.
- Bush, V. (1945). *Science, the Endless Frontier: A Report to the President on a Program for Postwar Scientific Research*. Washington DC: NSF.
- Freeman, C. (1987). *Technology Policy and Economic Performance: Lessons from Japan*. London: Frances Pinter.
- Georghiou, L. (2008, April 24). Europe's research system must change. *Nature*, 452, 935-6.
- Lundvall, B. Å. (1992). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Frances Pinter.
- Nelson, R. R. (1993). *National Innovation Systems*. New York: Oxford University Press.
- Rothwell, R., Freeman, C., Horsley, A., Jervis, V. T., Robertson, A. B., & Townsend, J. (1974). SAPPHO updated – Project SAPPHO phase II. 3, 258-291.
- von Hippel, E. (1976). The Dominant Role of Users in the Scientific Instrument Innovation Process,. *Research Policy*, 5(3), 212-239.

Appendix A Methodological details

Based on a mixed-methods design, this study draws on data gathered through three steps.

The first step comprised a preliminary review of recent literature on research assessments and documents on the operation of research assessments in different research funding organisations (RFOs) and research performing organisations (RPOs). This included academic works on covering the topic, policy papers, and operational documents as well as internal studies published by RFOs and RPOs.

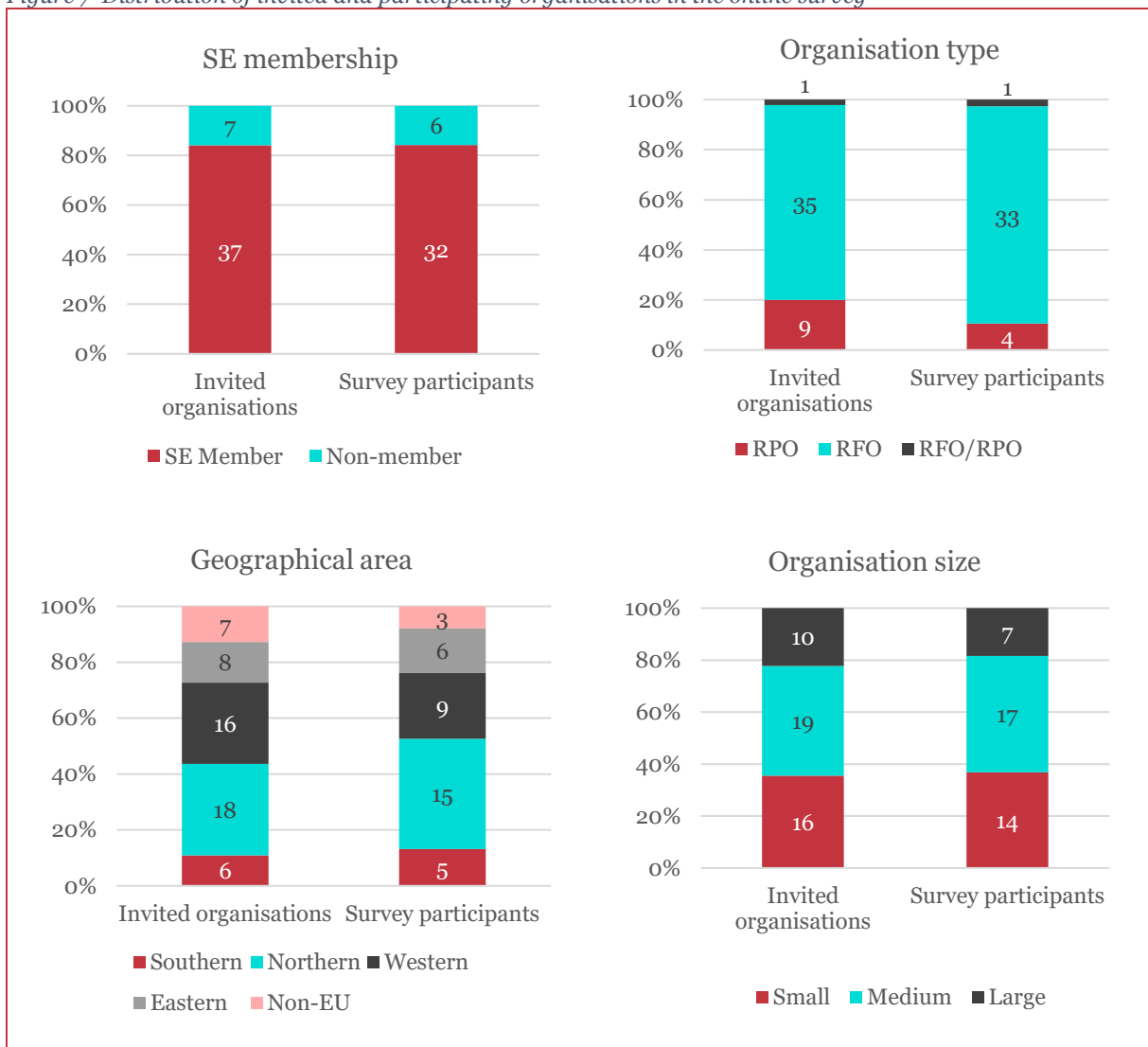
The preparation and analysis of an online survey was the second methodological step. The questionnaire was based on a draft version prepared by Science Europe and Task Force (a selection of representatives from Science Europe member organisations) prior to the start of the study. The questionnaire was reviewed by Technopolis Group, and suggestions for changes and additions were discussed and agreed with Science Europe and Task Force. The final version of the questionnaire was implemented as an online survey using LimeSurvey. Appendix C presents the survey questions, indicating in green and violet colour, the specific questions and adaptations for RFOs and RPOs respectively.

The survey was sent to 33 RFOs, 9 RPOs and 1 organisation with both research funding and performing function. Most invited organisations were members of Science Europe, and in addition, a select number of non-members were invited to participate. The survey was open from August 7th to September 23rd. As it can be observed in Table 5, the response rate was rather high, particularly among Science Europe members. Furthermore, the distribution of the invited and participating organisations is very similar (see Figure 7).

Table 5 Survey participation rate

| Organisation | | Response rate |
|---------------------------|-------------|----------------------|
| Science Europe membership | Members | 86% (32/37) |
| | Non-members | 86% (6/7) |
| Type of organisation | RFOs | 94% (31/33) |
| | RPOs | 44% (4/9) |
| | RFO/RPO | 100% (1/1) |
| Total | | 86% (38/44) |

Figure 7 Distribution of invited and participating organisations in the online survey



In a third-step, 20 organisations were selected to be interviewed based on their survey answers and ensuring a balance according to Science Europe membership, type of organisation (RFOs and RPOs), geographical area and organisation size. In-depth semi-structured interviews with a duration of approximately 1h were conducted with each invited organisation. The interview guide can be found in Appendix D.

