From STI Policy Objectives to Infrastructures: Understanding the Implementation of Directed Challenge-Driven Research Funding

Susanna Vase

University of Helsinki, Helsinki, Finland/susanna.vase@helsinki.fi

Abstract

Science, technology and innovation (STI) policy is shaped by the policy instruments used. However, we know relatively little about the work practices of policy actors implementing them. This article investigates how policy objectives are translated into governance by drawing on a case study of the implementation of a 'Strategic Research' funding instrument in Finland. The instrument is expected to fulfil a plurality of objectives, calling for solutions to various societal challenges through broad collaboration on research themes that require government approval. I examine the articulation work of the policy actors implementing the funding scheme and identify anticipatory tailoring and the repurposing of templates as central dimensions of this work. I show how the translation of policy objectives into a funding instrument expected to satisfy social worlds from politics to science is historically contingent and challenging. The article contributes with empirical detail into how policy actors managed multiple social worlds while implementing the research funding scheme, and the consequences and tensions that ensued.

Keywords: Science Policy, Implementation, Research Funding Instruments, Articulation Work, Strategic Research

Introduction

In 2013, the Finnish government decided to establish a Strategic Research funding instrument as part of the reform of state research institutes in Finland. Through the instrument, the proportion of peer-reviewed research funding increased, but the government also gained more tools to influence peer-reviewed funding, while the core funding of state research institutes, the Academy of Finland's[1] (AF) programme-based funding and the Finnish Funding Agency for Technology and Innovation 'Tekes'[2] funding decreased. The instrument calls for answers to societal challenges and emphasises societal relevance and collaboration across organisational and disciplinary divides throughout the research process. This kind of funding emphasis has become common in many countries. Its emergence is part of a wider quest for accountability of science that has been increasingly expressed in science policy during the last 30 years (see Jacob and Jabrane, 2018; Martin, 2011). Characteristic of the quest is the expansion of evaluation and management of research to measure the impacts of science (see Bornmann, 2013; Molas-Gallart, 2015; Martin, 2011; Miettinen

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et al., 2015). What these measures have in common is the aim to guide, assess, and legitimise research processes, as well as the value created by public research funding. Although the accountability requirements of challenge-driven funding settings are heterogeneous (see e.g., Parker and Crona, 2012: 267; Wehrens et al., 2014: 9–10; Jalas et al., 2019), they resemble the ideas of new knowledge production models, such as 'Mode 2' (Gibbons et al., 1994) and 'Triple Helix' (Etzkowitz and Leydesdorff, 1998). In close resemblance to the ideology presented in the new knowledge production literature, directed challenge-driven funding instruments have implemented peer review beyond academia, relevance requirements in addition to scientific quality criteria, and transdisciplinarity as a guiding principle for research with extra-academic actors as partners in knowledge creation (Möllers, 2016; Wehrens et al., 2014; Felt et al., 2016; Parker and Crona, 2012). Despite the similarities between the policy emphases and the ideas in the literature (e.g. Gibbons et al., 1994), case studies have demonstrated that within research projects, changes in knowledge production have not been as straightforward as proposed by the knowledge production models (see e.g. Möllers, 2017). Although scientists have gained wider access to networks and data, along with the perspectives of collaborating stakeholders on their research (Felt et al., 2016; Jacob and Jabrane, 2018), they have increasingly had to cope with the diverging and often conflicting demands of their stakeholders, funders and the academic community (Möllers, 2017; 2016; Jacob and Jabrane, 2018; Wehrens et al., 2014).

While scholars have studied how research collaborations cope with the requirements of directed challenge-driven funding, the way in which funders manage the arrangements 'on the ground' has remained relatively unexplored (see also Shove, 2003; Wehrens et al., 2022). Wehrens and colleagues (2022) recently contributed to this research gap by examining the work of programme committees, showing how they also juggled with a plurality of stakeholder interests, which they managed through staging work. However, it remains unclear how the funding arrangements have initially been implemented. Understanding the construction of funding schemes is important since they shape research conditions not only in terms of funding allocation but increasingly by providing narratives and measures of what science and its interaction with society ought to be. As policy instruments, their role in structuring the research landscape has become ever more prevalent due to the decline in public research funding and increasing proportion of temporary research employment (Lave et al., 2010: 667), which has led scientists to devote substantial amounts of time and effort to preparing funding proposals (Gross and Bergstrom, 2019: 1). To address this research gap and to respond to the quest to examine the institutional context and work practices of policy actors (e.g. Henderson, 2019), I conducted a case study on the implementation of a Strategic Research instrument in Finland. Drawing on interviews and textual documents, I examined how the policy actors central to its construction managed the implementation of policy objectives to a funding scheme and the tensions and consequences that followed. To do this, I used the concept of articulation work (Fujimura, 1987; Strauss, 1985) and drew on related literature in organisational studies and political science to understand the characteristics of the invisible work and its relationship to institutional change.

The paper proceeds as follows. First, I present the existing literature on science policy development and introduce my research approach, followed by the context and objectives of the Strategic Research instrument. The paper continues with a presentation of the materials and methods. In the empirical sections, I examine the articulation work of the policy actors, particularly anticipatory tailoring and the repurposing of templates that were central dimensions of that work. The empirical sections analyse the preparation of the law, the formation of the Strategic Research Council (SRC), the creation of the research theme process, and the construction of the research assessment tools and representations. Throughout the sections, I demonstrate the contingent nature of implementation and the emerging tensions between different social worlds ranging from politics to science. The final section discusses my findings in connection with

previous case studies, as well as literature related to the invisible work of policy actors.

