The Reproducibility Promotion Plan for Funders – A co-created set of recommendations to foster reproducible research practices

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Abstract:

Reproducibility is a critical component of research integrity, enhancing the quality, efficiency, and trustworthiness of scientific knowledge. Despite increasing attention, reproducibility remains insufficiently prioritised within the scientific agenda. Research funders are uniquely positioned to drive a culture change by shaping expectations and requirements for research organisations and research they fund. To support funders with this role, we co-created the Reproducibility Promotion Plan for Funders (RPP) in collaboration with a community of international funders. The RPP provides a structured a set of recommendations to support funders in promoting reproducible research practices across three themes: (1) Policy and Definitions, (2) Evaluation and Monitoring, and (3) Incentives. We offer practical recommendations, that can be tailored to fit funders' individual needs, and best practice examples to further strengthen its usability.

Keywords: Funders, Reproducibility, Academic Research, Co-creation, Community

Introduction

Reproducibility, and the perception of a 'credibility revolution' (Vazire, 2018) has recently received a lot of attention from the research community. Definitions for reproducibility can be interpreted in various ways, but it generally refers to the ability to obtain identical or similar results to the original study findings by repeating the same methods or analyses (Nichols et al., 2021). Reproducibility is an essential component of research integrity; enhancing trustworthiness, quality, efficiency, and objectivity in scientific research. It plays a critical role in enforcing and protecting good scientific practices and safeguarding public trust in science (Diaba-Nuhoho & Amponsah-Offeh, 2021).

Funders play a unique role in leveraging changes in research culture and behaviour, providing incentives that can impact what attributes to cultural norms (Horbach et al., 2025). Thus, funding organizations are in a powerful position to promote Open Science, incentivise reproducible research practices, and disincentivise questionable ones through mandated requirements in grant applications (Liu et al., 2022). They can require organizations and individual researchers to make an explicit commitment to reproducibility by rewarding them through monetary or infrastructural means (Horbach et al., 2025). Moreover, funders possess the authority to withhold support from those who fail to adhere to practices that enhance the rigor, transparency, and reproducibility of the research they conduct. Therefore, funders should ideally treat reproducibility as a key criterion when funding research (Bishop, 2015). Only then can they promote and facilitate a change in research culture which values transparency, openness, and reproducibility. It is necessary to instil these values at the start of the funding and research process as it fosters a culture of incentivizing, educating, and empowering researchers instead of policing quality at the end through practices such as peer review or replication attempts (Munafò et al., 2014).

Several funding institutions have already introduced initiatives to promote transparency and reproducibility in research. For example, the Netherlands Organization for Scientific Research (NWO) has launched funding calls for replication studies in 2016, emphasizing the importance of verifying and strengthening the trustworthiness of previous scientific results.

Other funding organizations, such as the National Institute of Health (NIH), have taken a different approach by introducing research quality requirements and reproducibility considerations into grant applications and its review process. In 2016, the NIH introduced its Rigor and Reproducibility policy, which requires grant applications to include instructions and the criteria by which reviewers are asked to evaluate the scientific merit of the applications including components that address reproducibility considerations through rigor and transparency specifically asking applicants to describe the rigor of prior research, the scientific rigor of the proposed experimental design, consideration of sex and the other relevant biological variables, and the authentication of key biological and chemical resources (NIH, 2016). This policy requires applicants to clearly describe the scientific premise and rigor of their prior research as well as the rigor of the proposed experimental design, the consideration of relevant variables, and the authentication of key resources for research. These examples illustrate how funding mechanisms can help embed transparency and reproducibility right at the start of the research process. At the same time, there is currently only limited evidence about the effectiveness of these initiatives (Dudda et al., 2024). Often, initiatives are specific to certain research domains (predominantly quantitative research) and are not epistemically diverse, limiting the immediate scope of their impact and generalizability for other disciplines. Furthermore, there remains a lack of cohesion and limited knowledge sharing among funding organizations regarding their best practices, policies, and initiatives to promote rigor and reproducibility. This fragmentation impedes coordinated efforts to enhance research quality more broadly. Although funding agencies are strategically positioned to influence systemic change, they currently underutilize their capacity to do so. Based on the lack of applicable guidance for funders to foster reproducibility, we have used a community-driven approach to identify the needs of funding organizations towards promoting reproducibility in the research they fund and to develop a set of recommendations which can be used by a variety of funders and considers existing best practices.

Aims and Objectives

In this study, we collaborated with a group of international funders to co-create a Reproducibility Promotion Plan (RPP) to support research funders promoting reproducibility practices within the research they fund. We aimed to address the following research questions: What topics are important for funders to foster reproducibility within their funding practices? Additionally, what can funders do internally and externally to foster reproducibility?