The analysis of all the collected data was conducted by Technopolis. The raw survey data were analysed applying descriptive statistics and the analysis of interview data was based on the notes taken by the interviewers. The analysis of the interviews was conducted manually by the study team of Technopolis working collaboratively. The information provided by each participant via interviews and survey was examined by more one member of the study team, searching for emerging themes, common topics among participants, as well as outstanding experiences. The outcomes were analysed, compared and discussed by the study team, in order to ensure a common understanding of the findings of the study.

As part of such discussions, a workshop on interim results took place in Vienna on October 3rd. By then, the survey data was already analysed, and 12 interviews had been conducted. During this workshop, the preliminary results of the study were presented to Science Europe and Task Force, and discussion on the findings took place among the participants. The workshop facilitated reflections on relevant topics and open questions, which were also taken into account for the selection of 4 organisations that remained to be invited as interview participants. A complete list of organisations participating in this study is provided in Appendix B.

Appendix B Organisations participating in this study

Table 6 Organisations participating in the survey and interviews of this study

| Country | Organisation | Organisation type | Organisation size | Science Europe membership | Participation in survey / interviews |
|----------------|--|-------------------|-------------------|---------------------------|--------------------------------------|
| Austria | FWF - Austrian Science Fund | RFO | Medium | Yes | Only survey |
| Belgium | F.R.S. - FNRS - Fund for Scientific Research | RFO | Medium | Yes | Only survey |
| Belgium | FWO - Research Foundation Flanders | RFO | Medium | Yes | Both |
| Croatia | HRZZ - Croatian Science Foundation | RFO | Small | Yes | Only survey |
| Czech Republic | GAČR - Czech Science Foundation | RFO | Small | Yes | Only survey |
| Czech Republic | CAS - Czech Academy of Sciences | RPO | Small | No | Both |
| Denmark | DFP - Independent Research Fund Denmark | RFO | Medium | Yes | Only survey |
| Denmark | DG - Danish National Research Foundation | RFO | Medium | Yes | Only survey |
| Estonia | ETAG - Estonian Research Council | RFO | Small | Yes | Both (interview scheduled) |
| EU | ERC - European Research Council | RFO | Large | No | Both |
| Finland | AKA - Academy of Finland | RFO | Medium | Yes | Only survey |
| France | ANR – French National Research Agency | RFO | Large | Yes | Both |
| Germany | DFG - German Research Foundation | RFO | Large | Yes | Both |
| Germany | EMBO - European Molecular Biology Organisation | RFO | Medium | No | Both (interview scheduled) |
| Ireland | HRB - Health Research Board | RFO | Small | Yes | Only survey |
| Ireland | IRC - Irish Research Council | RFO | Medium | Yes | Only survey |

| Country | Organisation | Organisation type | Organisation size | Science Europe membership | Participation in survey / interviews |
|-----------------|--|--------------------------|--------------------------|----------------------------------|---|
| Ireland | SFI - Science Foundation Ireland | RFO | Medium | Yes | Both |
| Israel | Weizmann Institute of Science | RPO | Medium | No | Both |
| Italy | INFN - National Institute for Nuclear Physics | RPO | Medium | Yes | Both |
| Latvia | LZP - Latvian Science Council | RFO | Small | Yes | Both |
| Lithuania | LMT - Research Council of Lithuania | RFO | Small | Yes | Only survey |
| Luxembourg | FNR - National Research Fund | RFO | Small | Yes | Only survey |
| The Netherlands | NWO – Dutch Research Council | RFO | Medium | Yes | Both |
| Norway | RCN - The Research Council of Norway | RFO | Medium | Yes | Only survey |
| Poland | FNP - Foundation for Polish Science | RFO | Medium | Yes | Only survey |
| Poland | NCN - National Science Centre | RFO | Medium | Yes | Only survey |
| Portugal | FCT - Foundation for Science and Technology | RFO | Small | Yes | Both |
| Romania | UEFISCDI - Executive Agency for Higher Education, Research, Development and Innovation Funding | RFO | Small | Yes | Both (interview scheduled) |
| Slovakia | APVV - Slovak Research and Development Agency | RFO | Small | Yes | Both (interview scheduled) |
| Slovenia | ARRS - Slovenian Research Agency | RFO | Small | Yes | Only survey |
| Spain | CSIC - Spanish National Research Council | RPO | Large | Yes | Both |
| Sweden | FORTE - Swedish Research Council for Health, | RFO | Small | Yes | Both |

| Country | Organisation | Organisation type | Organisation size | Science Europe membership | Participation in survey / interviews |
|----------------|---|--------------------------|--------------------------|----------------------------------|---|
| | Working Life and Welfare | | | | |
| Sweden | FORMAS - A Swedish Research Council for Sustainable Development | RFO | Small | Yes | Only survey |
| Sweden | VR - Swedish Research Council | RFO | Medium | Yes | Only survey |
| Switzerland | SNSF - Swiss National Science Foundation | RFO | Medium | Yes | Both (interview scheduled) |
| United Kingdom | UKRI - UK Research and Innovation | RFO | Large | Yes | Only survey |
| United Kingdom | W - Wellcome | RFO | Large | No | Both |
| USA | NIH - National Institutes of Health | RFO/RPO | Large | No | Both (interview scheduled) |

Appendix C Survey questions

Introduction

Our consultancy - Technopolis Group – has been contracted by Science Europe to conduct a study on research assessment practices of research performing organisations (RPOs) and research funding organisations (RFOs). On behalf of Science Europe, we would like to thank you for participating in this flagship initiative. The overall activity, of which this questionnaire is the first stage, will focus on two important priorities with strong relevance to the research system:

- Robustness of the selection processes: with the objective to ascertain that research assessment processes select the best projects for funding and researchers for promotion.
- Reviewing rewards, incentives and metrics in research assessment: with the objective to explore options/methods to modify how projects, outputs and researchers are evaluated.

Following this survey, a select number of respondents will be asked to participate in a short phone-based interview to further elucidate details of their organisations' research assessment practices and policies.

Your organisation's participation in this study will be very valuable to ensure that:

- The priorities and experience of your organisation, related to research assessment, are adequately accounted for in this activity.
- The challenges your organisation has faced—or is facing—are identified and integrated into discussions, with the view to exchanging and identifying ways to solve them.
- A strong knowledge base is developed, which would serve to facilitate evidence-based discussions and recommendations that respond to the needs of research performing and research funding organisations.
- MOs can draw on the study to inform their own reflection on research assessment.

Privacy and data anonymisation: This survey has been designed in a non-anonymous fashion to give the study team the opportunity to contact your organisation in the subsequent phases of the study. Survey answers will be analysed by Technopolis Group and Science Europe. Raw response data will not be published. Only general analysed findings will be presented in a publicly available report, which will acknowledge the participation of your organisation. Findings will be presented in a transparent manner and linked to the participating institutions. Should your organisation prefer anonymity, please inform us via email: your anonymity preferences will be respected. We kindly ask and trust all survey participants to provide truthful and accurate responses.

Should you have any questions concerning this online survey or this study as a whole, please feel free to contact: María del Carmen Calatrava Moreno (carmen.calatrava@technopolis-group.com; Tel: +43 664 8846 7985)

Thank you very much for your participation!