Theoretical discussions and conceptual framework

The emergence and development of science governance

Research investigating the emergence of science governance has provided insights into transnational and national debates and events (Nedeva, 2013), the strategies and positions of central Swedish policymakers (Persson, 2018), and the history (König, 2017) behind the establishment of the European Research Council (ERC). Authors have also examined the role of European Commission (EC) officials in the emergence of a security theme in the EU's Framework programme (Edler and James, 2015), and the development of a science diplomacy instrument (Epping, 2020). In the analysis of these empirical cases, the authors have employed conceptual frameworks from organisational studies, neo-institutional theory (Persson, 2018), political science (Edler and James, 2015), and policy instrumentation literature (Epping, 2020). Scholars have used the concepts of policy, normative and institutional entrepreneur to describe actors driving the science policy establishment processes. While the definitions of these concepts differ slightly, they commonly refer to actors with sufficient agency and interest to alter institutions and realise ideas that they value (e.g. Dimaggio, 1988; see Persson, 2018; Edler and James, 2015). The findings suggest that policy entrepreneurs can benefit from the ambiguity of policy framings (Edler and James, 2015; see also Mahoney and Thelen, 2010: 11) and actively build narratives around new institutions by mobilising resources and ideas (Persson, 2018; Edler and James, 2015). However, by assessing theories of policy entrepreneurship, authors have overall emphasised the need to pay more attention to the work practices of policy entrepreneurs, and the social contexts mediating their work (e.g. Henderson 2019; Bakir and Jarvis, 2017).

By using Finnish science policy as a case example, Lemola (2002) has suggested that international influences and organisations, such as the OECD have largely shaped national policies through 'convergence', namely the manner in which institutions become like one another (Dimaggio and Powell, 1983). Irwin and colleagues (2021) emphasise that while processes of 'convergence' or 'isomorphism' importantly characterise the cross-national recurrence of ideas and practices in science policy, the complexities and contradictions of science policymaking require as much attention to contextual influences and distinctiveness. Influenced by the organisational institutionalism literature (DiMaggio and Powell, 1983), they present regulatory standards, travelling concepts and ideas (see Flink and Kaldewey, 2018) such as 'National Innovation Systems' and 'Mode 2', and professionalisation through transnational networks and organisations such as the OECD (see also Lemola, 2002; 2003) as examples of 'isomorphic pressures'. Drawing on Science and Technology Studies (STS) approaches, the perspectives on difference that the authors discuss include the variety of actors, networks and the distinctiveness of policy cultures in different contexts. (Irwin et al. 2021:1-5.)

To contribute to the understanding of the standardising and contextualising forces shaping science policy, I employ the concept of 'articulation work' (Fujimura, 1987) to analyse the policy actors' work practices, and use research from organisation studies and political science to understand the characteristics of the work and its connection to institutional development and change. In the next section, I will further describe this approach.

Making science policy objectives 'doable'

As there is no predetermined way to actualise policy objectives, this study is interested in examining how the actors involved creatively combine the materials at hand to realise this goal. The concept of 'articulation work' originally introduced by Anselm Strauss (1985) and Joan Fujimura (1987) is particularly useful here, as it focuses on the coordination and integration of tasks not officially given in the job descriptions. The concept has been adapted to several contexts, but initially Fujimura developed the idea of this invisible work in relation to science, where it enabled the creation of 'doable' scientific problems (Fujimura, 1987). Moreover, scientists are continuously "plan-

ning, organising, monitoring, evaluating, adjusting, coordinating, and integrating activities" across social worlds to manage intellectual work, the site of production tasks (Fujimura, 1987: 258).

In the context of my study, the science policy actors practise articulation work to make the translation of science policy objectives into infrastructures 'doable'. Infrastructures, as a set of embedded rules, classifications, standards and technical systems (for a broader definition of infrastructure, see Star, 2010: 611–612), once constructed, often become invisible in the ways in which they govern practices (Bowker and Star, 1999). The implementation phase of science policy objectives therefore requires attention to the things that are intentionally or unintentionally excluded or included in the making of a governance instrument. The policy actors implementing the funding scheme work across several social worlds as they interact with political institutions, universities, state research institutes, and their work organisations, which can be expected to pose considerable demands for articulation. Attention to the social embeddedness brings the dependencies and conditions that shape policy actors' work to the forefront of the analysis.

I identified two forms of articulation work that were central to how the policy actors managed the different social worlds during the implementation of the instrument: *anticipatory tailoring* and the *repurposing of templates*. In the context of scientific work, Calvert (2006) has described tailoring as the ways in which scientists strategically adjust the appearance of their research to make it seem more applied to gain funding. Möllers (2017) extended Calvert's concept with forward and reverse tailoring, the latter of which captures the invisible work that scientists do to adjust problems that fit the needs of funders but fall short when it comes to fulfilling the interests of their scientific communities (see also Jalas et al., 2019). By investigating the development of weather forecasting models, Barley (2015) found that researchers practised 'anticipatory work' as they shaped their work practices in anticipation of their collaborators' representational needs. In this study, I will show how the policy actors tailored policy practices in anticipation of a range of communities' reactions, work requirements and legitimacy needs. The close proximity of politics was evident here, and in politics "actors must constantly adjust their behaviour in the light of how they expect others to act" (Pierson, 2000: 258). The productive nature of anticipation in policymaking has also been indicated by the 'law of anticipated reactions' (Friedrich, 1937), which describes how actors produce what they anticipate is the will and reactions of people with more power, even in the absence of explicit communication of the will of the powerful. The anticipatory acts by the science policy actors in my study sometimes required considerable prior knowledge of policy processes on their part, suggesting that they had skills that may be interpreted as those of policy entrepreneurs.

The invisible work of repurposing templates refers to the way in which science policy actors articulated alignment by using existing practices, conventions, and models as building blocks for the new practices. Research in political science and organisation studies has indicated that the resources, characteristics, and relationships of the founding stage of an institution often become imprinted on it (Stinchcombe, 1965) and reproduced (Aldrich and Ruef, 2006: 67). Moreover, it is common that "even where a policy initiative is new or novel, aspects of the rules of the game that surround it will be well established in layers of underlying values and understandings" (Dunlop, 2010: 349). In the case of the ERC, Persson (2018) showed that while the ideas that policymakers related to were ones generally known within transnational communities, their positions were anchored to national legacies and frameworks, which they transferred onto those of the organisation. Similarly, Epping (2020) found that national needs motivated the objectives of Science and Innovation Centres, and old practices were relabelled. Drawing on DiMaggio and Powell's mechanisms of isomorphism (1986), Beckert (2010: 155–159) has suggested that institutional entrepreneurs can use existing models as templates for designing institutions based on 'attraction', which is learned through socialisation and 'mimesis' in terms of imitation of solutions perceived as legitimate. In this study, I show how the science policy actors repurposed the existing models and practices as templates in developing the new

practices based on attraction, familiarity, understanding that their institutional backgrounds provided, and the legitimacy that the practices generated as existing solutions. This articulation work was also affected by external resource-related constraints and the institution in which the actors worked to build the new practices. The focus on the invisible work of policy actors increases understanding of the influences shaping STI policy (Irwin et al., 2021) by indicating how their work made the instrument converge with both national and global institutions and ideas, resulting in a hybrid of the familiar and the novel.