This study was conducted as part of the EU Horizon Europe-funded project TIER2 (Enhancing Trust, Integrity, and Efficiency in Research through next-level Reproducibility; https://tier2-project.eu). TIER2's main objectives are to enhance reproducibility in research through co-creative methods and centring epistemic diversity with a selection of broad research areas and cross-disciplinary stakeholder groups.

Methods

Ethical Approval

Prior to this study, the study protocol was pre-registered on the Open Science Framework (OSF), including a detailed description of its methodology and the research questions (Leitner et al., 2024). It received ethical approval from the Amsterdam UMC on March 20th, 2024, under dossier number 2024.0215. Prior to the workshops, participants received the study information including a privacy policy statement and were asked to electronically sign the informed consent form. See the supplementary materials and OSF for the full documents.

Background of the co-creation Workshop Method

Co-creation provides the opportunity for participants to assess, collaborate, and create joint knowledge, assuming that the participants involved are impacted by a specific problem and therefore have the relevant knowledge and experience to solve it. Sanders and Stappers' (2012) approach was used for the co-creation process described here. The primary goal and

focus were the active involvement of stakeholders, in this case funders, in the research process to collaboratively develop a user-centred output, the RPP. Within this co-creative process, researchers and funders collaborated, while researchers acted primarily as facilitators here. The co-creation methods incorporated the expertise and the needs of stakeholders from the beginning of the output development (Sanders & Stappers, 2012). By involving the community early on, we can ensure that the RPP is relevant and useful; meeting funders' needs with respect to fostering reproducibility in the research they fund.

Here, two co-creation workshops and one validation workshop informed the drafting of the RPP (Figure 1).

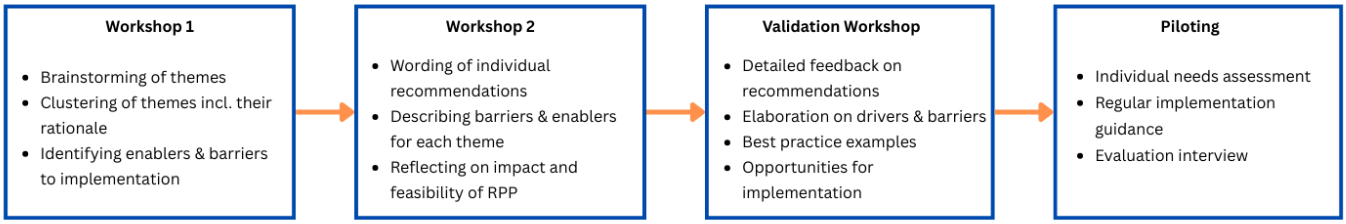

Figure 1. Timeline overview of the main elements of the RPP co-creation activities, including primary aims for each activity

Workshop Participants

The TIER2 project initiated the formation of a community of research funding organisations interested in strengthening reproducibility and willing to invest their time and resources in future project activities. Purposive sampling was used in form of inviting funders from the previously established TIER2 stakeholder community (https://osf.io/rdq3g/files/5ynhj). Further, personal contacts and snowballing was used to identify additional funders who have experience and/or expertise with topics pertaining to reproducibility or Open Science in relation to funding. These include contributions to projects, policies, or procedures that aim to improve reproducibility or to address connected themes, such as Open Data or Open Methods. In total, five funders participated in each of the two co-creation workshops and seven participants in the validation workshop, with four participants taking part in multiple

workshops. Participants were from international research funding organisations of various research funding capacities, with a focus on European funders (Table 1).

Table 1. Overview of participants from all three workshops

Workshop 1				
Participant ID	***Gender***	***Region***	***Funding type***	***Participation in other workshops***
#1	Female	Europe	National research funder	Validation workshop
#2	Female	Europe	National research funder	Validation workshop
#3	Male	Europe	National research funder	Workshop 2 & validation workshop
#4	Male	Europe	National research funder	Workshop 2
Workshop 2				
Participant ID	***Gender***	***Region***	***Funding type***	***Participation in other workshops***
#3	Male	Europe	National research funder	Workshop 1& validation workshop
#4	Male	Europe	National research funder	Workshop 1
#5	Male	Europe	International research funder	Validation workshop

Table 1. continued

Validation Workshop				
Participant ID	***Gender***	***Region***	***Funding type***	***Participation in other workshops***
#1	Female	Europe	National research funder	Workshop 1
#2	Female	Europe	National research funder	Workshop 1
#3	Male	Europe	National research funder	Workshop 1 & 2
#5	Male	Europe	International research funder	Workshop 2
#6	Female	Europe	National research funder	-
#7	Female	Oceania	National research funder	-
#8	Male	Europe	International research funder	-

Technical Workshop Set-Up

All workshop sessions were hosted on the virtual meeting platform Zoom (Zoom Communications, Inc.) to allow for international participation across different time zones. For the preparatory and co-creation exercises, the virtual collaborative platform Miro (RealtimeBoard Inc.) was used. Both co-creation workshops as well as the validation workshop were recorded, and the audio was transcribed using the secure transcription service Amberscript (Amberscript Global B. V.).