Instructions

This is the paper version of the online survey for the study of research assessment practices commissioned by Science Europe to Technopolis Group.

This survey has been designed to be responded to by both research funding organisations (RFOs) and research performing institutions (RPOs). The logic instructions in this survey (marked with '[]') indicate which questions you should answer according to your profile and previous answers. In addition, colours are also used to indicate questions that are specific for RFOs (in green), RPOs (in violet).

Please use the online version of the survey to share your answers with us:
<https://technopolis.limequery.com/119814?newtest=Y&lang=en>

Again, thank you for participating!

Questionnaire

1. *Please provide the name of your organisation. [Free text]

2. *Your organisation is...: [Single choice]
 - A research funding organisation (RFO)
 - A research performing organisation (RPO)
 - A research funding *and* research performing organisation

[Logic: If RFO in question 2] To allow us to compare organisations, please identify a generic ‘competitive funding scheme’ for which your organisation conducts research assessments, and complete the questionnaire describing this only. Please consider a ‘generic’ scheme as one that doesn’t focus on specific research themes or specific research outputs (i.e. innovation) but has a broad scope. If your organisation conducts only specific schemes, either in terms of theme or output type, please identify a scheme that best reflects your organisation.

You are welcome to fill-in the questionnaire more than once if you consider that answering for more than one funding scheme better reflects your organisations position on research assessment practices.

3. *[Logic: If RFO] Please state the name and provide a short description of the generic ‘competitive funding scheme’ that will be used as the basis for answering this questionnaire.

Name of scheme [Free text]

Short description of scheme [Free text]

[Logic: If RPO in question 2] In order to allow for comparisons to be made between organisations, please identify a generic ‘researcher promotion scheme’ for which your organisation conducts research assessments, and complete the questionnaire for that scheme only.

You are welcome to fill-in the questionnaire more than once if you consider that answering for more than one funding scheme better reflects your organisations position on research assessment practices.

4. *[Logic: If RPO] Please state the name and provide a short description of the generic ‘researcher promotion scheme’ that will be used as the basis for answering this questionnaire.

Name of scheme [Free text]

Short description of scheme [Free text]

[Logic: If RFO and RPO in question 2] In order to allow for comparisons to be made between organisations, please identify a generic ‘competitive funding scheme’ and a generic ‘researcher promotion scheme’ for which your organisation conducts research assessments, and complete the questionnaire for each of the identified calls only. Regarding ‘competitive funding schemes’, please consider a ‘generic’ scheme as one that doesn’t focus on specific research themes or specific research outputs (i.e. innovation calls), but has a broad scope in these regards. If your organisation conducts only specific schemes, either in terms of theme or output type, please identify a scheme that best reflects your organisation

You are welcome to fill in the questionnaire more than once if you consider that answering for more than one funding scheme better reflects your organisations position on research assessment practices.

5. ***[Logic: If RFO and RPO]** Please state the name and provide a short description of the generic “competitive funding” that will be used as the basis for answering this questionnaire.

Name of scheme [Free text]

Short description of scheme [Free text]

6. ***[Logic: If RFO and RPO]** Please state the name and provide a short description of the generic “researcher promotion scheme” that will be used as the basis for answering this questionnaire.

Name of scheme [Free text]

Short description of scheme [Free text]

Strategic orientation

This section is designed to elucidate your organisation's general policies associated with research assessment.

7. ***Does your organisation have a formal definition of research quality?** [Single choice]

- Yes
- No
- Do not know
- Not applicable

8. **[Logic: If yes in question 7]** How does your organisation define research quality? Feel free to either type or copy/paste your definition here, or paste a link if your organisation’s definition can be found in the public domain. [Free text]

9. ***How important are each of the following aspects in your organisation’s understanding of research quality?** [Matrix]

| | Very important | Moderately important | Less important | Do not know |
|---|----------------|----------------------|----------------|-------------|
| Novelty/originality | | | | |
| Methodological/theoretical rigour | | | | |
| Productivity (e.g. number of publications & other research outputs) | | | | |
| Academic significance or impact | | | | |
| Non-academic significance or impact | | | | |

9.a. Are there any other aspects that your organisation considers important in terms of research quality? Please describe them and indicate their importance.

10. *Does your organisation have any public statement(s) on its philosophy/policies to research assessment? (e.g. reports, web communications, speeches, press releases) [Single choice]
- Yes
 - No
 - Do not know
 - Not applicable
11. [Logic: If yes in question 10] Please provide the links to the relevant documents on your organisation's approach to research assessment. If these documents are not available online, please send them to us at the following email address: carmen.calatrava@technopolis-group.com [Free text]

Research assessment in competitive funding schemes and programmes [Logic: only for RFOs]

12. *[Logic: If RFO] What system does your organisation currently implement for the assessment of research proposals? Please select all that apply. [Multiple choice]
- i) Double-blind peer reviews conducted by external experts (i.e. the external reviewers do not know the identity of authors of the proposal, and vice versa).
 - ii) Double-blind reviews conducted internally by your organisation (i.e. the internal reviewers do not know the identity of the authors of the proposal, and vice versa)
 - iii) Single-blind peer reviews conducted by external experts (i.e. the external reviewers know the identity of the authors of the proposal, but the authors do not know who the reviewers are).
 - iv) Single-blind reviews conducted internally by your organisation (i.e. the internal reviewers know the identity of the authors of the proposal, but the authors do not know who the reviewers are).
 - v) Open reviews conducted by external experts (i.e. the identity of the reviewers is known by all applicants)
 - vi) Open reviews conducted internally by staff of your organisation (i.e. the identity of the staff members of your organisation who review the applications is known by all applicants)
 - vii) Panel reviews of external experts (i.e. external experts discuss and review the individual evaluations to fix a ranked list (or Yes/No ranking) of proposals to be funded or rejected).
 - viii) Panel reviews of internal experts (i.e. staff members of your organisation discuss and review the individual evaluations to fix a ranked list (or Yes/No ranking) of proposals to be funded or rejected)
 - ix) Ranking selection according to a set of quantitative criteria
 - x) Other, please specify.
13. *[Logic: If RFO and if 12.vii) or 12.viii)] Could you please explain how panels are selected and organised? [Free text]
14. *[Logic: If RFO] Which of the following statements about the assessment of research proposals apply to your organisation? Please select all that apply [Multiple choice]
- i) All units/departments in your organisation follow the same processes to assess research proposals under the same schemes.
 - ii) Your organisation adapts its research assessment systems for different research fields, or where different research outputs are intended.

