

The promises and premises of mission-oriented innovation policy—A reflection and ways forward

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Abstract

Missions may be regarded as a narrative for challenge-oriented policies, as a rationale for directional policies, and as an instrument for coordinating distributed innovation efforts. While the attention for mission-oriented innovation policy is rising, there are still many questions regarding both the governance and the conduct of missions as well as the (adverse) effects they might have on innovation and societal challenges. This research perspective reflects on what missions are, what they can do and potentially engender, and how they can be studied empirically. Rather than a static, predetermined, and closed-off instrument, we contend that missions are best understood as continuously interacting with the structures and interests of governments, markets, and society, aligning (1) problem-based governance targeting societal challenges and (2) innovation governance targeting novelty creation and deployment. This characterisation of missions, as embedded and evolving, advances empirical questions that could guide research into unexplored directions.

Key words: mission; innovation policy; societal challenge; transformation

1. Introduction

Governments worldwide are increasingly concerned with tackling grand societal challenges. Addressing these multidimensional challenges places new demands on policymakers, which sparked the search for new rationales, approaches, and instruments of innovation policy (Weber and Rohracher 2012; Kuhlmann and Rip 2018; Schot and Steinmueller 2018).

One approach to orchestrate transformative change concerns *mission-oriented innovation policy* (MIP; European Commission 2018; Geels 2019). Wanzenböck et al. (2020: 3) define MIP as ‘a directional policy that starts from the perspective of a societal problem, and focuses on the formulation and implementation of a goal-oriented strategy by acknowledging the degree of wickedness of the underlying challenge, and the active role of policy in ensuring coordinated action and legitimacy of both problems and innovative solutions across multiple actors.’ Following the lead of European Union’s ‘Horizon Europe’ programme, and looking for ways to meet Sustainable Development Goals (SDGs), policymakers and innovation agencies in various countries have started to explore how to link research and innovation (R&I) to ambitious goals for societal topics like affordable health, traffic safety, sustainable energy, and waste reduction (Kuitinen et al. 2018; Nesta 2019). High-level

strategy documents like a plan for mission-based innovation policy in Brazil (Mazzucato and Penna 2015), the Mission-oriented UK Industrial Strategy (UCL MOISS - Commission for Mission-Oriented Innovation and Industrial Strategy (2019) or a practice guide on designing missions in Sweden (VINNOVA, forthcoming) demonstrate the growing interest in MIP over the past years. While national MIP strategies have been put in place in countries like Germany (the High-Tech Strategy 2025), the Netherlands (the Mission-oriented Topsector and Innovation Policy), and various East Asian economies (see Karo 2018), governments in many other places still struggle with translating their interest for missions into actual policy approaches (Larrue 2019; Nesta 2019).

Although appealing because of their potential to tackle societal challenges by means of innovation, MIPs appear to raise a range of new policy questions urgently in need of answers (Wesseling et al. 2020). Pursuing missions creates its own challenges, as the inherent tensions of a MIP approach seem to be not fully understood yet (Brown 2020). So far, scholars have mainly focused on a better conceptualisation of so-called new mission policies, differentiating the current mission debate from earlier mission approaches (Mowery et al. 2010), discussing legitimate rationales for MIPs (Mazzucato 2016), or distinguishing different mission types (e.g. Wittmann et al.

2020). These mostly conceptual studies help put different MIP approaches in perspective, but lack clarity about how missions operate within their environment, how missions effect the changes they promise, and how to conduct and evaluate missions. To move forward in the debate and practice, we propose that further scrutinising the narratives, promises, and practices which underpin this generation of missions is a necessary step to develop a robust empirical programme that can substantiate the validity and efficacy of MIP's bold ambitions.

This article thus offers a constructive reflection on what missions are, what they are supposed to accomplish, and how they may be studied empirically. We examine the promises (Section 2) and shortcomings (Section 3) of the current debate. In Section 4, we present our views on how to understand and study MIPs, considering their complexity, variety, evolving shape, and degrees of effectiveness. In Section 5, we lay out important avenues for further research on MIP, mission governance, and change dynamics.