The Strategic Research funding scheme

Context of the reform

The decision to establish the Strategic Research funding scheme within the Academy of Finland (AF) was made as part of the wider reform of state research institutes in Finland by the Finnish government in 2013. As a reform, it affected the Finnish research environment widely. The organisations primarily targeted by the reform were state research institutes, universities, ministries, the government, and the main public research funding agencies in Finland, the AF, which funds peer-reviewed research, and Tekes[3], which funds innovation-oriented research and development projects. The AF has traditionally played the most prominent role in providing external research funding to universities, in addition to other funders such as Tekes, private foundations and the European Union (EU). Much of the external funding of state research institutes has been provided by ministries, the EU, Tekes and private companies. (Late and Puuska, 2014: 188.) Allocations in the state budget funding have provided a large share of the core funding of state research institutes, but it decreased by €66 million (25 per cent) from 2011 to 2021 due to the reform and additional funding cuts on institutes (Tulanet, 2023). The research priorities of the institutes are formulated in collaboration with a designated ministry, which also monitors their performance (Tula, 2023; Late and Puuska, 2014: 202). The institutes support different societal services and tasks, with one of their main missions being to support ministerial decision-making, but their research, performance management, publication and funding patterns vary considerably (VNK, 2012: 32, Late and Puuska, 2014: 188, 202).

Prior to the 2013 reform decision, for over 20 years several government-appointed groups had produced proposals on ways to reorganise Finland's national state research institutes to "enhance the efficacy of the sectoral-based state research system" and to increase coordination and collaboration between and within administrative levels (VNK/TIN, 2012: 36). Despite the continuous debate, no major changes were made before 2013. In 2011, the Research and Innovation Council[4] appointed a new group to prepare a proposal for a reform of the state research institute sector. The government asked Finnish STI organisations and networks to comment on the proposal and received 77 responses that presented support for and criticism of the proposed changes (VNK, 2012). In the case of Strategic Research, the decision text was slightly modified in light of the responses. For example, the instrument's budget was reduced from the proposed €200 million to €70 million[5]. Overall, however, the decision document on the instrument largely aligned with the proposal (VNK, 2012; 2013). To the surprise of the group preparing the decision, just before the decision was presented, additional funding cuts were made to some state research institutes on behalf of ministries, reducing their funding even before the reform took place (see also Haila et al., 2018: 19–20). The funding of the Strategic Research instrument was drawn mainly from the core funding of state research institutes (€52.5 million), the AF's programme-based funding (€7.5 million), and Tekes research and innovation funding (€10 million) (OECD, 2017: 36; VNK, 2013: 9). This change increased the share of peer-reviewed research funding, but at the same time gave the government more options to steer public research and peer-reviewed funding (see also HE 25/2014 vp: 12).

In addition to the establishment of the Strategic Research funding instrument, the reform reorganised research funding with the establishment of the VN TEAS instrument (competitive short-term funding to support government decision-making) drawn from the core funding of state research

institutes, and the gathering of funding for ministries' own reporting and research activities (OECD, 2017: 36; VNK, 2013). The reform also modified organisational structures by fusing state research institutes, merging the Centre for Consumer Society Research and the Institute of Criminology and Legal Policy at the University of Helsinki, and establishing networks between higher education institutions and state research institutes.

The objectives of the instrument

As the ministerial group (VNK, 2013) consulted various STI organisations when preparing the decision, the objectives were partly shaped by organisational responses, including the AF where the instrument was to be established. The Prime Minister's Office (PMO) and the AF's overseeing ministry, the Ministry of Education and Culture (MEC), were designated as the governing ministries of the instrument. The decision objectives stipulated that "the Strategic Research funding instrument funds longitudinal problem-oriented research, the purpose of which is to find solutions to significant societal challenges and problems" (VNK, 2013: 9), enabling the renewal of economic life and competitiveness, the development of working life, and the orientation of research towards changing knowledge needs, and to areas where no prior state research institute has conducted research (VNK, 2013: 9–10). According to the decision, with "a significant increase in competitive funding that serves societal needs and services", Strategic Research will become the third competitive public funding pillar alongside the innovation (Tekes) and scientific research funding (AF) (VNK, 2013: 9).

According to the decision, the Strategic Research Council (SRC) would be established within the AF, and its composition would be decided by the government. The SRC, comprising a chair and eight members, "independently decides on the programme structure of research activities, the financing of programmes, the selection of research projects, and the establishment of the necessary decision-making and other support structures" (VNK, 2013: 9). The SRC is composed of recognised researchers and research experts, representing research users with extensive experience in administrative, trade and other occupational and research-related transitions (VNK, 2013: 9). Projects are selected through open competition with an emphasis on "societal relevance, effectiveness and research quality. Research projects are fully funded on a multi-year basis" (VNK, 2013: 9). The objectives entailed that the government would decide on the selection of research themes for the research calls based on the proposal by the SRC. The government's decision on research themes is conducted in collaboration with ministries and coordinated by the PMO, with research experts and the Research and Innovation Council also being consulted. The government or its ministries do not participate in the allocation of funding to individual research projects or programmes. According to the decision, changes related to the AF entailed that the organisation's administration and research funding procedures "will be reformed to meet the special needs of the Scientific Research Council and Strategic Research Council" (VNK, 2013: 9.)

Methods and materials

In examining how the policy actors translated decision objectives into a funding scheme, I analysed the preparation of the law, the formation of the SRC, the creation of the research theme process, and the research assessment tools and representations. A case study design was employed for this purpose as it enables the combination of multiple data, and attention to contingency and causal relations (Ylikoski and Zahle, 2019; George and Bennet, 2005). I conducted interviews (N=22) with science policy actors who had been involved in the construction of the instrument or discussions related to it and gathered official documents on the case. The empirical analysis is primarily based on interviews with officials and senior management from the MEC and the AF, the SRC members and officials primarily responsible for managing the scheme, and officials from the PMO. The informants were either key actors in the construction of the instrument or had subsequently played a key role in its development. The data also includes interviews with researchers and organisational representatives who were not involved during the implementation but were later closely associated with the instrument. Temporal dimensions of the phenomenon are considered, as the

analysis sheds light on several stages of the implementation, as well as the tensions and consequences that followed.