Co-Creation Workshop 1

Prior to the first co-creation workshop, participants were invited to complete a preparatory exercise allowing them to reflect on the meaning and importance of reproducibility, existing

policies and practices that aim at strengthening reproducibility, and why these work or not. The detailed instructions of the preparatory exercises can be found on OSF.

The first co-creation workshop employed the Double Diamond design process (Design Council, 2025), a diverge-converge structure, where participants were encouraged to explore ideas individually at first (diverge) and then to cluster and refine them as a group (converge) (Figure 2). Here, participants focused on identifying and defining overarching themes important for the RPP. The specific exercises facilitating the development of the main RPP themes can be found on OSF.

Co-Creation Workshop 2

Prior to the second co-creation workshop, participants were invited to complete another preparatory exercise allowing them to familiarize themselves with the themes identified in the first workshop. The details of the second preparatory exercise can be found on OSF.

Building on the previously identified themes, and again, employing the same diverge-converge structure as in the first workshop, participants focused on drafting specific recommendations, identifying barriers and enablers, and selecting best practice examples during the second workshop (Figure 2). The individual exercises used to develop the different recommendations can be found on OSF.

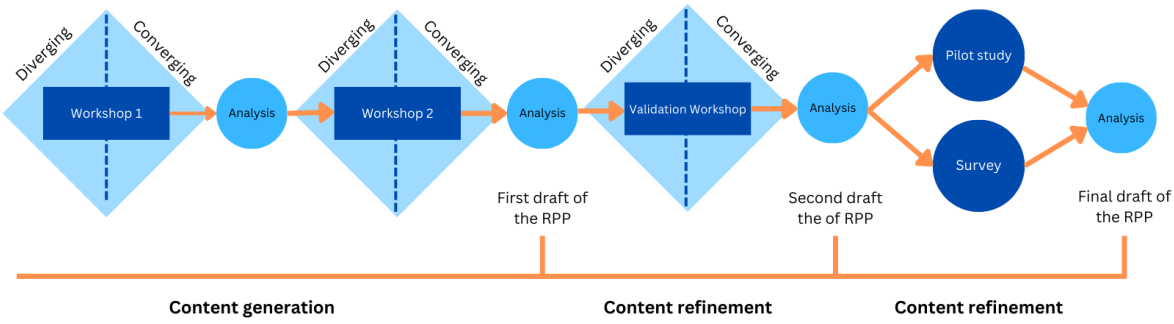

Figure 2. Visual depiction of the adapted Double Diamond design approach used in this study

Workshops 1 and 2, conducted during the content generation phase, included a divergent phase in which participants developed a broad range of themes and recommendations for the RPP, followed by a convergent phase where ideas were collectively selected, prioritized, and grouped. Following these workshops, the researchers analysed the data and developed the first version of the RPP. During the content refinement stage, a validation workshop was conducted, again including a divergent phase in which participants evaluated the recommendations and a convergent phase where consensus on refined recommendation was reached. Additional feedback to refine content was collected through an online survey and a piloting study. After completing all content refinement activities, the researchers analysed the data and finalized the recommendations accordingly.

Co-Creation Workshop Analysis

Data analysis was conducted after the second co-creation workshop, using the deductive analysis method 'analysis on the wall' (Sanders and Stappers, 2012). Data sources included written content on the Miro whiteboard created by the co-creation workshop participants, audio transcripts, and notes taken by the workshop facilitators. During the first co-creation workshop, participants identified five main themes which were then divided amongst the four project team members (BL, ABB, FEK, & JT) for further analysis. Three team members worked on two topics and one researcher worked on three. Individually, each went through the data to (1) identify subthemes within each main theme, (2) specify recommendations for the specific subthemes, (3) select best practice examples for the recommendations, and (4) pair barriers and enablers to the individual recommendations. Following this, the data was further analysed during a live session, where all four project team members compared and refined the subthemes and recommendations, reducing the five main themes to three. The analysis map can be found on OSF.