2 The promises of missions

Recent debates around missions present them as potential policy responses to ongoing societal challenges. What stands out in the current discourse on missions is the promise that they provide a means to unite actors and innovation activities around a common goal (Mowery et al. 2010; Edler and Fagerberg 2017; Robinson and Mazzucato 2019). Contrary to the missions policymakers have pursued earlier (see Kuittinen et al. 2018 for examples), via the machineries of governmental bodies like national laboratories, current-day societal missions are supposed to engage diverse sets of organisations and stakeholders in both the development as well as the adoption of new ways of production, distribution, and consumption.

The concept of a mission lends itself to drive such transformations in various ways, including targeted techno-scientific developments ('breakthroughs') and empowering societal stakeholders to articulate their needs and use their inventiveness (Kuittinen et al. 2018; Hekkert et al. 2020). This versatility means that missions are being adopted and translated into a variety of policy strategies for accelerating and aligning change-oriented activities. For instance, the European Union's new framework program for R&I utilises a 'mission-oriented research and innovation' approach to spur multidisciplinary and cross-sectoral research on concrete societal problems (European Commission 2018; Lamy et al. 2017). Linking up with an economic development perspective, missions may inspire new 'smart specialisation approaches' to regional policy in search of promising diversification paths (Foray 2018; Janssen and Frenken 2019; Mccann and Soete 2020). Alternatively, coming from a focus on demand and diffusion, missions offer possibilities to elicit innovative and need-specific technical and behavioural solutions via public procurement, testbeds, or even instruments outside the scope of science, technology, and innovation (Boon and Edler 2018; Uyarra et al. 2020). Increasingly there is an understanding that missions may help problem-solving activities to transcend the boundaries between policy domains concerned with either economic welfare or with societal well-being and sectoral goals (Larrue 2019; Wanzenböck et al. 2020). In this way, the belief is that missions can trigger (and be triggered by) societal actors not commonly involved in R&I systems—possibly also affecting the nature of effectuated changes in these systems.

In a nutshell, missions matter because of the promise of engendering dynamics of mobilisation (of resources, actors, and institutions) and innovation around a goal, which are otherwise

unachievable, uncoordinated, or too slow. The prospect of inducing various forms of innovation or transformative change for wide-ranging, deeply embedded, and urgent societal issues makes them relevant for policymakers in different domains.

3 Shortcomings in the debate

So far, the debate around MIP has been largely dominated by academic and conceptual research on the design and formulation of missions, but falls short in explaining which mission approaches, mission designs, governance structures, and monitoring practices are appropriate for ensuring that missions achieve the envisaged impacts (Mazzucato et al. 2020; Wanzenböck et al. 2020). This narrow empirical basis on mission implementation means that many claims made about mission impacts are still thin, with few studies recognising and addressing distinct stages in the trajectory from formulating till completing a mission (Robinson and Mazzucato 2019).

A shortcoming of the current debate is its narrow focus on initiating new missions (and its early stages), with less emphasis on the actual implementation. There is a neglect of how the suitability of the mission approach varies depending on the context, the given problem or demand conditions, as well as the priorities implicit to the mission approach (e.g. accelerating technological change or industrial transformation, or prioritising innovation for specific societal problems; Brown 2020; Wanzenböck and Frenken 2020). This neglect is surprising, as it has been acknowledged that even similarly targeted missions will unfold differently when deployed in the unique context from which they originate (Mazzucato 2018). The debate hitherto has overemphasised the choice of policy instruments for steering market parties, downplaying the role of the government in managing the mission beyond these marked instruments (Mazzucato 2016; Robinson and Mazzucato 2019).

As MIPs gain prominence, the preference and rush for launching missions risks becoming a default answer that is applied uncritically to address societal issues, ignoring the accumulated experience from pre-existing and analogous goal-oriented policies, and the complex social and political issues they bring to surface (see e.g. the 'governance through goals' literature—Biermann et al. 2017). A recent study on the OECD's attempts to shift to a transformative innovation agenda also points at limitations imposed by legacies of earlier policy approaches (Diercks 2019). As with any new policy theme, policymakers might be simply continuing old institutional logics (e.g. Smink et al. 2015) while 'relabelling' traditional policies (Howlett and Rayner 2007), with no consistent view on how missions are formulated, conducted, or evaluated.