The interviews were collected in 2019-2020 and were a combination of thematised semi-structured and open interviews, which I recorded and transcribed. The informants signed an informed consent form and received a copy of it. To preserve their anonymity, specific background information of informants is not presented in detail. As the transcriptions were all in Finnish, I translated the extracts presented in this article into idiomatic English. The primary textual documents analysed are the government's decision on the reform (VNK, 2013) and the AF law amendment (HE 25/2014 vp). I also used the reform proposal (VNK, 2012) and its organisational responses (VNK, 2012) to understand the government's decision, based on which the implementation got underway. I analysed the data using techniques such as open coding and memo writing (Corbin and Strauss, 2008; Strauss, 1987) to determine how the policy actors formed and explained their choices and actions. I was interested in the work they did to manage their involvement in the implementation of the instrument, how the objectives of the decision were developed in the legislative text and further in the AF, and the outcomes of these choices. The recurring dimensions of the invisible work that emerged from the data were subjected to several coding rounds, during which I systematically re-evaluated the extracts.

Anticipatory tailoring

> Although political decisions are not always realised in accordance with how officials have prepared them, our professionalism lies in preparing decisions so well that there is little opposition from political parties… (MEC official)

The extract above from a ministry official sheds light on the invisible work that frequently appeared during the implementation: how the policy actors tailored practices in anticipation of the reactions, work requirements and legitimacy needs of others. The policy actors held discussions with several parties (e.g., the government's research coordination group 'TEA', ministries, and research organisations). Hence, the officials learned the professionalism indicated in the extract, namely, how to shape materials so that they would be accepted as decisions, through discussions with various actors, including those outside political parties. The tailoring involved anticipation of acceptance by heterogeneous audiences and theorising on issues, such as how to mediate the interface between politics and science. Policy actors shaped practices in anticipation of the likelihood of ideas being adopted, of their suitability for the conventions of target audiences, better communication, or smoother work processes. Below I provide examples of this work during the implementation and the consequences and tensions that followed.

Preparation of the law

Following the government's decision to establish the instrument, the law on the AF (HE 25/2014) was amended to accommodate the decision objectives at the AF. The law was a significant document for the further specification and legal verification of the decision objectives. For example, details such as the appointment of SRC members for a maximum term of three years with a maximum extension of three years, and the schemes' project duration of 3–6 years (HE 25/2014: 24) were specified in the legislative text, ensuring the relatively longitudinal nature of the projects. The law was prepared by MEC officials, who consulted several organisational representatives to contribute to an earlier draft of the law (HE 25/2014 vp: 13). Since the MEC is the governing ministry of the AF, the two organisations closely collaborated in discussions on the details of the instrument. In drafting the law, MEC officials tailored it to respond to what they anticipated would fulfil the government's wishes, while preserving what they thought could ensure the autonomy of the scientific community:

> […] We were terribly careful when wording the memorandum or background text to the law. For example, we explicitly stated that ministries or politicians do not participate in decision-making on projects and that the research should be relevant. We included many statements to this effect, even though the legislative text is relatively short […] We considered very carefully what should be documented so that it would align with the will

> of the government... it provided a lot of guidance at the outset, and still does of course. (MEC official)

As a result of the tailoring of the legislative text, it was made legally binding that the ministries and Members of Parliament (MPs) had no direct role in decision-making on Strategic Research projects. One of the organisational representatives, who later became an SRC member, participated in the consultation with organisations on the new law and was satisfied that they were able to include many of their ideas in the preparation. The representative explained that they had much experience in similar policy processes and knew how to write proposals that would be relatively easy to include, implying policy entrepreneur skills in terms of mobilizing their ideas in the policy process. Moreover, they described that many organisations had criticised the law proposal without including specific and feasible counter-proposals, and that they could anticipate that merely criticising the proposal would not play any role in the final version. During the early stages of the SRC's work at the AF, the potential political pressures that MEC officials had anticipated when preparing the law became apparent. A politician was interested in influencing the choice of projects and the formation of programmes, and the SRC had to reject these suggestions. The details and arguments that the officials had incorporated in the law increased the doability of the SRC's work by clarifying the division of labour between the actors (Fujimura, 1987):

> The law is very good. It states very clearly that the government decides on research themes, but that it must not interfere in the selection of research projects or the formulation of programmes. When [a politician] showed an interest in acting against this idea, we made it very clear that it's not right according to the law. It was easier for everyone to understand it then. Legal argumentation is not only about what is said in the law but also about how it's argued. If the arguments are clear and precise enough on these issues, it's relatively easy to build one's own independent position, so to speak. (SRC member)

The carefully tailored law helped the SRC to manage emerging tensions between the social worlds of politics and science. It also made the selection process of projects in the Strategic Research funding scheme converge towards the way in which projects are selected in the programme-based funding at the AF. However, the SRC itself has a different kind of representation in comparison to the other funding schemes at the AF, the formation of which will be discussed in the following section.

Formation of the council

According to the government's decision, the SRC was to be established at the AF, and the government's decision on the SRC would be made in collaboration with ministries. The members should be recognized researchers and research experts, representing research users, with extensive experience in administrative, trade and other occupational and research-related transitions. (VNK, 2013: 10.) MEC officials specified in the law that the MEC would prepare a proposal to the government in consultation with various stakeholders on the composition of the SRC. They also added that the SRC is required to have a double majority, meaning that a majority of members must be recognised researchers, and the other majority must be research experts representing the users of the research (HE 25/2014 vp: 16). The double majority statement justified the inclusion of several recognized researchers who are involved in scientific work, but at the same time, it justified the representation of research users, which diversifies the SRC structure in comparison to scientific committees. According to MEC officials, the criteria for recruiting SRC members stipulated that they would be experts covering a range of issues and sectors, referring to them as holistic individuals with a broad understanding of a wide range of developments and systems. Impartiality was considered an important quality. Many officials deemed that representatives from ministries were not suitable due to their potential interest in selectively promoting the lines of work at state research institutes with which they were associated prior to the reform. The importance of the composition of the SRC with its anticipated credibility and impartiality became apparent when, in the first round of the selection of SRC members, an MP wanted to deviate from the ministry's proposal:

> In the first round, it became wildly politicised. In other words, I wonder how many times the proposal was taken back to the government because there was one minister who always brought it to the table. (MEC official)

The MP wished to include a person in the SRC who had not been proposed by the ministry. Consequently, the ministry had to rearrange the composition of the SRC according to the MP's proposal by excluding the initial candidate with a similar profile and choosing the member proposed by the politician. The event presumably further strengthened the ministry officials' belief in the need to anticipate the reactions of political representatives and other stakeholders and demonstrated the significance of the specifications laid down in the law. Overall, several informants described the selected SRC members as credible due to their wide recognition and achievements in various social sectors. The involvement of members with perceived credibility in social sectors across science and politics was seen by many as a crucial factor in how different audiences received the institutional change in the initial stages of the instrument's implementation:

> It's certainly very significant for an appreciation of the whole issue that the first Council had two academics, [names of the members], who sort of counterbalanced the discussion that was prevalent in the scientific community at the time, especially at the planning stage. Namely that we're going to compromise the quality of science, and that we're now conducting the kind of research that politicians demand. Well, if it's chosen by two people who have been regarded by the Finnish scientific community as the brightest stars in terms of the quality of science, it certainly gives it a different tone. (SRC official)

The articulation work of officials underscores the centrality of anticipation in terms of them making choices that are likely to generate wide acceptance – a common feature in policymaking (see Pierson, 2000: 258; Dunlop, 2010: 358). These choices in turn affected the influences towards which the instrument converged, as will be shown in the sections that follow. Next, I turn to the development of the research theme process.

Creation of research themes

The government's decision outlined that the SRC would prepare a proposal on key research themes and focus areas, which would be decided by the government in collaboration with ministries. This process would be coordinated by the PMO (VNK, 2013: 10). In the legislative text, MEC officials specified that prior to the SRC's proposal, various STI organisations and research experts would be consulted (HE 25/2014 vp: 8). They also specified that based on the theme decision, the SRC would further decide on the programmatic structure of the scheme's research work, and that the themes and emphases would be determined on an annual basis [6](HE 25/2014 vp: 16). The objective of making research more relevant by increasing the government's role presented a challenge for MEC and AF officials in terms of how to keep politics close enough, but not so close as to interfere with the setting of scientific priorities. As shown below, according to AF and MEC officials, the practice was intentionally tailored to enhance the autonomy of the SRC in preparing themes:

> We certainly discussed how independent it is. It became very independent to the extent that during the process, the SRC forms the themes itself. Then they're adopted by the government. Not rubber-stamped, but largely prepared – no changes were desired or expected. […] The government's decision-making works according to a presentation procedure, so it's quite formal. They make a large number of decisions at every meeting... well-prepared presentations are delivered. Some members of the government could take up issues for discussion if they wanted to, as they get the agenda, but they probably consider that the preparation has been good. On the other hand, there's a fear that the instrument will be politicised… (MEC official)

In addition to the role structure between the SRC and the government, the articulation work of the officials made the research theme process converge with the existing policymaking conventions in Finland, according to which policies are prepared well by officials before they are presented to decision-makers. In principle, changing the themes is possible, as in other cases such as the recruitment of members. However, several offi-

cials believed MPs would be unlikely to make any major changes because it would signal distrust towards the SRC members and the preparation process. Several policy actors highlighted how there had been very few changes between the SRC's theme proposal and the government's decision on research themes during the annual theme selection process. Changes had included the addition of cross-cutting themes (e.g., immigration) or some word modifications (e.g., democracy replaced by community, and basic services added as a feature to the theme of equality). After receiving the SRC's proposal, PMO officials prepare a separate decision document for the government based on the proposal. Due to PMO officials' invisible work during this phase, some differences occur between the two text documents even before the presentation to the government. As PMO officials have prepared the decision for the government based on the proposal, they have simultaneously adhered to government conventions by shortening, deleting or adding details to the decision text in anticipation of its better alignment with the government's information dissemination styles:

> So, a snippet of the text that stated... or a research method was proposed in the SRC's text that could be used to address these issues. In a way, I think it would be odd to already be talking about research methods in the government's decision. I think it's illogical. Perhaps I might question a little why there is guidance on a particular research method in the SRC's initiative... although it's an example, but still… In the government's decision in particular, it's not logical to point it out there. (PMO official)

To satisfy diverse legitimacy needs, PMO officials used more general language when preparing theme decisions for the government and other non-academic audiences, while SRC officials drafted more specific research programme texts for researchers. The officials highlighted that these differences were merely textual and did not alter the substance of the themes. One SRC member discussed noticing that some of their texts had been condensed or slightly modified, and described one situation during the government led by Juha Sipilä in 2015–2019:

> Sipilä's cabinet put a lot of emphasis on the bioeconomy, and we had one theme related to the circular economy. Then they erased all mention of the circular economy from the text and we were, like, can't we use that? And then they asked, why don't you talk about the bioeconomy? It may be that government officials think that it sounds better if we cut parts, but then they also make a decision that affects the substance, which can orient the framing of the research. (SRC member)

The invisible work of tailoring the theme process structure and text formats affected the construction of relevance in research themes. The theme process rendered the alteration of themes by politicians more challenging and less probable. Textual modification by PMO officials in terms of omitting indicative research methods, made the research theme descriptions slightly vaguer in the government's decision compared with the SRC's proposal. The theme areas depend on the process structure and the extent to which theme descriptions and research programme texts become tailored. Once the instrument was running, tensions arose because the organisation of the theme process did not satisfy all parties. A couple of PMO officials talked about how the low frequency of change, and the overall vagueness of research themes were problematic. They explained that they and certain political representatives had hoped for more tangible results on a specific theme, but since proposals are already well prepared by the time politicians receive them, it decreases the likelihood of themes being altered. In November 2023, the government led by Petteri Orpo with representation by the National Coalition Party, the Finns Party, the Christian Democrats and the Swedish People's Party announced that they would not accept a research theme on immigration and would postpone it (Junkkari, 2023). This was the first time that a government had declined and postponed a theme in the history of the instrument. The Finns Party, known for its anti-immigration views, perceived that the proposed theme "Interactions between immigration, work and wellbeing in future Finland" (Strategic Research, 2023) did not sufficiently consider the negative effects of immigration (Junkkari, 2023).