Validation Workshop

Based on the co-creation workshop analysis, the project team drafted the first version of the RPP which was presented and further refined during the validation workshop with funders. For this, seven funders from the TIER2 stakeholder community participated and were

randomly assigned into two groups. Each group worked on two of the three main themes. Per main theme, participants provided general feedback on the individual recommendations and considered potential enablers and barriers, as well as best practices from their own funding organizations. Building on the insights from the validation workshop, the project team further refined the RPP (Figure 2). Detailed instructions of the validation workshop exercises can be found on OSF.

Survey

The validated first draft of the RPP was transferred into a survey on Microsoft Forms (Microsoft 365) to receive more detailed feedback from a broader group of funders. As such, the survey was disseminated amongst the whole TIER2 funders' stakeholder community, including funding organizations which were not involved in the co-creation process. Within the survey, we assessed the clarity of the recommendations, their importance, and further collected best practice examples as well as ways of overcoming potential barriers. In turn, the two detailed survey responses were used to refine and finalize the RPP (Figure 2). The survey can be found on OSF.

Results

Main themes identified during the first co-creation workshop

The aim of the first co-creation workshop was to identify and categorize essential themes and elements relevant for a policy guide for funders to promote reproducible practices. Using a diverge structure, the workshop exercises were geared towards generating as many themes as possible which would be useful for funders to have in a reproducibility promotion plan. The workshop concluded with the collection of five themes: 1) Motivation ("the Why"); 2) Definition ("the What"); 3) Incentives and Recognition; 4) the "How"; and 5) Monitoring.

Further, participants were asked to consider how the RPP could be implemented within their own funding organizations and beyond. Internally, one key factor identified within funding organizations was the development of a specific cross-disciplinary workgroup involving

members of the program management, grant administration, and legal team, amongst others.

Refinement of themes during the second co-creation workshop

The second co-creation workshop built upon the outcomes of the first one. By using a converge structure, participating funders further refined the five themes by developing specific recommendations to be included in the RPP.

Based on the insights gathered in both workshops, the authors synthesized the five previously identified themes into three overarching ones: 1) Policy and Definitions; 2) Evaluation and Monitoring; and 3) Incentives. For some themes, a strong interconnectedness was identified. Specifically, the themes “the How” and “Monitoring” were merged into “Evaluation and Monitoring”. As the individual recommendations could not be clearly assigned to one or the other theme, this warranted a closer look at these two previously identified themes. Between the two, a clear thematic distinction was missing. Already in the first version of the RPP (https://osf.io/3fpbj/files/jhvsc), “the How”, covering the whole spectrum of how reproducibility could be in included in funding processes and policies, included recommendations on monitoring and evaluation criteria. As such, the new theme “Monitoring and Evaluation" emerged combining both within. Further, the theme "Motivation” was closely linked to “Incentives and Recognition”, and recommendations for each category highly overlapped. For example, in the first RPP draft (https://osf.io/3fpbj/files/jhvsc), recommendations on additional (financial) resources were included for both themes aiming at motivating or incentivising researchers to incorporate reproducible practices in their grant proposals, respectively. Under “Motivation”, the recommendation was “to motivate with extra financial resources”, while under “Incentives” it was to “include [budget lines] in financial proposals for reproducible practices”. In the final RPP, these two recommendations were combined to the following recommendation: “Funders should reward researchers who emphasise and enact reproducibility practices in their grant proposals and penalise researchers who do not engage and enact agreed reproducibility practices” (Recommendation I2). In the corresponding explanation, the

strengthening of the researchers' intrinsic motivation is specifically highlighted. As such, these two themes were merged resulting in the theme "Incentives". Opposite to this, the theme "Definition" or "the What" was not merged but further broadened to also include policies thus highlighting their importance. Here, the specific recommendations attributed to this theme illustrated a need to go beyond a pure definition of reproducibility.

Themes

Below, we describe each theme and the rationale behind them.

1. ***Policy and Definitions***

Participants highlighted that a definition of reproducibility was essential, which also highlights epistemic diversity across research fields (Table 2). Further, the concept of reproducibility should be defined as precisely as possible in a common language to increase accessibility for non-experts. Such a wording could then be used across many fields and promote epistemic variety. Funders could also use the definition to introduce researchers to the concept of reproducibility and thus encourage them to adopt possible new reproducible practices in their work. One suggestion was to include the "why" of reproducibility's significance along with its definition. According to one participant:

"Then you have a framework of why it is important for [funders] and for [researchers] and for research itself, and what [funders] are expecting from [researchers]."

(Workshop 1).

While defining reproducibility at a higher level is important, the need for domain-specific definitions in some cases was also recognized and highlighted. Specifically, funders could ideally contextualize requirements by providing definitions and guidance tailored to specific domains, where high-level wording alone may not be sufficient.

