

Promoting the societal impact of research funding

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Abstract

An increasing focus on societal goals poses a number of challenges for research funding policy and scholarly studies. Drawing on insights from the PROSECON project, this paper examines key issues in the design and practice of societally targeted funding from both the perspective of research funders and participants in funded research projects. From the funder side, there is a need to coordinate the implementation of societally targeted funding with other funding and policy instruments, and to better understand the role of different targeting approaches that can focus on themes, societal impacts or on forms of research collaboration. From the researcher side, it is important to take into account the great complexity in funding and cross-grant interactions. Prior researchers' experience and collaborative relations play a large role in how societally targeted funding shapes research activities. Societally targeted funding is in many cases viewed as an enabler of research that is societally oriented, where key factors are flexibility, shared and aligned goals and the active involvement of non-academic participants.

1. Introduction

There has been increasing and widespread focus on how research can address societal challenges, and in particular how research funding can promote societal impact. However, it is not clear how this can be accomplished in practice.

A societal challenges or missions orientation to research and innovation policy implies a greater focus on specific outcomes and hence necessitates greater policy coordination. To this end, missions-oriented policy is often seen as a package of policies targeted to a challenge or goal (Schot and Steinmueller 2018, Larrue 2021). While earlier research and innovation policy rationales were focused on increasing R&D investments to counter market failures and later on increasing collaboration in response to systems failures, more recent missions or societal challenges rationales place much greater demands on policy coordination and the complexity of potential solutions (Mazzucato 2018; Kattel and Mazzucato 2018; Boon and Edler 2018).

Funding design and how funding is allocated can influence the direction and impact of research (Lyll et al., 2013). There are some questions concerning how this should be done, and we lack knowledge of how different approaches might work, or even how they can be implemented (Laudel and Gläser, 2014; Gläser, 2019). In terms of funding design, this can include how calls for grant applications are formulated and conducted, how proposals are assessed, allocation processes, monitoring and reporting activities, and post-grant assessments.

Drawing on insights from the PROSECON project (Promoting the Societal and Economic Impact of Research – the Role of Funding Practices¹), this paper presents insights on the design and implementation of funding to promote societal impact, and how this funding shapes the nature and objectives of research. We thus address this question from both perspectives of funders and researchers.

2. Data and methodology

The overall aim of the project is to explore how and to what extent research funding aimed at increasing societal contributions may shape research practices and networks in public research. This was done in a multilevel comparative design with two research fields, renewable energy and food science, within three countries, Denmark, Norway and the Netherlands. Data collection covered both funding programs and organizations, researchers and research projects, including:

- Interviews with representatives of funding organizations and experts on research funding systems in the three countries
- Desk research on funding policies, programs and assessment criteria
- A publication dataset for 2009-2018 within renewable energy and food science in the three countries
- Interviews with Principal Investigators (PIs) and other academic and non-academic participants in 12 case studies of societally targeted funding
- Funding mapping of PIs' participation in all recent grants

The project is funded by the Novo Nordisk Foundation in Denmark.

3. Results

This section discusses key insights from the project, examining first key issues from the funder perspective and thereafter how societally targeted funding can influence research from the researcher perspective.

Operationalizing societal funding goals

While the notion that research contributes to addressing societal challenges seems very straightforward, it is far from clear how societally targeted funding should be designed. Funders face a number of challenges when trying to promote societal objectives alongside academic and economic objectives in their funding programs. Interviews with board members and administrators of funding agencies revealed issues across the funding design process, from call formulation to proposal assessment and to monitor the progress of awarded grants. Funders need to balance different objectives, where it was found that even the most societally oriented funding programs still placed significant emphasis on academic and economic objectives (Stage et al. 2023). These intertwined aims can be partially conflicting with each other, and clearer and more mature mechanisms are in place for promoting academic and economic objectives than for promoting broader societal objectives.

In practical terms, the study found that funders use at least three main societal design mechanisms to promote societal objectives. The thematic mechanism encourages or requires focus on specific research areas or themes. The impact mechanism focuses on specific desired outcomes and effects of research. Finally, the collaboration mechanism requests or requires the participation of specific types of actors in the funded research.