The repurposing of templates

At several stages of implementation, existing examples (e.g., convention, practice, model) influenced actors' thinking, resulting in alternatives being turned into good enough or best practice, while structurally shaping the new institution. Actors repurposed existing institutions as templates based on attraction, familiarity, resource-related constraints, and legitimacy that the existing practices offered as solutions. The choices were heavily influenced by the institutional roles and backgrounds of the policy actors. Below, I provide examples of this articulation work during the implementation and the consequences and tensions that ensued.

Construction of assessment tools

The decision to significantly increase the proportion of competitive funding for problem-oriented research created a demand to extend and reform the assessment of the funding (VNK, 2013: 9). Establishing the scheme as part of the AF was already perceived as sensible in the proposal (VNK/TIN, 2012), which the AF favoured in its response to the proposal (VNK, 2012). MEC officials specified in the legislative text that the SRC's management would seek to use the AF's practices to ensure cost efficiency (HE 25/2014 vp: 9). This suited the AF as they were motivated to increase the share of peer-reviewed funding (interviews with the AF) in the system. The AF's infrastructure therefore became a template for developing Strategic Research from objectives to practice. The SRC and its unit officials were tasked with developing assessment tools for monitoring and evaluating the impact of research projects during and after their implementation (HE 25/2014 vp: 9, 16). There was a high demand for articulation (Fujimura, 1987) at the AF because SRC officials had to work to an extremely hectic implementation timetable. As a solution, SRC officials repurposed the AF's organisational practices as the basis for new ones:

> But at the civil service level, our timetables were extremely tight at the beginning. Of course, we had to make the most of what had been done at the AF. We couldn't just come up with something completely new... we didn't have the time. Instead, we looked at how our application cycles work, and what our legal or other aspects allow. The challenge was that we were proceeding so fast in these matters that our lawyers and business units (among others) had to keep up. They asked, 'Oh is this the application process for next autumn?' and I said 'No, it's for this January', and in September or October, we started talking about how we need it now. It was a big challenge, but miraculously people... complied, [*sighs and laughs a little*] so we were able to get it done. (SRC official)

When constructing a new societal impact reporting practice for funded projects, SRC officials repurposed the AF's existing quantitative formats of scientific impact. They extended these formats with their ideas and by asking researchers what the measures could be when they implemented a series of indicators[7] to represent the social impact of science. The established range of measurable activities outside research can be understood as part of the artefactual (artefacts and services through which societal impact is realised), and institutional-interactional dimensions of societal impact (forms of collaboration and science-society interaction) (Miettinen et al., 2015: 272). For example, the epistemic dimension of societal impact, the understanding gained of phenomena (Miettinen et al., 2015), could not be directly represented with the indicators. Since several manifestations of societal impact could not be assimilated into quantitative indicators, officials established a societal impact narrative to capture them. To this end, they used the UK's Research Excellence Framework (REF) conventions as a template for the narrative, which resulted in the assessment practice partly converging with the UK's assessment models, implying the influence of global examples (Irwin et al., 2021: 2; Lemola, 2002).

The implementation of a societal impact dimension, distinct from scientific impact, was operationalised further when officials established a separate societal review panel, which may have important implications for the classification of reviewers' expertise and the composition of evaluation committees. As a consequence of actors repurposing the AF's existing solutions as starting points for new solutions, many of the assessment practices within Strategic Research nevertheless

converged with existing funding instruments at the AF. The SRC functions similarly to the AF's scientific committees, which select scientists from the field to recommend projects for funding. International and national reviewers are invited to work with the SRC on the review panels, and the AF's disqualification rules apply to the SRC members. The SRC decides on funded projects and evaluates their societal significance, impact and research quality (HE 25/2014 vp: 16). Tensions emerged due to the constraints imposed on the SRC's work by the AF's disqualification rules. The institutional rule, designed to promote impartiality and guard against favouritism in decision-making, helped create an arrangement whereby an SRC member with wide scientific networks in particular was more likely to assess proposals outside their field of expertise:

> Well, first of all, I'm not allowed to apply for funding through these instruments during that time, and after all, as a member of the SRC, you can't have an influence on anything much at all. On the positive side, it was a good group and I learned a lot there, but I was disqualified from the things I knew about. On the one hand, that's good, but on the other hand, it's a bad thing. As a result, I think we made several decisions where a potentially worse project received funding instead of the one that I considered should have been funded. […] Individuals within their field or a related field are either unable to judge because they don't know the subject matter, or then the evaluators wonder why the applicants have not collaborated with them and give them less credit, so it immediately becomes an inverse disqualification problem. Moreover, they are not officially disqualified, but might actually be, due to competition or something else. (SRC member)

The extent to which disqualification rules restricted the ability of SRC members to apply their expertise to the proposals depended on their scientific networks. The eligibility of SRC members to assess and comment on proposals further affects how relevance and scientific quality are understood in the allocation of funding.

Using existing institutions as building blocks for new ones may later again direct the construction of new institutions:

> […] … Again, we can see the power of peer review, as we also held a separate peer review panel. We had learned from the Strategic Research instrument how they should be organized in terms of societal impact. We certainly know how to evaluate science, but for the Flagships we constructed an impact panel in line with the SRC doctrines. (AF's management)

The newly established societal impact assessment of Strategic Research provided the actors with a usable template for building a societal impact assessment for the AF's new Flagship instrument. The officials and management were aware of potential challenges in the process of reviewing applications and measuring impact in project assessment. Despite the scepticism, especially when resources are tight, an established practice may acquire a standard-like stance that guides how a practice could be organised in other contexts. In this way, an alternative may become a guiding principle, generating changes through which an institution or its adaptable components eventually become more dominant or standardised in the environment. The gradual repurposing of practices can thus lead to a broader organisational change.