In both the research and the practice, it is crucial to recognise MIPs are the products of particular governance arrangements, are not static, but evolve over time and in tandem with the prevalent problem-solution structures (Wanzenböck et al. 2020). While it may be possible to use missions to redirect existing policies, incorporating complementary policy interventions into a coherent policy mix may be necessary for mission success. The innovation systems and transitions literature could provide useful leads about what such complementary interventions could be, given their focus on optimising and transforming systems to create new solutions (Schot and Steinmueller 2018; Hekkert et al. 2020).

So far, however, the debate on rationales for the 'new generation' of innovation policy is still limited to stressing the urgency for having courageous policy goals, with a lack of nuanced theoretical and empirical insights on why and how (through which mechanisms) missions may contribute to transformations, and how this

relates to already present (innovation) policies (Hekkert et al. 2020). The manifold ways through which missions can be implemented obscure this link with policies even further.

In this sense, the debate has yet to address what role missions play in the governance for transformative change (Kuhlmann et al. 2019; Borrás and Edler 2020), and what capabilities come into play when deploying missions (Kattel and Mazzucato 2018). MIPs imply an emboldened role for the state; it is thus necessary to acknowledge the tension that arises between the capacities missions demand and the actual competencies which governments have, after many years of delegating activities under the header of neoliberalism, new public management, and austerity (Edler and Fagerberg 2017). It might also be overly optimistic to assume missions can readily tap into innovation as an answer for societal challenges, as science, technology, and innovation systems may not always be prepared, available, or aligned with new challenges—the structural foundations for missions to succeed may be missing.

Finally, missions may create tensions with the existing rationales and routines of government and industries still geared to economic growth and longstanding sectoral imperatives (Mazzucato 2016), and with the actors who benefit from incumbent socio-technical systems. This raises a series of issues concerning the politics of MIP as a response to societal challenges. In framing a mission, policymakers give assent to a particular understanding of a challenge and potential solutions, foregrounding particular issues while de-emphasising others, and constructing an official view on what is considered (un)certain; these are fundamentally political acts. It involves collectively binding decisions which shape not only the allocation of public funds, but also the mobilisation of societal efforts towards the defined goal. While these efforts might open space for exploring alternatives and solutions, they might also reflect vested interests or shut down debate around established lines of thinking (Brown 2020; Scoones and Stirling 2020). Tensions thus emerge as the outcome of contestation regarding the predefined ambition, policy-led direction, and capacity to tackle societal issues. Proponents of missions with a technocratic character may inadvertently reinforce the growing rejection of scientific and technological responses or heighten ideological polarisation around societal issues (e.g. combating climate change and ensuring affordable transportation).

All these issues pose the need to understand in which contexts missions are deployed, to problematise the framing of missions and which tensions might be encountered, and to propose new approaches for examining how missions are performing, how they may be better conducted, and whether they are in effect transformative and for whom. In order to create a coherent and comprehensive body of empirical research on MIPs, possibly also fulfilling the demand of policymakers for more actionable insights, it is essential to broaden the currently prevailing perspectives on the promises and premises of missions.

4 Advancing the debate

For MIPs to mobilise and catalyse responses to societal challenges, a more nuanced and empirically grounded debate is necessary. The stakes are very high, so the label ‘mission’ should not be taken face-value. On the one hand, a large number of incongruent activities have received this label, many of which are conventional programmes. On the other hand, initiatives that achieve much of what missions are supposed to do are often neglected because they lack that label. To move forward in this regard, we propose investigating in practice what affordances are made possible through pursuing

missions. Rather than adopting the essentialist view concerned with ‘what are missions?’, we suggest to consider also the question ‘when are missions?’. That is, when and under which circumstances are particular goal-oriented policy initiatives effective in engendering the dynamics of change (in the form of mobilisation, activation, coordination, etc.) which they seek to unleash? This perspective shift leads us to examine the premises concerning (1) the governance and (2) the politics of missions, (3) the environment in which they emerge, and (4) the impacts they are supposed to achieve.

