POLICY BRIEF FOR RESEARCH FUNDERS

SUMMARY

Open Science to Increase Reproducibility in Science (OSIRIS) contributes to reform of the research and innovation system from the top down and the bottom up, to regain overall trust in science, by investigating the underlying drivers and facilitators, co-creating and testing effective evidence-based solutions, identifying incentives for reproducibility by stakeholders, and embedding reproducibility in research design. The reproducibility of research results is fundamental for rigorous, trustworthy science.

We explored barriers, drivers, enablers and incentives to reproducibility through systematic literature review, interviews with researchers across Europe, focus group discussions with stakeholders, and an audit of policies and guidelines of public funders using Transparency and Openness Promotion (TOP) 2025 criteria.

Public research funders play a key role in promoting, motivating or facilitating reproducibility in research through their policies, guidelines and funding programmes. Yet we found that currently policies are often vague, lack clear requirements or incentives for reproducible research practices. There is limited integration of openness and transparency standards among EU public funders. Funders link reproducibility to open science and research integrity, yet rarely cite it explicitly.

Our recommendations urge funders to harmonise policies and support structure across Europe, embed reproducibility in grant criteria; incorporate capacity and skills building in programmes for early-career researchers; and co-invest in institutional infrastructure and support services that enhance research quality and trust.

BACKGROUND

The reproducibility of research results is fundamental for rigorous science as it confirms or corrects the outcomes of single studies. Reproducibility is understood as a continuum from the reproduction of results—based on the same data, code and methodology—to replication—meaning the repeating of results using the same analytical method, but with different data. When results can be independently verified, research that goes on to influence future research and policy decisions moves forward with confidence. However, reproducibility remains a major challenge in many research disciplines.

Multiple institutional stakeholders play an important role in the science ecosystem: research funders, publishers, journals and research performing organisations. Through their policies, guidelines, initiatives, support, and interventions, they can influence the quality and trustworthiness of research by removing barriers that hinder reproducibility, and promoting facilitators that enhance it.

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OUR RESEARCH APPROACH

Open Science to Increase Reproducibility in Science (OSIRIS) investigates the underlying barriers, drivers, and facilitators; tests effective evidence-based solutions, identifying incentives for reproducibility by stakeholders, and embedding reproducibility in research design. In a systematic scoping review, we assessed the extent to which Open Science interventions have been rigorously tested for their effectiveness to improve reproducibility. Interviews with 60 researchers across Europe examined views, practices and motivations for reproducibility across disciplines, with factors that facilitate or hinder. Seven focus group discussions with research funders, journal editors, research institution leadership, national reproducibility networks, reproducibiliTea journal clubs and civil society organisations (58 participants) explored roles and responsibilities of these stakeholders to assure the quality and trustworthiness of research, with initiatives to facilitate or remove barriers. An audit using Transparency and Openness Promotion (TOP) 2025 criteria assessed how research institutions, journals and funders address and promote reproducibility in their policies, procedures and guidelines.

WHAT RESEARCHERS SAY

Half of all interviewed researchers indicate that research funders play a key role in being able to promote, motivate or facilitate reproducibility in research, by setting the standards they expect in research, by providing support, or through policies. Open science and data sharing policies are perceived as supportive external factors, although they may be inconsistently implemented. Interestingly, this point of view that research funders are important facilitators of open science and reproducibility is stronger amongst researchers in western and northern Europe, compared to southern and eastern Europe (Table 1).

Table 1.Percentages of interviewees indicating research funders as important facilitators for reproducible research across Europe (N=60)

	North (Denmark,Finland, Ireland, Sweden,UK)	East (Hungary,Lithuania, Poland, Romania)	South (Croatia, Greece, Italy, Portugal, Spain)	West (Belgium, France, Germany, Netherlands)
% interviewees	63	47	27	57
N	16	15	15	14

At the same time, a quarter of interviewees perceive the fact that research funders have no clear requirements or expectations about reproducible research, and do not reward it, as a systemic barrier. Policies and guidelines on for example detailed reporting of research methods and the sharing of data and code are missing or lack leverage. Where they do exist, researchers consider them as box-ticking exercises in the absence of monitoring, and when not backed up by practical support. Reproducibility is then deprioritised and unsupported, left on the margins of what researchers experience that counts in science.