By embedding language on reproducible practices into funding calls and policies throughout the funding lifecycle, the concept of reproducibility may become more visible. To further strengthen reproducibility in funded research, practical guidance could be shared with

researchers on how to implement reproducibility practices to reduce burden for and increase adoption by researchers.

Table 2. Overview of the final recommendations in the RPP for the theme Policy and Definitions

	Policy and Definitions (PD)
PD1	Funding organisations can ensure that there are guidelines in place which cover open science and reproducibility for their funding calls.
PD2	Funders should use a clear definition for reproducibility in grant calls. This definition should be in a common and simple language.
PD3	Funders should provide context for the importance of reproducibility to the research they fund.
PD4	The definition of reproducibility should consider and clarify epistemic and disciplinary differences.
PD5	Funders who have endorsed reproducible research practices at any stage of their funding life cycle, should provide researchers with examples of how to implement these reproducible research recommendations.
PD6	Funders should share their best practices and guidelines publicly to increase transparency and uptake.

2. *Evaluation and Monitoring*

Monitoring was a theme that already emerged during the first workshop and was further explored by participants in the second one. How to monitor and evaluate reproducibility became an important point of discussion emphasizing that it is important not to control researchers or to collect unnecessary data or information, but rather to only monitor aspects essential to ensure reproducibility (Table 3).

Funding organizations should clearly specify in their funding programs which reproducibility practices are being evaluated and monitored; and why. Further, questions were raised if funders should monitor compliance and, in turn, sanction non-compliance, or what metrics or evaluation criteria should be used. As one participant noted:

"... There should be a clear understanding of what is expected. Then in terms of monitoring, you ask for certain pieces of information, and they have to show [them]. If they cannot, that would have a reasonable explanation of why they cannot show it or why it is delayed. However, if they do something else with the money then that is a lawsuit."

(Workshop 1)

Reproducibility criteria could be embedded at multiple stages of the funding lifecycle, from the proposal stage to evaluation and monitoring, helping to prevent misinterpretation and support better compliance.

While acknowledging the added burden this may place on funders, distributing monitoring and evaluation across different timepoints may ideally reduce the workload at the end of a project.

Integrating automated approaches into reporting systems to streamline reproducibility monitoring may help reduce the burden not only on funders but also on researchers. As one workshop participant put it:

"Researchers really get annoyed when you demand things from them. You just need to figure out how to do it. Any suggestions on how we can monitor this silently, maybe through other types of reporting that you already have would be beneficial, as you talked about just before any automated measures. [...] I would go for something like silent monitoring. You have to get your observations at the individual level. If you're focused on program-level outcomes, then you're not bothering researchers with reproducibility at least."

(Workshop 2)

Table 3. Overview of the final recommendations in the RPP for the theme Evaluation and Monitoring

	Evaluation and Monitoring
EM1	Funding organizations should specify in their funding programs which reproducibility practices are being evaluated and monitored, and why.
EM2	Funding organizations can ensure that criteria for reproducibility are embedded at multiple stages across the funding lifecycle, in particular at the evaluation and monitoring stage.
EM3	Funding organizations should decide and describe at which level reproducible practices will be monitored and evaluated.
EM4	Building on EM3, funding organizations should monitor reproducible practices at multiple timepoints of the funding and research cycle. Funders should (1) review plans for reproducibility measures in grant proposals before funding decisions are made and (2) check for completed reproducibility activities and practices during the project or after project completion.
EM5	Funding organizations should develop and integrate automated approaches into reporting to streamline monitoring of reproducibility practices.
EM6	Funding organizations should allocate sufficient resources (e.g., personnel, time) to have the capacity to monitor the various reproducible practices.

3. *Incentives*

In their capacity as funders, participants agreed early on that providing incentives as well as recognizing and rewarding the use of reproducible practices in research as essential (Table 4). Funders hold the tools necessary to not only demand reproducibility practices but also to shift cultural norms and behaviour within the research ecosystem. One possibility would be to make reproducibility visible in calls through financial incentives, such as focused budget lines for specific calls for replication studies or small add-on grants for reproducing previous results. This was echoed in both workshops. As one participant stated:

"The other one is incentives. That's something I've been thinking about a lot because I think [...] that there's a lot of emphasis on innovation, creative ideas, and new research. Maybe we should also give incentives or reward research like replication studies and see if research is reproducible or not, and what if it's not reproducible? Is it bad research? Maybe not. Should all research be reproducible? I think that the incentives are something that, on the part of the funding agencies, we can have some room for improvement"

(Workshop 1).