Construction of representations for research

The government's decision objectives emphasised the importance of finding solutions to major societal problems through longitudinal, problem-oriented research (VNK, 2013: 9), but the articulation of these dimensions into funding scheme criteria, guidelines and narratives was left to SRC members and officials at the AF. In many instances, the SRC members drew upon their experiences of practices and conventions to understand the meanings of research interaction and impact within the funding scheme. They articulated alignment by repurposing conventions or practices that were attractive or familiar to them as templates for the new ones. As a consequence, parts of the new interaction practices converged with models of national funding organisations that fund applied or innovation-oriented research:

> One of the things I've probably influenced the most is the central role of interaction in the instrument.

> And that… that derives from my past experience. Of course, from a researcher's point of view, it's very understandable that you receive money, then you conduct research, and in the end, you produce some results. And then you say you need more money to get the next... solution. That's just the way it goes, that's the logic of research. But I know from experience [in organisation x] that it works well when the research is followed by those who have an interest in the outcome, also at the stage when the work is progressing. (SRC member)

The meaning that the SRC member attributed to the interaction emphasis, namely that stakeholders closely follow research results, was influenced by their organisational role and conventions. The influence of the SRC members' and officials' work settings was observable in examples against which they articulated the conception of relevance inherent in the instrument, although they highlighted that relevance has multiple meanings. They were also influenced by phenomena, people, ideas, and problems that required solutions. Among these were the climate crisis, the proliferation of disinformation, the lack of legitimacy and the utilisation value of research, and poorly informed decision-making. They often saw interaction and relevance as manifesting in connection with policy processes, or as research partnerships with extra-academic actors or various sciences throughout the research process, highlighting the aim of developing solutions to societal problems or using research to implement developments in practice. Additionally, they discussed interaction and impact emphases as activities such as communication, consultancy practices, and policy work– a variety of activities that can be understood as part of artefactual and institutional-interactional dimensions of societal impact (Miettinen et al., 2015: 272).

These understandings were developed into formal criteria according to which consortia members must come from a minimum of two separate organisations, three or more research groups, and three disciplines. The views were also turned into programme guidelines and recommendations according to which researchers are encouraged to co-produce knowledge and interact with various disciplines and stakeholders throughout the project and provide tangible solutions to real-world problems with the help of interaction coordinators and programme directors. The meanings closely resembled the new knowledge production literature's ideas (e.g., Gibbons et al., 1994), suggesting that traditional academic research resides in an ivory tower. A couple of SRC members and officials referred to the framing of grand challenges and EU societal challenges as providing inspiration for the scheme, the impact of which was already apparent in the proposal for the government's decision, implying a convergence with global ideas and frameworks (Irwin et al., 202: 2; Lemola, 2002). One member specifically referred to the innovation helix as the mode of interaction that the programme was aiming for. Otherwise, there was no mention of policy literature concepts, such as 'Mode 2' (Gibbons et al., 1994) or 'Responsible Research and Innovation' (RRI) (Owen et al., 2012) by the implementation group. However, as the scheme was implemented, programme leaders, coordinators and researchers funded by the scheme began to use concepts such as 'wicked problems' (Rittel and Weber, 1973) and 'RRI' (Owen et al., 2012) in the scheme's events, documents, and public descriptions of research, due to their familiarity and the resemblance between the discourses and the emphases of the scheme:

> The concepts may have come into use due to us. I hadn't seen discussions on transdisciplinarity anywhere in the AF's material before. In a way, transdisciplinarity is not a good term because there's no direct translation into Finnish. I just started using it… and 'wicked problems' is such a central concept in my [field of science], it's such a natural […], unifying thing for me that everyone is studying these wicked problems. (A researcher with different roles in the funding scheme)

In this way, at the initial stages of science policy implementation, policy actors may not necessarily adopt all policy discourses directly from global examples to national practice through isomorphism (Lemola, 2002). Once established, a funding instrument may provide a platform for other actors to start using older science policy discourses, or to strengthen the use of more recent discourses as tools for 'identity work' (Flink and Kaldewey, 2018: 20), among other purposes.

The implementation group's relations, roles, and composition also influenced how research practices and processes became represented. A couple of SRC members and officials stood out as being highly dedicated to the implementation. Members often highlighted their mutual sense of togetherness and mentioned that most of them knew each other and implicitly understood the instrument's core meanings similarly. Some of these understandings were challenged by a social scientist who was not involved in the implementation. Tensions arose as the representations of knowledge production that had become central to the instrument did not represent the diversity of disciplinary interaction patterns:

> Strategic Research puts an awful lot of emphasis on that stakeholder thing, which begs the question of why and whoever came up with such an idea [*slight laugh*]. Because first of all, in our field, we've always worked with other people. Social sciences are certainly not born in any kind of ivory tower, but in basic places, where basic humans exist… […] Co-research is such a challenging term, and in SRC programmes there's a lot of talk about co-creation, or about doing things together, but certainly, as researchers we don't actually give the decision-making power in most studies, at least in social science decisions, to the group we're researching. It's not equal, no matter how much we try to say it is. (A researcher with different roles in the funding scheme)

This researcher's approach and background, like others, provided a template for understanding the interaction and impact of research. However, according to the researcher, interacting with society is inherent in their research process, although a distance remains between the researcher and their informants, for example in the collection and analysis of data. The kind of distance in interaction, a specific interaction pattern, may be understood as part of their process of gaining an understanding of a research phenomenon, the epistemological dimension of societal impact (Miettinen et al., 2015: 272). In their SRC project, they examine why a phenomenon is commonly perceived the way it is. One of their patterns of interaction with the phenomenon appears to be 'disrupting' the mainstream assumptions related to the ontology of the societal problem and subsequent solutions developed. However, the researcher's views aligned with others on the favourability of interdisciplinary collaboration in research.

The section illustrates how the composition of the implementation group, attuned to the plurality of the funding instrument's objectives and subsequent legitimacy requirements across social worlds, led to ambiguous but selective representations of research interaction. These representations were later co-produced by others who employed discourses aligning with the initial representations but were unable to reflect the diversity of understandings regarding science-society interaction.