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TRANSPARENCY AND OPENNESS PROMOTION

The weakness of policy leverage is confirmed by our policy audit of public funders throughout the EU against the TOP2025 criteria. This shows that across these European public funders, TOP 2025 criteria are largely not promoted, supported, or recognised in policies or practices. Data and code sharing are the most frequently required or supported research practice. Thirteen funders (46%) in our sample require data sharing, five have public plans to implement data sharing requirements, and two use data transparency as an evaluative criterion without requiring it. Data transparency is the only area with any level of support for clearly documented monitoring in place by funders, usually via data management plans (25 %), and explicit funds available to support these activities (25%). Ensuring independent verification of research practices (i.e. TOP Level 3) or resourcing independent checks on reporting accuracy or computational reproducibility was not seen.

I haven't seen this in the funders here, and I think it's a bit of a problem. I see it as problematic of course, because I would like my focus on open and reproducible research to be more acknowledged and appreciated by the funders. But it's not. (Social scientist, Sweden)

WHAT FUNDERS SAY

During focus group discussions, funders themselves indicate that they indeed do not consider research reproducibility as a criterion for the research they fund. They typically frame reproducibility as inseparable from open science and research integrity, but do not explicitly mention or define it in their policies. They see their requirements for data management planning, for adherence to research integrity codes, and for transparency protocols as indirect pathways to foster reproducible research, even if reproducibility is not named outright.

Public funders also indicate that research agendas are often set by governments, not by themselves. Then reproducibility may clash with the push for novelty, impact and economic benefit—the dominant currencies of funding. In their view reproducibility demands more than policy tweaks. It needs time, resources, incentives, and a healthier research culture. Short funding cycles, pressure to publish positive results, lack of value for replication, and overwhelming researcher workloads are enduring barriers.

I think one thing that could be a good thing is if the funding would not be given for the complete period of let's say three years, but it would be kind of given in separate steps and for example after one year you would determine what the applicant has done to ensure open science practices and to foster reproducibility.
And then you could maybe increase it in the process. That would be the most prudent thing to kind of check the progress at different levels, and then to make sure that the applicants work aligns with your visions as a funder.
(Medical scientist, Germany)

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POLICY RECOMMENDATIONS FOR RESEARCH FUNDERS AND THE EUROPEAN COMMISSION

- In view of the regional differences in policies and support structure for open science and reproducible research we still see today, we call on the European Commission to guide harmonisation on policies, guidelines and support structures across Europe.

- Using reproducibility as a funding criterion can act as a strong incentive for researchers to implement reproducible research practices. In practice this can mean that public research funders:

    - Move towards more innovative mechanisms for funding independent replication of research;
    - Perform expert computational reproducibility checks on research outputs to inform assessments;
    - Advise review panels to score research proposals higher when they include practices that facilitate reproducible research, such as data and code sharing plans;
    - Allocate bonus points to projects with built-in reproducibility components such as preregistration, replication studies or open workflows.

- Research funders can contribute towards capacity and skills building in reproducible research practices for early career researchers, through their funding programmes for these cohorts. They can fund development of self-learning training modules for the doctoral researchers they fund or promote one-to-one training through a buddy-system. Ideally, this type of training could be built into funding opportunities for early career researchers.

- Research funders should incentivize and co-finance the development of institutional infrastructure and roles that support reproducibility. That can include co-funding data stewards or reproducibility officers within the funded institutions. This can be seen as an investment in the quality of the funded work at these institutions. Targeted calls for institutional reproducibility hubs or networks, potentially requiring evidence of institutional support, could be another way to co-create reproducibility-focused infrastructure.

References:

D2.2 What Helps and Hinders Reproducible Research? Researchers' Perspectives from a Cross-Disciplinary Interview Study. https://osf.io/exy5f

D2.3 Examining Infrastructure to Support Scientific Reproducibility in the EU: An Examination of Journals, Funders, and Academic Research Institutions. https://osf.io/n7bsw

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