Two aspects were further highlighted. First, funders could assess and ensure that applicants allocate sufficient funding in their budget proposals to safeguard reproducibility practices. Second, funding institutions could allocate more resources to projects which integrate reproducibility practices into their proposed research work. By including language in grant calls which encourage reproducibility practices and by specifically developing call topics which require certain reproducibility practices or even soft references to reproducibility can incentivize uptake of these practices by researchers.

"Incentives and recognition, [...] we can facilitate, and we can incentivize by carefully developing the core topics of a program. We can have texts that point towards specific practices that should be employed by projects. Does it need to be a requirement? It can be part of the narrative of the core topic. This could be a way that we have seen it. It has been an effective way with other themes. For example, we have used this approach to encourage international cooperation. That's another thing. We have seen that even with soft references to encourage transfer cooperation, we have seen that the consortia do adopt this. We can do something similar with reproducibility."

(Workshop 2)

Through funding, researchers who have previously not actively engaged with the concept of reproducibility can be encouraged to do so if this is included as an assessment criterion, highlighting it as a key factor for a successful proposal.

The knowledge exchange around reproducibility practices amongst funding organizations and researchers could be additionally incentivized. Encouraging stakeholders to share best practices and experiences can lead to broad awareness and acceptance of practices within the research community and illustrate that certain practices are even encouraged and rewarded. This was echoed by a participant in the second workshop:

"I think incentives are also something that funders should think of infrastructures as well, and that the relevant evaluation criteria are already established. I really like to think maybe funders can also share their best practices, individual best practices, like how can we get researchers exchanging on good practices"

(Workshop 2)

Lastly, during both workshops, funders discussed the importance of incentivizing researchers, but they also highlighted the importance of incentivizing the funders themselves and raising awareness on the importance of reproducibility among them.

Table 4. Overview of the final recommendations in the RPP for the theme Incentives

	Incentives
I1	Ensure financial space to fund reproducibility in three ways; a) replication studies in your capacity as a funder b) ensure that applicants allocate sufficient funding in their budget proposals to safeguard reproducibility practices c) allocate more resources to projects that integrate reproducibility practices into the requirements of the funding call
I2	Funders should reward researchers who emphasize and enact reproducibility practices in their grant proposals and penalize researchers that do not engage and enact agreed reproducibility practices.
I3	Funders should support and reward applicants with extra resources (i.e. tools, Open Science practices, and infrastructure).
I4	Funder should encourage researchers to share best practices in reproducibility with other researchers. This enables funders to collect further ideas for showcasing, recommending, and/or mandating reproducible research practices.

Barriers and enablers for implementing the RPP

During both co-creation workshops, participants were asked to identify barriers that may affect the implementation of individual recommendations. They were also invited to share potential enablers and suggest strategies to overcome the identified barriers to facilitate the successful adoption of the recommendations in their own organizations and beyond (Table 5).

Defining reproducibility emerged as an overarching barrier. Funders emphasized the difficulty of defining reproducibility in a meaningful way which encompasses epistemic diversity and is applicable across disciplines. This difficulty could affect the alignment amongst stakeholders, including funding organizations and researchers, and the consistency of requirements in funding calls. To act as an enabler and overcome these barriers, participants emphasized the importance of defining reproducibility at a higher, more conceptual level, grounded in shared values. These shared values can be incorporated by leveraging the close connection between Open Science and reproducibility and by drawing on existing policies that promote transparency and rigor in research.

Another overarching barrier identified by funders in implementing the RPP is the time and financial burden involved, particularly in relation to the initial organisational changes required. This includes the introduction of new policies and the establishment of new infrastructures, amongst other things. As an example, participants reflected on the increased burden on researchers and funders for evaluating and monitoring additional practices and documentation, perceiving it as too resource intensive. However, the development of relevant and automated monitoring infrastructures and their integration into funding programs, associating new metrics with existing Open Science ones, could act as an enabler and reduce the additional burden on both researcher and funder side.

Increased financial burden was another barrier identified across all themes included in the RPP. Participants reflected on this from the funder's perspective, listing the lack of financial resources for creating new infrastructures and implementing methods for monitoring, additional personnel costs, increased time investments, and the need for increased funding

to incentivize researchers. To overcome these barriers, participants emphasized various enablers, including the importance of collaboration within the funder community, sharing best practices, utilizing existing infrastructures, and monitoring practices. Integrating reproducibility expectations into funding calls offers an avenue to reduce financial pressures on researchers and funders alike. In parallel, targeted budget reallocations, such as the introduction of dedicated replication calls, may lessen the financial burden on funding institutions, incentivise researchers, and yield long-term systemic benefits.