4.1 Governance of missions

First, we understand missions as emerging governance mechanisms supposed to afford the engagement of a wide spectrum of stakeholders around a mobilising goal of societal relevance, with the objective of activating and/or catalysing these stakeholders’ (innovative) activity in service of that goal (Hekkert et al. 2020). The acts of formulating and pursuing a mission instigate directionality, prioritising a set of challenges and the exploration and exploitation of potential solution directions. Such directionality, when combined with appropriate complementary instruments, should engage stakeholders, and reinforce coordination across policy and practice fields. As we know from literatures on system building (Musiolik et al. 2012), strategic niche management (Kemp et al. 1998), and small wins (Termeer et al. 2017), this involves activating dynamics of collaboration, knowledge creation, innovation, and institutional change. In this sense, when missions work effectively, they should mobilise resources and synergies in new ways. Getting public and private actors from different domains on board in such a venture is likely to require unusual institutional arrangements that fall outside traditional policy routines—it is far from sufficient to simply state a new goal.

The above-sketched understanding of missions opens up a series of critical questions regarding the multiactor and multilevel governance of missions. For example, who is included in processes of formulating, pursuing, and monitoring missions, and how much say do they have in shaping these processes? Recent findings from transformative innovation policy in Sweden (Grillitsch et al. 2019) suggest that alignment of interests can be critical for effectively providing directionality. Taking such observations to missions, one may ask which interests are explicitly or implicitly prioritised, and how are they represented. How inclusive are the efforts to foster coordination? How to align regional, national, and supranational mission initiatives? Promising new lines of inquiry for research concern the mechanisms for mobilisation and coordination, approaches to facilitate negotiations of divergent interests, and transdisciplinary modes of research that could contribute.

4.2 Politics of missions

Second, we see missions as always embedded in and in tension with the structures of the science, technology, and innovation systems and different systems of provision (production–consumption), and in ongoing societal debates and controversies about the issues they address. Hence, missions emerge as a negotiated outcome between different interests, concerns, and imperatives—they are neither apolitical in their formulation, nor neutral in their conduct. That requests a better understanding of the politics of missions. Drawing from evolutionary governance theory (Van Assche et al. 2013), we understand missions as dynamic configurations, evolving in interplay and interdependence of scoping and framing of mission goals, the actors, power, and knowledge sources dominating the directionality narrative, and the institutions determining the degrees

of transformations and path dependencies in both governance models and innovation directions. Missions always address challenges partially, thereby including particular actors, paths, possibilities, and concerns. How this partiality is negotiated, and who decides, is a critical feature worthy of scrutiny and transparent debate.

Attention to these dimensions further politicises the questions about governance. Who benefits and who loses by following particular missions? To what extent is there space for dissent and conflict, and how are these conflicts negotiated? Research on the pursuit of SDGs shows that open and transparent processes do not automatically produce transformative goals (Fukuda-Parr and McNeill 2019). Do missions create space for a progressive debate or further entrenches polarised positions? How is the mission timed (e.g. responding to a crisis) and how does it influence the perceptions different publics have about an issue? We understand that these questions cannot be answered a priori, and are not static, but are rather an evolving outcome of the process of formulating and conducting missions.

4.3 Mission environment

Third, understanding the governance and politics of missions requires studying the environment within which missions operate. We propose that missions sit at the interface of two systems, which might both create change as well as be subjected to change. These are the socio-economic system relevant for a social domain dealing with a challenge (like health, traffic safety, clean industry), and the innovation system that may be mobilised for solving that challenge. While the socio-economic system entails the overall set of established technologies, infrastructures, behaviours, and values relevant for production and consumption patterns in a social domain, the innovation system consists of the actors and structures steered to create and deploy novelty in the form of new knowledge, products or behaviours. Linking activities in both these systems, missions are the product of the interplay between four governance spheres (depicted within the circle in Figure 1).