- iii) Your organisation offers training to individuals involved in the **assessment of research proposals**.
 - iv) Your organisation provides written guidelines to individuals (e.g. external reviewers, panellists, etc.) involved in the **assessment of research proposals**.
 - v) Reviewers/panel members are explicitly informed of tools and criteria that should **not** be used in the assessment.
 - vi) Reviewers/panel members are asked to fill a standardised form designed to address the formal requirements of the assessment.
15. ***[Logic: If RFO and if 14.iii) or 14.iv)]** What do the training/guidelines for the chosen research assessment cover? Please select all that apply. [Multiple choice]
- Definition, identification and processing of conflicts of interest.
 - Roles of **reviewers/panel members**.
 - Tools, metrics and criteria used in research assessment.
 - Consideration of written reviews by external reviewers/panel members.
 - Proceeding of the panel meetings.
 - Unconscious discrimination (e.g. gender, ethnicity, seniority)
 - None of the above
 - Other [Free text]
16. ***[Logic: If RFO]** Whose track-record and/or scientific contributions does your organisation require reviewers to assess when assessing the researcher and/or research team who submitted a research proposal? [Single choice]
- Principal investigator (PI).
 - All senior investigators.
 - All members of the research team.
 - Other [Free text]
17. ***[Logic: If RFO]** Which of the following aspects of **applicants'** track record does your organisation assess when evaluating **research proposals**? Please tell us for each option whether your organisation considers it now, has done so in the past or plans to do so in future. Please also tell us how important each aspect is in the overall assessment of track record, but only for aspects you are currently using or have used in the past, please leave blank otherwise. [Matrix]

| | Use | | | | | Importance | | |
|--|-------------------------------|------------------|--|--|--|----------------|----------------------|----------------|
| | Currently using | Used in the past | Never used but considering using in the future | Never used and not considering using in the future | | Very important | Moderately important | Less important |
| Publication outputs of the applicant/s | Activate question 0, 20 and 0 | | | | | | | |
| Non-publication outputs of the applicant/s (e.g. datasets, software, etc.) | Activate question 19 | | | | | | | |
| Previous funded research projects of the applicant/s | | | | | | | | |
| Awards of the applicant/s | | | | | | | | |
| Open science practices of the applicant/s (e.g. open access to publications, data, etc.) | | | | | | | | |
| Teaching activities of the applicant/s | | | | | | | | |
| Mentoring by the applicant/s | | | | | | | | |
| Internal responsibilities within the applicant/s research organisations (e.g. Head of department or research unit) | | | | | | | | |
| Data curation conducted by the applicant/s | | | | | | | | |
| Applicants' participation in international research projects | | | | | | | | |
| Applicants' knowledge transfer/commercialisation (i.e. patents, clinical trials, spin-offs) | | | | | | | | |
| Applicants' participation in conferences | | | | | | | | |
| Applicants' services for the research community (i.e. organisation of conferences, peer-review services, etc). | | | | | | | | |
| Research communication by the applicant/s | | | | | | | | |
| International character of the team of applicants | | | | | | | | |

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| Number of highly cited publications | | | | | | | | |
| Number of publications in high-ranking journals | | | | | | | | |
| Altmetrics scores | | | | | | | | |
| Qualitative assessment of the content of authored publications/research output | | | | | | | | |

20.a. **[Logic: If RFO]** Are there any other author-level approaches/tools used by the reviewers (currently, in the past, or planning to use in the future) which are not listed in the question above? Please describe them and tell us how important each approach/tool is in the overall assessment.

21. ***[Logic: If RFO and depending on the answer in question 17]** Are any of the following journal-level approaches/tools used by the reviewers to measure research productivity in the assessment of **research proposals at your organisation**? Please tell us for each option whether your organisation uses it now, used it in the past or plans doing so in future. Please also tell us how important each approach/tool is in the overall assessment, but only for aspects you are currently using or have used in the past, please leave blank otherwise. [Matrix]

| | Use | | | | Importance | | |
|---|-----------------|------------------|--|--|----------------|----------------------|----------------|
| | Currently using | Used in the past | Never used but considering using in the future | Never used and not considering using in the future | Very important | Moderately important | Less important |
| Journal reputation | | | | | | | |
| H5-index | | | | | | | |
| H5-median | | | | | | | |
| Journal impact factor | | | | | | | |
| Source Normalized Impact per Paper (SNIP) | | | | | | | |
| Eigenfactor | | | | | | | |
| SCimago Journal Rank (SJR) | | | | | | | |
| CiteScore | | | | | | | |

21.a. **[Logic: If RFO]** Are there any other journal-level approaches/tools used by the reviewers (currently, in the past, or planning to use in the future) which are not listed in the question above? Please describe them and tell us how important each approach/tool is in the overall assessment.

22. ***[Logic: If RFO]** How does your organisation require reviewers/panel members to assess **research proposals**? Please tell us for each option whether your organisation requires it now, required it in the past or plans doing so in future. Please also tell us how important each aspect is in the overall assessment, but only for those you are currently requiring or have required in the past, please leave blank otherwise. [Matrix]

| | Required | | | | | Importance | | |
|--|--------------------|----------------------|--|--|--|----------------|----------------------|----------------|
| | Currently required | Required in the past | Never required but considering using in the future | Never required and not considering using in the future | | Very important | Moderately important | Less important |
| Soundness of the proposed methodology | | | | | | | | |
| Feasibility of the proposed research (i.e. pilot testing, risk management, timeline appropriateness) | | | | | | | | |
| Resource allocation in line with objectives | | | | | | | | |
| Feasibility of the proposed research in relation to the expertise and prior experience of the applicant(s) | | | | | | | | |
| Complementarity and balance of expertise of the researchers involved in the proposal | | | | | | | | |
| Dissemination plan of the proposed research | | | | | | | | |
| Novelty of the research question | | | | | | | | |
| Potential economic and societal impact of the research results | | | | | | | | |
| Potential transfer/commercialisation of knowledge (i.e. patents, clinical trials, spin-offs) | | | | | | | | |
| Potential contribution of the proposed research to public policies | | | | | | | | |
| Potential contribution of the proposed research to Sustainable Development Goals (SDG), grand challenges, or other mission-based initiatives | | | | | | | | |
| Ethical considerations (e.g. the proposed research should be ethically acceptable) | | | | | | | | |

22.a. *[Logic: If RFO] Are there any other aspects not listed in the question above that your organisation require reviewers/panel members to assess (currently, in the past, or plans doing so)? Please describe them and tell us how important each aspect is in the overall assessment.

Challenges implementing research assessment in competitive funding schemes and programmes [Logic: only for RFOs]

23. *[Logic: If RFO] Does your organisation face any of the following challenges when assessing research proposals? Please select all that apply. [Multiple choice]

- i) Defining and developing an assessment process that is perceived as non-discriminatory and legitimate by all relevant stakeholders
- ii) Defining a set of criteria and tools to differentiate research proposals of similar quality
- iii) High investment of resources (e.g. time, effort) for gathering quantitative data (e.g. h-index, journal impact factor, etc.) on the applicant(s).
- iv) High investment of resources for the qualitative assessment of the content of applicants' research outputs
- v) Ensuring that the entire research assessment follows the established guidelines/requirements avoiding informal modifications of its implementation.
- vi) None of the above
- vii) Do not know

24. [Logic: If RFO] Are there any other major challenges not listed in the question above that your organisation faces when assessing research proposals? Please describe them below. [Free text]

25. *[Logic: If RFO and if 23.v) is marked] Which methods and/or tools are used 'informally' (not in line with formal requirements) by reviewers? [Free text]

26. *[Logic: If RFO] Has your organisation implemented any mechanisms to monitor and regulate the implementation of formal requirements of the assessment of research proposals?