¹ <https://ps.au.dk/forskning/forskningscentre/dansk-center-for-forskningsanalyse/research-projects/prosecon>

The funders acknowledged that these three design mechanisms are not silver bullets that readily promote societal objectives but are currently the best tools available. Challenges and compromises were faced by funders when using these mechanisms. First, there is a tradeoff in choosing narrowly defined content or directionality of funding, where funders express concern about the need to compromise on academic quality to get enough research projects within narrow thematic areas set by policymakers, calling for broader formulation of thematic areas. Second, funders may not give societal research enough credit in funding allocation decision situations because their impact measures for societal objectives are formulated more vaguely than those for academic or economic objectives. There were both difficulties in defining societal value and also in the ability to assess the expected societal impact of proposals, which complicates plans to rely on expected societal impact as a main assessment criterion. This can reduce funders' ability to support the kind of research crucial to achieving mission-oriented objectives. Lastly, funders may compromise on how broadly research addresses complex societal problems because they struggle with both stimulating collaboration between the hard sciences and the social sciences and humanities as well as with involving non-traditional actors, such as NGOs and public organizations, and instead mainly focus on involving private firms and researchers from adjacent fields. Yet both social scientists and non-traditional actors hold key insight into issues necessary for the scaling and diffusion of effective solutions to societal challenges.

Coordination in the funding system

In designing and implementing societally targeted funding programs, funders face challenges both in determining what works for funding seen on its own and in coordinating with different funding instruments and with policymaking in broader terms.

Our studies of cases in Denmark, Norway, and the Netherlands identified a number of coordination challenges. The first concerns coordination with the government and policymakers. Missions are typically part of broader policy initiatives, where funding organizations need to interpret both how the missions or societal challenges and intended outcomes should be defined in practice. For example, increased directionality through narrowly defined calls raises issues of adverse effects for other areas that receive correspondingly less funding, or whether a narrow focus on societal impact might lead to a reduction in the scientific quality of funded research.

A second concern is how new missions fit with existing funding policies. Aagaard et al. (2022) characterize three types of institutional changes involving the implementation of new policy rationales. The first type, *layering*, involves the addition of new elements without any substantial change to existing policies and institutions (Thelen 2004). *Displacement* involves the introduction of new initiatives at the expense of existing practices (Streeck and Thelen 2005). Finally, *conversion* 'occurs when rules remain formally the same but are interpreted and enacted in new ways' (Mahoney and Thelen 2010, 10). Hence, the implementation of new rationales also involves the redesign and repurposing of existing instruments and organizations.

Studies of in particular Norway and Denmark illustrate the potential conflicts in policy rationales and the challenges in striking a balance between for example academic quality and focus on societal impact. At the same time, the studies indicate that it is difficult to successfully implement a societally targeted approach without at least a (partial) conversion of existing funding programs and institutions (Aagaard et al. 2022).

The complexity of research funding

From the perspective of funders, among the challenges involved in the design and implementation of societally targeted funding programs, coordination across funding structures is important. The need for coordination, and also an enhanced understanding of linkages, is further emphasized by the complexity of funding dynamics.

In PROSECON, we coded articles and funding acknowledgments from the Web of Science database within renewable energy and food science for Denmark, Norway and the Netherlands in the period 2009-18 (Aagaard et al., 2021). This yielded a sample with a total of 31,514 articles and 67,999 authors. In all fields/countries, over 80% of articles included at least one funding acknowledgment, and between 35-45% had two or more acknowledgments (see Aagaard et al., 2021). This provides at least one perspective on the linkages between different forms of funding, which can be viewed according to three analytical levels (Aagaard et al., 2021, Thomas and Ramos-Vielba, 2023):

- ‘Funding configurations’ of funding instruments co-used at the level of individual researchers.
- ‘Funding amalgamations’ of funding instruments co-used at the level of collaborating researchers.
- ‘Co-funding networks’ of funding instruments co-used at the level of all researchers active in the field.

From the viewpoint of individual researchers or grants, societally targeted grants can represent only a portion of overall funding portfolios. This means researchers can also be working on other grants at the same time, though our knowledge of the scale of this phenomenon of working on multiple grants at once is limited. Researchers may use grants for projects aiming towards societal challenge goals along with their other funding, which may moderate or amplify individual grant outcomes. The role of funding for what a researcher does, however, has typically been assessed by looking only at single grants in isolation.

How societally targeted funding can shape research – some insights

We lack sufficient understanding of how funding can shape research networks and practices to enhance societal goals, which is needed to inform many of the funding design challenges outlined above. In order to examine how societally targeted funding influences the nature and goals of research, we conducted a series of in-depth case studies. We developed a framework for analyzing research that identifies four dimensions covering research practices and research networks: interdisciplinary networks (collaboration between different academic disciplines); transdisciplinarity (participation of non-academic stakeholders, like private companies or non-profit organizations); pursuit of specifically prioritized societal research problems; and research outputs that are user-oriented (e.g. transferable products or tailored formats) (Ramos-Vielba et al., 2022). The first two dimensions, interdisciplinarity and transdisciplinarity, correspond to the funder targeting focus on collaborative research processes, while prioritization and user-orientation characterize targeting on potential research outputs.