In this view, the governance and politics of missions, and ultimately their impacts, are mediated by four interacting domains. Missions are subject to *problem-based governance*, which encompasses the various efforts focused on directly adapting socio-economic systems dealing with the societal challenge. For instance, efforts such as governments', civil society's, and business' ongoing climate commitments. Missions are also in dialogue and tension with the structures and arrangements involved in *innovation governance* (lower part of the figure), which impact upon the rate, direction, and quality of activities in the innovation system. This involves policies—for example, for public and private R&D, knowledge transfer, entrepreneurship—as well as other stakeholder's own or joint initiatives for influencing what new goods, services, etc. emerge from the innovation system. Many missions so far aim to activate and mobilise especially this sphere (Larrue 2019), but how this is accomplished in practice, and to what effect, remains underexplored.

Two other spheres that should be considered concern the actors that are dominant in installing change-oriented governance arrangements (Borrás and Edler 2020). First, the *government* itself often takes the lead in prioritising problems and setting performance goals, but which also faces internal complexity and competing priorities. Secondly, *markets and/or civil society* at large, which may have substantial influence on which priorities are being pursued (and how), for example, by matching or resisting the mission efforts. The horizontal axis in figure 1 thus reflects tensions and dialogues that take place between inside-out governance led by policymakers and politicians alone, and outside-in governance responsive to the perspectives of other stakeholders (Van der Steen et al. 2016).

Depending on what type of governance is more dominant at a certain point in time, the four depicted spheres can 'pull' the missions more towards their edge. For example, although the German government's High-Tech Strategy on creating sustainable circular economies (BMBF 2019) might initially have focused on breakthrough research for material efficiency and digitalisation, actor

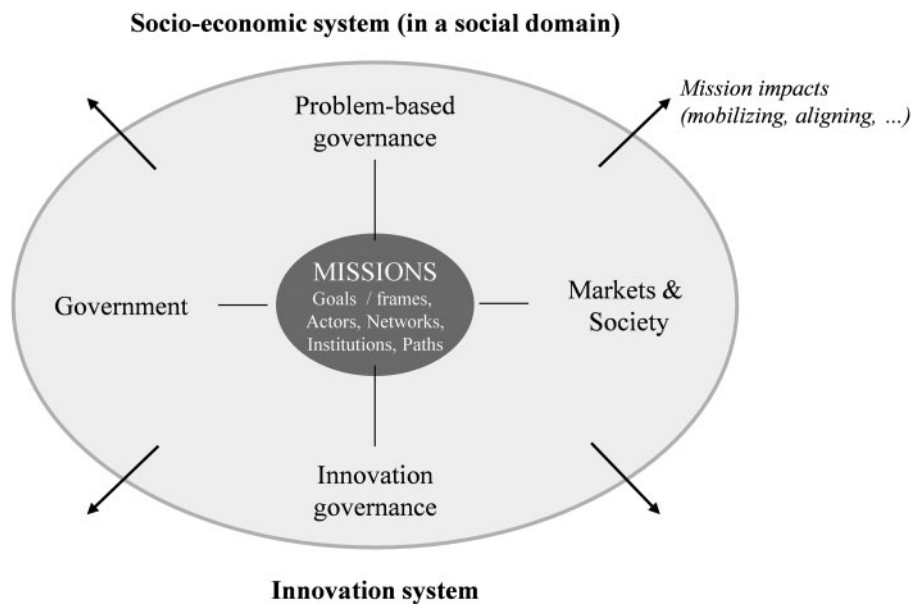


Figure 1. Schematic representation of our perspective, reflecting the embedded and evolving nature of missions, engendering changes in socio-economic and innovation systems.

Table 1. Overview of premises and research questions for advancing the empirical work on MIP