- Yes
- No

27. [Logic: If RFO and yes in question 26] Please provide details of the mechanisms used to monitor and regulate the implementation of your organisation's formal requirements for the assessment of research proposals [Free text]

Robustness of the selection processes in competitive funding schemes and programmes [only for RFOs]

The objective of this section is to understand how research funding organisations ensure that their selection processes indeed identify the best proposals in a fair and transparent manner.

In the context of this study, 'robustness' is understood as the capacity of selection processes to, in line with the objectives of the evaluation, reliably and fairly assess the quality of proposals and to select them for funding.

28. *[Logic: RFO] How often does your organisation perform evaluations of its selection processes of research proposals with the view to testing their robustness? [Single choice]

- i) Our organisation does this at fixed intervals: every year.
- ii) Our organisation does this at fixed intervals: every 2-3 years.

- iii) Our organisation does this at fixed intervals: every 4-5 years.
- iv) Our organisation does this at fixed intervals of more than 5 years
- v) Our organisation has done this more than once, but not at fixed intervals
- vi) Our organisation has done this once only, and there is no rule to do so at fixed intervals
- vii) Our organisation has never done this, but plan to do so in the future
- viii) Our organisation has never done this, and currently has no plans to do so in the future
- ix) Other. Please specify: [Free text]

29. **[Logic: If RFO and 28.i) or 28.ii) or 28.iii) or 28.iv) or 28.v) or 28.vi) is marked]** Are the results of those evaluations made publicly available? [Single choice]

- Yes
- No
- Do not know

30. **[Logic: If RFO and yes in question 29]** Could you please provide the links to the evaluation documents/results? If these documents are not available online, please send them to us to the following email address: carmen.calatrava@technopolis-group.com [Free text]

31. **[Logic: If RFO]** How often does your organisation survey researchers' attitudes towards, and experiences of, assessment of research proposals? [Single choice]

- i) Our organisation does this at fixed intervals: every year
- ii) Our organisation does this at fixed intervals: every 2-3 years
- iii) Our organisation does this at fixed intervals: every 4-5 years
- iv) Our organisation does this at fixed intervals of more than 5 years
- v) Our organisation has done this more than once, but not at fixed intervals
- vi) Our organisation has this once only, and there is no rule to do so at fixed intervals
- vii) Our organisation has never done this, but plan to do so in the future
- viii) Our organisation has never done this, and currently has no plans to do so in the future
- ix) Other. Please specify: [Free text]

32. **[Logic: If RFO and 31.i) or 31.ii) or 31.iii) or 31.iv) or 31.v) or 31.vi)]** Whose attitudes has your organisation surveyed? Please select all that apply. [Multiple choice]

- i) Researchers who have participated as reviewers in funding decision processes
- ii) Researchers who have applied for research funding and were successful
- iii) Researchers who have applied for research funding but were not successful
- iv) Other. Please specify: [Free text]

33. **[Logic: If RFO and 31.i) or 31.ii) or 31.iii) or 31.iv) or 31.v) or 31.vi) is marked]** Please provide links to the documents related to this survey (e.g. reports). If these documents are not available online, please send them to us to the following email address: carmen.calatrava@technopolis-group.com [Free text]

34. ***[Logic: If RFO]** Please indicate whether your organisation considers making any of the following changes to the way research proposals are assessed. [Matrix]

| | This has been a long-standing practice of our organisation | Our organisation has made this change | Our organisation is planning to make this change | Our organisation has not made this change and is not planning to do so in the future | Do not know | Not applicable |
|--|--|---------------------------------------|--|--|-------------|----------------|
| Reducing the use of journal-based metrics | | | | | | |
| Eliminating the use of journal-based metrics | | | | | | |
| Broadening the range of non-publication research outputs that reviewers/panel members are required to assess, such as software, hardware, data, etc. | | | | | | |
| Broadening the range of quantitative tools that are used to assess research impact. | | | | | | |
| Considering qualitative indicators of research impact, such as influence on policy and practice | | | | | | |
| Considering the research content of the scholarly publications of the applicants | | | | | | |
| Being explicit about the criteria used in the assessment of research proposals | | | | | | |

34.a. **[Logic: If RFO]** Are there any *other* changes that your organisation has made or considers making to the way research proposals are assessed? Please describe them and indicate if they have already been implemented.

35. ***[Logic: If RFO]** Please indicate if your organisation scrutinises its own selection processes against each of the following types of potential discrimination: (Please select all that apply). [Multiple choice]

- Discipline / research field
- Gender
- Disability
- Ethnicity
- Seniority
- Affiliation
- Not applicable: our organisation does not scrutinise potential discrimination in selection processes

- Do not know
- Other. Please specify: [Free text]

36. **[Logic: If RFO]* Has your organisation implemented any of the following adjustments to their processes to select **research proposals** in order to tackle any potential or observed discrimination? Please select all that apply. [Multiple choice]

- Introduction of quotas to balance the selection of **applicants** with a certain profile (e.g. based on discipline, gender, ethnicity, affiliation).
- Introduction of a policy to give priority to the selection of **proposals from applicants** with underrepresented profiles when the quality of their **proposal and research outputs** is as high as that of the other **proposals**.
- Introduction of double-blind reviews (the reviewers do not know the identity of **applicants**, and vice versa)
- Selection of groups of reviewers with diverse profiles (e.g. discipline, gender, ethnicity, seniority).
- Not applicable: there is no known discrimination in our funding procedures
- Not applicable: our organisation has not implemented any adjustments to tackle potential or observed discrimination.
- Other adjustment. Please specify:

*Implementation of novel methods and processes in competitive funding schemes and programmes
[Logic: only for RFOs]*

The objective of this section is to address alternative methods that organisations have piloted or experimented with to **conduct research assessments and allocate funding**, either complementing or replacing traditional peer review.