Discussion and conclusions

By drawing on a case study of the implementation of the Strategic Research funding instrument in Finland, the article provides an understanding of the translation of STI policy objectives into governance. How policy actors anticipated the reactions and legitimacy needs of heterogeneous audiences, and repurposed existing practices as templates, were central dimensions of the articulation work (Fujimura, 1987) through which they managed the implementation. Ambiguity has been indicated as a central feature in the mobilisation and framing of science policies (Edler and James, 2015), and their tailoring to several purposes (Calvert, 2006). This study suggests that on several occasions when turning policy objectives into practices, sufficient specificity was crucial for how the policy actors managed tensions at the interface of science and politics. This was evident in terms of how the details written into the legislative text significantly assisted in mediating the division of labour (Fujimura, 1987) between SRC members and MPs, or how SRC members with specific backgrounds were important for generating legitimacy across institutions. Although the legislative text was particularly important for specifying the objectives, the government's decision also had a considerable bearing on the implementation. The choice to establish the instrument as part of the AF as opposed to Tekes had further consequences for the repurposing of organisational practices. Moreover, the implementation

was influenced not only by the work of the SRC members and officials at the AF but also by what happened before, during and after their work. The MEC and AF officials in particular played an important role in shaping the conditions pertaining to the work of the SRC members and officials. The instrument's implementation can thus be understood as a profoundly interconnected and historically contingent process: the actors' choices were influenced by a range of stakeholders, external conditions, and constraints. This provides empirical support for the importance of looking at the social embeddedness of policy actors and their work (e.g., Henderson, 2019), since the process could not be reduced to the actions of a few policy entrepreneurs, although the actors' visions and skills played an important role in the process. Their anticipatory acts and the subsequent ability to mobilize ideas in policy processes can be interpreted as policy entrepreneur skills that they have gained by working closely in the policy environment.

The inherent tension between politics and science required careful negotiation by the policy actors as they translated policy objectives into 'doable' practices (Fujimura, 1987). The tensions that followed the implementation in terms of the research theme process, the formation of the council, disqualification rules constraining the SRC member's involvement in assessment, or the representations of research excluding patterns of science-society interaction, show how challenging it can be to construct funding instruments that satisfy several social worlds. Challenge-driven funding arrangements have subjected researchers to multiple and conflicting requests (Jacob and Jabrane, 2018; Möllers, 2017; Parker and Crona, 2012), which they have managed by "shifting in and out of different contexts" (Möllers, 2016: 369). This case study provides further evidence of how funding management also copes with a plurality of demands (see Wehrens et al., 2022) and indicates how this plurality directly influences the design of science policy practices. In the same way that Wehrens and colleagues (2022) characterise staging work as a way for committees to take care of the programme, concern for the success of the scheme was also reflected in the invisible work of the policy actors, as they made their choices in anticipation of achieving widespread acceptance (see also Pierson, 2000: 258) and legitimacy for the new institution. Although strategic thinking was inherent in their work, the invisible work should not be viewed as mere window dressing or deceitful in some way. It is noteworthy that the caring extended beyond the scheme, as through its construction, the actors sought to maintain the legitimacy and continuity of the institutions they cared about. Their work was also shaped by several organisational and resource-related constraints, leading to ad-hoc choices or trial and error.

The way in which the policy actors repurposed institutional structures that were familiar to them or embedded in their roles contributes to previous findings on how new policy instruments are produced in reference to existing structures and values (Dunlop, 2010; Stinchcombe, 1965; Aldrich and Ruef, 2006: 67), as in the case of the ERC, where Swedish policymakers transferred many of their national legacies onto the ERC's agenda (Persson, 2018; see also Epping, 2020). These findings highlight the relevance of the composition of groups implementing funding schemes, and their repurposing of templates based on attraction, mimesis (Beckert, 2010: 155–159), familiarity and resource-related constraints. The tensions that emerged due to representations of knowledge production within the scheme could be alleviated by using research-based understandings of interaction as templates. For example, prior research has indicated that understandings resembling Mode 2 and innovation helix models of scientific knowledge production do not represent the diversity of the interaction patterns of research with society (Ylijoki et al., 2011; Tuunainen and Knuuttila, 2009; Zierhover and Burger, 2007). This is also related to how the categorisation of scientific impact as external to societal impact can reproduce old distinctions in STI policy discourses (see Flink and Kaldewey, 2018) and enhance a conception according to which a better understanding of a phenomenon, which is a vital precondition for resolving societal problems, is not part of the third mission (see Miettinen et al., 2015: 258).

The instrument was not a reproduction of existing practices but rather gained features of

existing global and national institutions, which in combination also resulted in novel institutional practices, adding to our understanding of how contextualising and standardising forces take shape in science policy (see Irwin et al., 2021). For example, the SRC officials' repurposing of the AF's conventions as templates for the assessment tools of Strategic Research made the instrument converge with the AF's existing funding instruments, while the models used by SRC members resulted in the instrument also gaining influences of innovation-oriented funding. The repurposing of the UK's REF's impact narratives implies convergence of the scheme's societal impact assessment with the UK's assessment practices. There was also convergence between the research theme emphasis on societal challenges and the institutional conventions of policymaking in Finland, whereby the government receives the SRC's research theme proposal late in the decision-making process. In Finland, policy officials have a notable role in policy preparation (Murto, 2014), which mediates organisational interaction. In another country, the societal challenge- emphasis may mean something else. The articulation work identified in this case implies a more general prevalence, but the characteristics it generates in implemented institutions may vary based on the actors, policy cultures and institutions of the policy context and even within the same institution as the actors and institutions working in its surrounding environment undergo changes. For example, the audiences whose reactions are anticipated by policy actors may not be as heterogeneous in 'excellence' instruments (see Scholten et al., 2019) as in 'challenge-driven' instruments. Further empirical case studies of science policy management in different STI policy contexts are needed to investigate these connections, and also the extent to which established funding schemes change over time. The findings lead me to conclude that the manner in which STI policies are implemented undoubtedly matters.

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Notes

1 In 2023, the English name of the organisation changed into Research Council of Finland.

2 In 2018, Tekes was merged with Finpro and became Business Finland.

3 On the governing role of the Research and Innovation council (former Science and Technology Policy Council), see Pelkonen (2006).

4 However, only €55 million became allocated to the instrument.

5 The SRC and its officials decided to organise workshops annually on the research themes with the public as a basis of their work.

6 At first, SRC officials created a broad selection of societal impact indicators but later decreased their number to avoid generating an excessive reporting load.