A further barrier identified by participants addresses the bureaucratic processes affecting both researchers and funders. Participants identified a need for stronger collaboration between funders and publishers as critical for promoting the uptake of reproducibility practices throughout the research cycle. They underscored the need to co-develop expectations and standards, thereby streamlining requirements across the academic ecosystem. Clear guidelines aligned with legal frameworks and outlined consequences for non-compliance were also viewed as essential to improving adherence.

Table 5. Main overarching barriers and corresponding enablers identified by workshop participants during the co-creation process

Barriers	Enablers
Definition of reproducibility in epistemic context	Defining reproducibility on a higher, more conceptual level
Resource intensive (e.g., time)	Development of automated monitoring systems
Increase of financial burden	Fostering collaboration among funders to share best practices, utilize existing infrastructures, and monitoring practices Integration of reproducibility expectations in funding calls Targeted budget reallocation
Increase in bureaucratic processes	Co-development of expectations and standards across the funder community

Survey for RPP refinement

The individual recommendations, best practices examples, as well as the barriers and enablers were included in the survey sent out to the broader TIER2 funders community for input. The gathered responses were used to refine the RPP content. Specifically, best practices were added across all three themes. Moreover, clarification and language adjustments were made some recommendations for policy and definition and evaluation and monitoring.

Piloting of the RPP

The validated RPP was then piloted by two funding institutions, one international and one national institution, over a six-month period. Monthly 30-minute meetings were held between the project team and each individual pilot organization. During the initial meeting, the project team assessed the needs of the respective institution and developed a targeted pilot plan to guide the implementation of the selection of relevant recommendations. In subsequent meetings, the team provided tailored guidance on existing tools and input to policy documents within the funding organization. Engaging in an ongoing dialogue, feedback provided by the pilot institutions was incorporated throughout the process (Figure 2).

The piloting phase concluded with a final evaluation meeting. Participating funding institutions reported that the RPP was highly insightful, noting that it not only offered practical, best-practice-based recommendations to support implementation, but also stimulated internal discussions within the institutions. The RPP also encouraged funders to reflect on their role in promoting reproducibility within the research ecosystem. During the evaluation interviews, participants highlighted internal challenges associated with the implementation of the RPP. Recurring barriers included entrenched bureaucratic procedures, particularly the difficulty of persuading policymakers within funding institutions of the necessity for change. Furthermore, even when agreement was reached, the prolonged time required to operationalize such changes was perceived as a substantial impediment. Additional constraints on further implementation stemmed from competing urgent priorities

and the rapidly evolving landscape of open research, shaped in part by emerging technologies, ethical considerations, and global events. Therefore, the piloting process offered further evidence supporting the validity and practical relevance of the RPP.

Discussion

We co-created a promotion plan with recommendations, the Reproducibility Promotion Plan for funders (RPP) to support funding institutions in promoting and integrating reproducibility into the research they fund. The promotion plan offers concrete recommendations across three key themes; 1) Policy and Definition; 2) Evaluation and Monitoring; and 3) Incentives. These recommendations progress from foundational to more advanced actions, ensuring that funders—whether new to the concept of reproducibility or already deeply involved—can use them effectively. Each recommendation is accompanied by a detailed explanation of its importance and rationale, as well as practical guidance on implementation. To further reduce the burden on funders, the promotion plan incorporates existing examples of best practices drawn from funding institutions and reproducibility initiatives to facilitate effective adoption.

Recognizing the diversity among funding institutions, the RPP does not aim to be a one-size-fits-all approach; we value diverse funding contexts and recommendations can be tailored towards the needs of a funder. Together with our engaged stakeholder community, we developed a set of recommendations and selected best practice examples that reflect this diversity across disciplinary and organizational contexts. Importantly, the RPP is intended as a flexible policy promotion plan rather than a prescriptive framework to accommodate diverse settings and epistemic funders contexts. We encourage funders to assess their specific needs first and then select the recommendations that are most relevant. Funders are not expected to implement the RPP in its entirety; rather, adoption may be phased according to each funder's level of readiness, taking into account institutional capacity, available resources, identified needs, and operational feasibility. The RPP is designed to be

adaptable, serving as a starting point for internal discussions, policy development, and refinement.

The RPP was created by funders, for funders, and piloted within the funding community, offering a uniquely robust and context-sensitive approach to addressing challenges for promoting reproducibility within funding lines. Its co-creation by those who directly shape research funding policies ensures that this tool aligns with funders' needs, operational realities, strategic priorities, and institutional constraints. Moreover, iterative feedback provided by funders during the piloting process enhances its practical relevance and usability, showcasing that the tool functions effectively in real-world settings. Such a funder-driven process not only increases the tool's credibility and legitimacy, but can also foster greater community uptake, ultimately strengthening the collective capacity to guide and improve research practices.