37. **[Logic: If RFO]* Has your organisation implemented or experimented with the following assessment or funding allocation methods? Please select all that apply. [Multiple choice]

- Sandpits (funding allocation method where funding is allocated through an intensive, interactive event hosted by a funder, in which groups of researchers from different disciplines collaborate to develop research proposals).
- Lotteries in **research funding decision** (a two-stage system in which a) high-quality applications are identified by peer review and b) **funding** decisions are made on the basis of a computer-generated lottery)
- Self-Organising Funding Allocation (SOFA) (funding mechanism in which every research proposal starts with the same allocation of funding every year but must allocate a portion to other proposals)
- Double-blind assessment of **proposals** (the reviewers do not know the identity of **authors of the proposal**, and vice versa)
- Single-blind assessment of **proposals** (the reviewers know the identity of the **authors of the proposal**, but the **authors** do not know who the reviewers are).
- Open peer review of **proposals** (the identities of both the **author** and the reviewer are known and/or the review reports are online openly available).
- We have not implemented alternative assessment methods.
- Other. Please specify [Free text]

38. [Logic: If RFO: show only for those options marked in question 37] How satisfactory was their implementation? [Matrix]

| | Very unsatisfactory | Somewhat unsatisfactory | Neither unsatisfactory nor satisfactory | Somewhat satisfactory | Very satisfactory | Do not know |
|--------------------------------------|---------------------|-------------------------|---|-----------------------|-------------------|-------------|
| Sandpits | | | | | | |
| Lotteries | | | | | | |
| Self-organising funding allocation | | | | | | |
| Double-blind assessment of proposals | | | | | | |
| Single-blind assessment of proposals | | | | | | |
| Open peer review | | | | | | |
| Other | | | | | | |

Research assessment of researcher promotions [Logic: only for RPOs]

39. *[Logic: If RPO] What system does your organisation currently implement for the promotion assessment? Please select all that apply, but disregard any approach that is only used rarely (e.g. for small specialised programmes) [Multiple choice]

- i) Double-blind peer reviews conducted by external experts (i.e. the external reviewers do not know the identity of the candidates for promotion, and vice versa).
- ii) Double-blind reviews conducted internally by your organisation (i.e. the internal reviewers do not know the identity of the candidates for promotion, and vice versa)
- iii) Single-blind peer reviews conducted by external experts (i.e. the external reviewers know the identity of the candidates for promotion, but the candidates do not know who the reviewers are).
- iv) Single-blind reviews conducted internally by your organisation (i.e. the internal reviewers know the identity of the candidates for promotion, but the candidates do not know who the reviewers are).
- v) Open reviews conducted by external experts (i.e. the identity of the reviewers is known by all candidates)
- vi) Open reviews conducted internally by staff of your organisation (i.e. the identity of the staff members of your organisation who review the applications is known by all candidates)
- vii) Panel reviews of external experts (i.e. external experts discuss and review the individual evaluations to fix a ranked list (or Yes/No ranking) of candidates to be promoted).
- viii) Panel reviews of internal experts (i.e. staff members of your organisation discuss and review the individual evaluations to fix a ranked list (or Yes/No ranking) of candidates)
- ix) Ranking selection according to a set of quantitative criteria
- x) Other, please specify.

40. ***[Logic: If RPO and 39.vii) or 39.viii) marked]** Could you please explain how panels are selected and organised? [Free text]
41. ***[Logic: If RPO]** Which of the following statements about the assessment of **researcher promotions** apply to your organisation? Please select all that apply [Multiple choice]
- i) All units/departments in your organisation follow the same processes to **decide on the promotion of researchers**.
 - ii) Your organisation adapts its **promotion** assessment systems for different research fields, or where different research outputs are intended.
 - iii) Your organisation offers training to individuals involved in the **decision process to promote researchers**.
 - iv) Your organisation provides written guidelines to individuals (e.g. external reviewers, panellists, etc.) involved in the **decision process to promote researchers**.
 - v) Reviewers/panel members are explicitly informed of tools and criteria that should **not** be used in the assessment.
 - vi) Reviewers/panel members are asked to fill a standardised form designed to address the formal requirements of the assessment.
42. ***[Logic: If RPO and if 41.iii) or 41.iv)]** What do the training/guidelines for the chosen research assessment cover? Please select all that apply. [Multiple choice]
- Definition, identification and processing of conflicts of interest.
 - **Roles of individuals involved in the decision process**.
 - Tools, metrics and criteria used in research assessment.
 - Assessment of the written reviews by reviewers/panel members.
 - Proceeding of the panel meetings.
 - Unconscious discrimination (e.g. gender, ethnicity, seniority)
 - Other [Free text]
43. ***[Logic: If RPO]** Which of the following aspects of **candidates'** track record does your organisation assess when evaluating their **potential promotion**? Please tell us for each option whether your organisation considers it now, has done so in the past or plans to do so in future. Please also tell us how important each aspect is in the overall assessment of track record, but only for aspects you are currently using or have used in the past, please leave blank otherwise. [Matrix]

| | Use | | | | | Importance | | |
|--|--------------------------------|------------------|--|--|--|----------------|----------------------|----------------|
| | Currently using | Used in the past | Never used but considering using in the future | Never used and not considering using in the future | | Very important | Moderately important | Less important |
| Publication outputs of the candidate | Activate question 0, 46 and 47 | | | | | | | |
| Non-publication outputs of the candidate (e.g. datasets, software, etc.) | Activate question 45 | | | | | | | |
| Funded research projects obtained by the candidate | | | | | | | | |
| Awards of the candidate | | | | | | | | |
| Open science practices of the candidate (e.g. open access to publications, data, etc.) | | | | | | | | |
| Teaching activities of the candidate | | | | | | | | |
| Mentoring by the candidate | | | | | | | | |
| Internal responsibilities of the candidate within the research organisation (e.g. involvement in internal committees) | | | | | | | | |
| Data curation conducted by the candidate | | | | | | | | |
| Candidate's participation in international research projects | | | | | | | | |
| Candidate's services for the research community (i.e. organisation of conferences, peer-review services, etc.) | | | | | | | | |
| Candidate's knowledge transfer/commercialisation | | | | | | | | |
| Candidate's participation in conferences | | | | | | | | |
| Research communication by the candidate | | | | | | | | |

- 43.a. **[Logic: If RPO]** Are there any other aspects of candidates' track record that your organisation assesses (currently, in the past, or plans doing so in the future) when evaluating their promotion? Please describe them and indicate their importance in the overall assessment of track record.
44. ***[Logic: If RPO and depending on the answer in question 43]** What types of published outputs are assessed when evaluating **candidates for promotion**? Please select all that apply. [Multiple choice]
- All scholarly publications
 - All peer-reviewed scholarly publications
 - Non-peer-reviewed publications (i.e. pre-prints, books, manuals)
 - Most recent publications
 - Thematically related publications
 - Highly cited publications
 - Publications recommended by the **candidate**
 - Open access publications
 - Do not know
 - Other. Please specify: [Free text]
45. ***[Logic: If RPO and depending on the answer in question 43]** What non-publication research outputs are assessed when evaluating **candidates for promotion**? Please select all that apply. [Multiple choice]
- Datasets
 - Software, codes and algorithms
 - Hardware
 - Audios, videos and images
 - Instructions and manuals
 - Do not know
 - Other non-publication research outputs. Please specify: [Free text]
46. ***[Logic: if RPO and depending on the answer in question 43]** What author-level tools are used by the reviewers to measure research productivity in the **promotion** assessment? Please tell us for each option whether your organisation uses it now, used it in the past or plans doing so in future. Please also tell us how important each approach/tool is in the overall assessment, but only for aspects you are currently using or have used in the past, please leave blank otherwise. [Matrix]

| | Use | | | | Importance | | |
|-------------------------------------|-----------------|------------------|--|--|----------------|----------------------|----------------|
| | Currently using | Used in the past | Never used but considering using in the future | Never used and not considering using in the future | Very important | Moderately important | Less important |
| Cumulative number of citations | | | | | | | |
| H-index | | | | | | | |
| Number of highly cited publications | | | | | | | |