Examples of shaping include both changes in the way researchers considered their networks and practices after the studied funded project and perceptions that the societally-targeted funding program enabled transdisciplinary collaboration (Ramos-Vielba et al., 2023). Past experience was important for understanding how societally targeted research influences research. In a number of cases, societally targeted research projects built on the results of earlier, more academically oriented research, where the full development from research to

application appeared to take place over a series of grants. Most of the PIs we interviewed had prior experience with societally targeted funding, though they still noted an accumulation of expertise in how to effectively work in and manage collaborations with non-academics.

In all the cases we studied, active non-academic engagement played an important role in project work development. While participants had different expectations for the project, their respective objectives appeared to have been aligned with each other.

Typically, additional funding criteria, in this case for a societal orientation, are seen as imposing constraints on academic research. However, societally-targeted funding can also be viewed as an enabler of research that emphasizes inter- and transdisciplinarity and societal orientation, which would not have gotten funding through curiosity-driven calls.

Encouragement appears to be as effective as compulsory. Whether a dimension was encouraged or formally demanded by research funding, the shaping seems similar. Therefore, making a dimension mandatory in the funding requirements might not necessarily imply certain intensification in the shaping of research. In most of the studied cases, researchers appear to have significant flexibility and scientific autonomy to make relevant rearrangements in project plans to help enhance their success. PIs also provided examples of various changes that they implemented during projects (Ramos-Vielba et al., 2023).

Case studies revealed certain patterns for cross-grant interactions (Thomas et al., 2023), which occurred across grants where the researchers worked in a variety of different roles, including being PI, Co-Investigator (Co-I) and Team Member (TM). Such interactions were also observed across grants with varied inter- and transdisciplinary societal-targeting dimensions, and from domestic and non-domestic funders. Synergies leading to more outputs per grant and enabling better prospects to win future grants were reported benefits of interactions. Difficulties managing multiple grants at once were reported as challenges (Thomas et al., 2023).

Discussion

This paper has examined issues concerning the design and implementation of societally targeted funding. We approach these issues from both the perspective of funders on how to design societally targeted funding, and from the perspective of researchers on how societally targeted funding shapes research.

Based on the funders' angle, the study points to a number of implications for funding policy. First, successful implementation of societally targeted policies requires at least a partial conversion of funding systems as a whole, in order to coordinate across funding and other policy instruments, to address conflicts and to strike a balance between scientific and societal research objectives. Second, efforts to design societally targeted funding programmes need a better understanding of the effects of different approaches, such as thematic targeting, focus on impact, or focus on the role of collaborations.

Researchers' insights in our analysis of cases involving societally targeted funding provides some initial indications on potential effects, displaying three major emerging dynamics: (1) Previous researchers' experience with different types of funding and research collaborations matters (2) Encouragement as effective as compulsory: Whether a dimension was encouraged or formally demanded by research funding, the actual shaping seems similar. (3) Dimensions involving societal actors more malleable to shaping: The dimensions that incorporate societal

actors to scientific research – transdisciplinarity and user orientation – increased in post-funding acquisition phases in more cases.

Finally, and linked to both funders and researchers' perspectives, it is important to consider the complexities of societally targeted funding and potential cross-grant interactions. Mapping these interactions can be useful both in the assessment of grant proposals, monitoring the progress of awarded projects, and in gaining further understanding of how funded research may lead to scientific and societal impacts.

Open science practices

The interview data that support the findings of this study cannot be made publicly available since it contains personal data that cannot be sufficiently de-identified.

Acknowledgments

The authors would like to thank Josefine Bjørnholm for research assistance in parts of the study, and to Kaare Aagaard who was involved in the first half of the PROSECON project and co-authored a number of the papers referred to in this paper. We are also grateful to our interviewees for engaging with us openly and enthusiastically, to participants in the online interactive funder workshop held on March 22 2023, and to Barend van der Meulen, Aldo Geuna, and Taran Mari Thune for valuable feedback on the project.

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Competing interests

The authors have no competing interests.

Funding information

This work was supported by the Novo Nordisk Foundation under the project 'Promoting the socio-economic impact of research—the role of funding practices' (PROSECON) (grant number NNF18OC0034422).

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