Topic	Premises	Research questions for an empirical research agenda
Inclusive mission governance	<ul style="list-style-type: none"> Inclusion is not merely necessary for legitimising missions vis-a-vis other stakeholders, but essential for genuinely addressing the underlying challenge and harnessing the capacity and resources from various groups. 	<ul style="list-style-type: none"> How can governance arrangements best create opportunities for participation and representation of the diverse parties affected? To what effect do missions mobilise and coordinate these actors to address particular challenges? Which governance structures are ultimately successful in supporting transdisciplinary arrangements, solution development, and adoption?
Progressive mission politics	<ul style="list-style-type: none"> Missions are inherently political and need to be addressed as such; Attempts to frame missions as merely technocratic exercises are likely to spur controversies and resistance that ultimately undermine their aims. 	<ul style="list-style-type: none"> Which forms of leadership contribute to more progressive mission politics in missions (i.e. politics responsive to new insights), and which undermine it? How to balance different interests without being paralyzed by continuous negotiations or entrenched controversies? In which political circumstances (e.g. amidst a controversy) are missions an (in)appropriate means for problem prioritisation or and solution direction?
Generative mission environment	<ul style="list-style-type: none"> MIPs do not operate in isolation and depend on interacting and mobilising a wider environment; Addressing the mission but neglecting the environment is insufficient to spur changes and likely to lead to failures. 	<ul style="list-style-type: none"> How can MIPs effectively enact and reconfigure existing innovation system structures to generate mission-relevant innovation outputs? How do the formulation and the legitimacy of a mission statement influence the commitment of stakeholders? How to balance between opening new pathways (exploration) and advancing in particular directions (exploitation) when pursuing a mission?
Systemic mission impacts	<ul style="list-style-type: none"> MIPs effectiveness depends on engendering new dynamics in either socio-economic and innovation systems 	<ul style="list-style-type: none"> In what ways do missions impact upon socio-economic and innovation systems? Under which circumstances are missions (in)effective? What assessment tools and approaches are most adequate for observing the dynamics that are activated and catalysed by missions? How to clarify MIPs' often implicit theories of change, and how to trace the connections between 'higher order' objectives (meeting ambition levels) and intermediary mission outcomes?

groups like societal organisations can affect the course of a mission as it unfolds (e.g. moving it more towards reducing and refusing consumption), with feedbacks on the problem-solving legitimacy of the respective spheres. Once a government has launched a mission statement it might also adjust or launch other interventions featuring in the relevant policy mix.

4.4 Impacts of missions

Finally, given that missions operate in such complex environments, and address societal issues that are often ill-defined or poorly understood, establishing the impact of missions is not trivial (Amanatidou et al. 2014). For understanding the systemic impact of missions it is crucial to get an insight in how they feature in the wider set of objectives on which the four types of governance are impacting (see Figure 1). Moreover, more clarity is needed about the theory of change upon which missions stand—that is the logical framework of the relationship of problems, desired goals, inputs, outputs, and outcomes but also conditions. This requires embracing the uncertainty and ambiguity associated with acting in complex systems, and adopting an evaluative mindset in the conduct of missions, gradually testing, and validating or revising their underpinning assumptions. As we highlighted, these are dynamic engagements, whose conduct is adaptive, iterative, and responsive to changing circumstances.

Even if the headline goals remain unchanged, how they are interpreted, structured into intermediary goals, and evaluated is often up for (re)negotiation.

This view on impacts opens many questions regarding the appropriate means for evaluating, monitoring, and reporting required by missions, as well as a better evidence over the effectiveness of particular types of missions in different contexts. For instance, in the Dutch MIP strategy (EZK/Dutch Ministry of Economic Affairs and Climate Policy, 2020), it seems disproportionate to base evaluations entirely on the extent mission goals are achieved—at least as long as the appointed 'mission teams' are primarily concerned with networking and agenda-setting, without having a mandate over substantial funding streams. The view presented here foregrounds the need to develop reflexive and formative evaluation approaches for assessing and adapting the ways missions relate to systemic transformation (Molas-Gallart et al. 2020), for instance, by adhering to a functional perspective on system changes (Ghazinoory et al. 2020; Hekkert et al. 2020).

5. Conclusion and further research

The increasing interest for MIP as a policy strategy demands a more refined and actionable understanding of how, when, and under which circumstances missions may actually help address societal

challenges. For this purpose, we stressed the importance of examining missions as a narrative for challenge-oriented policies, as a rationale for directional policies engendering change, and as a coordination mechanism for governing distributed innovation efforts. The perspective we sketch here, highlighting missions as evolving and embedded, serves to deepen the debate on MIPs by reconsidering its underlying premises. Table 1 outlines these premises and articulates reflective and operational questions emerging from our discussion and from the ongoing debate, with the intention of spurring the much-needed empirical investigation into how missions are unfolding. That list is provisory, as researchers and policymakers continue searching for ways to respond to and concretise the promises of missions.

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