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| Number of publications in high-ranking journals | | | | | | | | |
| Altmetrics scores | | | | | | | | |
| Qualitative assessment of the content of authored publications/research output | | | | | | | | |

- 46.a. **[Logic: If RPO]** Are there any *other* author-level approaches/tools used by the reviewers (currently, in the past, or planning to use in the future) which are not listed in the question above? Please describe them and tell us how important each approach/tool is in the overall assessment.
47. ***[Logic: if RPO and depending on the answer in question 43]** Are any of the following journal-level tools used by the reviewers to measure research productivity in the **promotion** assessment? Please tell us for each option whether your organisation uses it now, used it in the past or plans doing so in future. Please also tell us how important each approach/tool is in the overall assessment, but only for aspects you are currently using or have used in the past, please leave blank otherwise. [Matrix]

| | Use | | | | Importance | | |
|---|-----------------|------------------|--|--|----------------|----------------------|----------------|
| | Currently using | Used in the past | Never used but considering using in the future | Never used and not considering using in the future | Very important | Moderately important | Less important |
| Journal reputation | | | | | | | |
| H5-index | | | | | | | |
| H5-median | | | | | | | |
| Journal impact factor | | | | | | | |
| Source Normalized Impact per Paper (SNIP) | | | | | | | |
| Eigenfactor | | | | | | | |
| SCimago Journal Rank (SJR) | | | | | | | |
| CiteScore | | | | | | | |

- 47.a. ***[Logic: If RPO]** Are there any other journal-level approaches/tools used by the reviewers (currently, in the past, or planning to use in the future) and not listed in the question above? Please describe them and tell us how important each approach/tool is in the overall assessment.

Challenges implementing assessments on the promotion of researchers [Logic: only for RPOs]

48. *[Logic: If RPO] Does your organisation face any of the following challenges when assessing candidates for promotion? Please select all that apply [Multiple choice]
- i) Defining and developing an assessment process that is perceived as non-discriminatory and legitimate by all relevant stakeholders
 - ii) Defining of a set of criteria and tools to differentiate candidates with comparable achievements
 - iii) High investment of resources (e.g. time, effort) for gathering quantitative data (e.g. h-index, journal impact factor, etc.) on the candidate(s)
 - iv) High investment of resources for the qualitative assessment of the content of candidates' research outputs
 - v) Ensuring that the entire research assessment follows the established guidelines/requirements avoiding informal modifications of its implementation.
 - vi) None of the above
 - vii) Do not know
49. [Logic: If RPO] Are there any other major challenges not listed in the question above that your organisation faces when assessing candidates for promotion? Please describe them below. [Free text]
50. *[Logic: If RPO and if 48.v) is marked] Which methods and/or tools are used 'informally' (not in line with formal requirements) by reviewers? [Free text]
51. *[Logic: If RPO] Has your organisation implemented any mechanisms to monitor and regulate the implementation of formal requirements of the assessment of candidates for promotion?
- Yes
 - No
52. [Logic: If RPO and yes in question 51] Please provide details of the mechanisms used to monitor and regulate the implementation of your organisation's formal requirements for the assessment of candidates for promotion [Free text]

Robustness of the selection processes in research performing organisations [only for RPOs]

The objective of this section is to understand how research performing organisations ensure that their selection processes indeed identify the best researchers in a fair and transparent manner.

In the context of this study, '**robustness**' is understood as the capacity of selection processes to, in line with the objectives of the evaluation, reliably and fairly assess the quality of researchers, and to select them for promotion.

53. *[Logic: If RPO] How often does your organisation perform evaluations of its selection processes of candidates for promotion with the view to testing their robustness? [Single choice]
- i) Our organisation does this at fixed intervals: every year.
 - ii) Our organisation does this at fixed intervals: every 2-3 years.
 - iii) Our organisation does this at fixed intervals: every 4-5 years.
 - iv) Our organisation does this at fixed intervals of more than 5 years
 - v) Our organisation has done this more than once, but not at fixed intervals
 - vi) Our organisation has done this once only, and there is no rule to do so at fixed intervals

- vii) Our organisation has never done this, but plan to do so in the future
- viii) Our organisation has never done this, and currently has no plans to do so in the future
- ix) Other. Please specify: [Free text]

54. ***[Logic: If RPO and 53.i) or 53.ii) or 53.iii) or 53.iv) or 53.v) or 53.vi)]** Are the results of those evaluations made publicly available? [Single choice]

- Yes
- No
- Do not know

55. **[Logic: If RPO and yes in question 54]** Could you please provide the links to the evaluation documents/results? If these documents are not available online, please send them to us to the following email address: carmen.calatrava@technopolis-group.com [Free text]

56. ***[Logic: If RPO]** How often does your organisation survey researchers' attitudes towards, and experiences of, promotion assessments? [Single choice]

- i) Our organisation does this at fixed intervals: every year
- ii) Our organisation does this at fixed intervals: every 2-3 years
- iii) Our organisation does this at fixed intervals: every 4-5 years
- iv) Our organisation does this at fixed intervals of more than 5 years
- v) Our organisation has done this more than once, but not at fixed intervals
- vi) Our organisation has done this once only, and there is no rule to do so at fixed intervals
- vii) Our organisation has never done this, but plan to do so in the future
- viii) Our organisation has never done this, and currently has no plans to do so in the future
- ix) Other. Please specify: [Free text]

57. ***[Logic: If RPO and 56.i) or 56.ii) or 56.iii) or 56.iv) or 56.v) or 56.vi) is marked]** Whose attitudes has your organisation surveyed? Please select all that apply. [Multiple choice]

- i) Reviewers of promotion applications/processes
- ii) Applicants for promotion who were successful
- iii) Applicants for promotion who were not successful
- iv) Other. Please specify: [Free text]

58. **[Logic: If RPO and 56.i) or 56.ii) or 56.iii) or 56.iv) or 56.v) or 56.vi) is marked]** Please provide links to the documents related to this survey (e.g. reports). If these documents are not available online, please send them to us to the following email address: carmen.calatrava@technopolis-group.com [Free text]

59. ***[Logic: If RPO]** Please indicate whether your organisation considers making any of the following changes to the way research proposals are assessed. [Matrix]

| | This has been a long-standing practice of our organisation | Our organisation has made this change | Our organisation is planning to make this change | Our organisation has not made this change and is not planning to do so in the future | Do not know | Not applicable |
|--|---|--|---|---|--------------------|-----------------------|
| | | | | | | |

| | | | | | | |
|--|--|--|--|--|--|--|
| Reducing the use of journal-based metrics | | | | | | |
| Eliminating the use of journal-based metrics | | | | | | |
| Broadening the range of non-publication research outputs that reviewers/panel members are required to assess, such as software, hardware, data, etc. | | | | | | |
| Broadening the range of quantitative tools that are used to assess research impact | | | | | | |
| Considering qualitative indicators of research impact, such as influence on policy and practice | | | | | | |
| Considering the research content of the scholarly publications of the candidates | | | | | | |
| Being explicit about the criteria used in the assessment for the promotion of researchers | | | | | | |