Tools developed by funders for funders already exist, including the Research Integrity Promotion Plan (RIPP) (Horbach et al., 2022), and some funding organisations have incorporated reproducibility practices into their funding calls or assessments of rigour. However, to our knowledge the RPP is the first tool to focus on reproducibility, providing actionable recommendations and best practices for funders that explicitly account for organisational readiness levels, and was co-created, refined, and curated by funders themselves.

Strengths and limitations

As stated above, the RPP is the first funder co-created tool to enhance and promote reproducibility practices in the research they fund. The co-creation process and the direct involvement of funders strengthen the validity of the RPP by ensuring that it reflects their real needs in promoting reproducibility. The practices and recommendations gathered through this process draw on existing best practices from the TIER2 funder community, further enhancing the validity and reliability of the RPP. Moreover, our participants possessed expert knowledge of reproducibility and Open Science, particularly in relation to funding practices.

This high level of expertise enriches the content within the RPP and strengthens the conceptual foundations and practical applicability of it.

Another strength of the RPP lies in its built-in assessment component, which requires funders to evaluate their organization's current level of readiness and existing reproducibility practices. This process supports the development of tailored implementation plans to improve efficiency, while also encouraging organizations to critically reflect on and assess their ongoing work. However, it is also important to acknowledge the limitations of our research work here. The sample size per workshop was relatively small, with eight funders contributing to the co-creation and validation of the RPP across all workshops. Furthermore, two funding institutions piloted the RPP.

Although our participants had diverse funding roles and disciplinary backgrounds, geographic representation was limited. Most were affiliated with European funding institutions, resulting in an underrepresentation of perspectives from other cultural/geographical contexts. Nevertheless, our cohort brought substantial expertise in Open Science, and many working in organisations that already embed Open Science and reproducibility requirements into their funding calls to some extent. Moreover, participants came from funding organizations active in a range of disciplinary fields, providing valuable and practice-based insights into current funding processes and challenges.

Despite these limitations, the participants brought substantial expertise and deep knowledge of reproducibility-related challenges. Their insights strengthened the RPP by highlighting the most relevant considerations for funding institutions. Their contributions, particularly their recommendations and examples of best practices, also helped make the RPP more accessible to funders with less experience in reproducibility, facilitating broader uptake.

Future directions

During the co-creation and validation process, as well as the pilot implementation, participants proposed several ideas to further expand the reach, development, and accessibility of the RPP for funders. One suggestion was to transform the RPP into a set of living recommendations. Hosting the RPP on GitHub, or a similar version-controlled repository, would allow funders and funding institutions to continuously update the document, share new best practices, and contribute examples of implementation. Such a dynamic working environment could support the adoption of reproducibility practices in new funding institutions while strengthening community engagement and fostering a reproducibility mindset among funders.

Another step to reduce the time burden for funders is the potential creation of a "readiness questionnaire." This tool would support funders assess their existing policies and infrastructures and identify which reproducibility recommendations they would like to prioritize, that are both implementable and feasible. We highly encourage the continued development of these tools and the ongoing refinement of the RPP and would support further community development among funders.

More broadly, we call on funders to collaborate with one another, learning from others and sharing experiences to strengthen a more cohesive, informed, and effective funding ecosystem that drives collective impact and innovation. In the pursuit of advancing scientific research, reproducibility remains a cornerstone of both credibility and progress. Funders occupy a unique position within the research ecosystem, with the ability to demand certain practices from the research(ers) they fund, to set standards, incentivize best practices, foster behaviour change, and ensure that research investments generate reliable, long-term value. By strengthening a community of funders committed to reproducibility, we can create a ripple effect throughout the scientific ecosystem, ensuring that future discoveries are grounded in transparency, reliability, and rigor.

Conclusion

Our work, conducted in collaboration with our TIER2 funder stakeholder community, has resulted in an experience-based, co-created promotion plan designed to support funding institutions in promoting reproducibility practices in the research they fund. The resulting promotion plan, the RPP, offers concrete recommendations to foster reproducibility from a funders perspective across three key themes: 1) Policy and Definition; 2) Evaluation and Monitoring; and 3) Incentives. Each theme includes a set of recommendations structured at different levels of advancement, allowing them to build on one another and provide guidance for funders with no prior experience as well as those who already have knowledge or practices in place. The RPP is intentionally flexible, enabling funders to adapt its recommendations to their specific needs and priorities. We believe that the RPP offers a practical pathway for funders to enhance the quality, reliability, and trustworthiness of the research they support.

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Supplementary information

All supplementary information can be found on OSF.

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