60. *[Logic: If RPO] Please indicate if your organisation scrutinises its own selection processes against the following types of potential discrimination: (Please select all that apply) [Multiple choice]

- Discipline / research field
- Gender
- Disability
- Ethnicity
- Seniority
- Not applicable: our organisation does not scrutinise potential discrimination in selection processes
- Do not know
- Other. Please specify: [Free text]

61. *[Logic: If RPO] Has your organisation implemented any of the following adjustments to their processes to assess promotions in order to tackle any potential or observed discriminations? Please select all that apply. [Multiple choice]

- Introduction of quotas to balance the selection of candidates with a certain profile (e.g. based on discipline, gender, ethnicity, affiliation).
- Introduction of a policy to give priority to the selection of candidates with underrepresented profiles when the quality of their academic outputs is as high as that of the other candidates.
- Introduction of double-blind reviews (i.e. the reviewers do not know the identity of candidates, and vice versa)

- Selection of groups of reviewers with diverse profiles (e.g. discipline, gender, ethnicity, seniority).
- Not applicable: there is no known discrimination in our promotion procedures
- Not applicable: our organisation has not implemented any adjustments to tackle observed discrimination.
- Other adjustment. Please specify:

Implementation of novel methods and processes in the promotion of researchers [Logic: only for RPOs]

The objective of this section is to address alternative methods that organisations have piloted or experimented with to decide on the promotion of researchers, either complementing or replacing traditional peer review.

62. *[Logic: If RPO] Has your organisation implemented or experimented with the following assessment methods? Please select all that apply. [Multiple choice]

- Lotteries in promotion decisions (a two-stage system in which a) high-quality candidates are identified by peer review and b) promotion decisions are made on the basis of a computer-generated lottery)
- Double-blind assessment of candidates to be promoted (the reviewers do not know the identity of candidates for promotion, and vice versa)
- Single-blind assessment of candidates to be promoted (the reviewers know the identity of the candidates for promotion, but the candidates do not know who the reviewers are).
- Open peer review of candidates to be promoted (the identities of both the candidates and the reviewer are known and/or the review reports are online openly available).
- We have not implemented alternative assessment methods.
- Other. Please specify [Free text]

63. *[Logic: If RPO: show only for those options marked in question 62] How satisfactory was their implementation? [Matrix]

| | Very unsatisfactory | Somewhat unsatisfactory | Neither unsatisfactory nor satisfactory | Somewhat satisfactory | Very satisfactory | Do not know |
|---------------------------------------|---------------------|-------------------------|---|-----------------------|-------------------|-------------|
| Lotteries | | | | | | |
| Double-blind assessment of candidates | | | | | | |
| Single-blind assessment of candidates | | | | | | |
| Open peer review or candidates | | | | | | |
| Other | | | | | | |

Declarations on Research Assessment Practices

64. *Please indicate whether your organisation has joined/published any declaration on research assessment practices: (Please select all that apply). [Multiple choice]
- i) Our organisation is one of the signatories of the San Francisco Declaration on Research Assessment (DORA).
 - ii) Our organisation is in the process of signing DORA.
 - iii) Our organisation is developing measures to be compliant with DORA before signing the Declaration.
 - iv) Our organisation has signed/is part of another similar initiative.
 - v) Our organisation is in the process of signing/becoming part of another similar initiative.
 - vi) Our organisation is developing measures to be compliant with another similar initiative before signing a declaration.
 - vii) Our organisation has an internal policy requiring it not to sign any external declaration.
 - viii) Our organisation has not yet discussed/considered signing DORA or a similar initiative.
 - ix) Other. Please specify [Free text]
65. *[Logic: If 64.iv) or 64.v) or 64.vi) is marked] Which other initiative/s has your organisation supported / will your organisation support? [Free text]
66. *[Logic: If 64.i) or 64.iv) is marked] When did your organisation sign DORA and/or another similar initiative/s? [Free text]
67. *[Logic: If 64.vii) or 64.viii) is marked] What were the reasons for your organisation not to sign DORA or other similar initiatives? Please select all that apply. [Multiple choice]
- Our organisation did not know about DORA or any other similar initiative.
 - Our organisation wants to retain the autonomy to implement metrics in a way that fits with our mission and values.
 - Our organisation wants to use journal-based metrics or tools to inform the assessment of research/researchers.
 - Our organisation has developed a responsible approach to use metrics for the assessment of research/researchers.
 - Our organisation decided to keep our assessment approach continuously under review, rather than signing a fixed statement.
 - Metrics are an important check and balance in our evaluative processes.
 - Metrics have a level of objectivity that humans do not.
 - None of the above
 - Other. Please specify: [Free text]

Final remarks

68. Is there any aspect that has not been covered in this questionnaire, but that you would consider important to communicate? [Free text]

Appendix D Interview guide

Introducing and thanking

- Thanking the participant
- Introduce the aim of the study and interview
- Position and role within the organisation
- Impressions on the questionnaire (i.e., who answered, topics)

Description of the processes in research assessment

- Main characteristics of their research assessments: Design phase, implementation, operations, stakeholders, communication (internal, external, with applicants)
- Differences between the generic scheme (see questionnaire) and others implemented in the organisation
- Self-evaluation of research assessments

Strengths and aspects that work well

- Aspects of which the organisation can be proud in relation to their research assessments
- Aspects that contribute to the robustness, fairness and transparency of research assessments
- Key resources/strategies to support such strengths

Weaknesses and room for improvement

- Aspects that are not optimised (internal and external aspects)
- Aspects that may have a negative impact on the robustness, fairness and transparency of research assessments
- Resource limitations and possible solutions or strategies for improvement

Changes, learning dynamics and opportunities

- New procedures, methods, tools and strategies implemented/experimented in the last years
- Changes planned or considered for the future
- Learning dynamics (from researchers, internal discussions, other institutions, self-assessments, evaluations, other schemes, experimenting, national politics, international developments, etc.)
- Observed trends in research assessment (qualitative approaches, assessment of open science, manifestos)

Challenges and contingency plans

- Challenges of research assessments (internal and external factors)
- Contingency plans
- Alignment of the written procedures/rules/guidelines with the actual implementation

Other aspects based on survey answers

- Further elaboration on remarkable/interesting information from the survey
- For non-EU institutions: Opinion on the European approach

- If excellence is mentioned in questions 7-8 of the survey, then investigate how they define it (different from quality?) and how they assess it

Closure

- Any other topic, not covered during the interview
- Any material they could provide
- Thanking the participant

technopolis |group| Austria
Rudolfsplatz 12/11
A-1010 Wien
Austria
T +43 1 503 9592 12
F +43 1 503 9592 11
E info.at@technopolis-group.com
www.technopolis-group.com