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Position paper
'Mission-oriented innovation policy observatory'

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This paper describes the purpose and activities of the Copernicus Institute of Sustainable Development's Mission-oriented Innovation Policy Observatory (MIPO). Missions may be regarded as a narrative for challenge-oriented policies, as a rationale for directional policies engendering change, and as an instrument for governing distributed innovation efforts. While the popularity of missions is rising, there are still many questions and tensions regarding both the governance and instrumentation of missions as well as the (adverse) effects they might have on innovation and societal challenges. More theoretical and empirical grounding is needed to understand when and under which circumstances missions can be effective. The MIPO aims to develop an open access knowledge base on the different aspects of mission policy processes and to create a dialogue amongst researchers, policy makers and societal stakeholders to foster knowledge exchange.

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1. Introduction

Around the world, governments are increasingly concerned with tackling grand societal challenges and implementing the sustainable development goals. Although policies aimed at encouraging technological innovation might be helpful in this respect, there often is also a need for additional policies that together transform the socio-technical systems of production and consumption.[1] **Addressing multi-dimensional change processes places new demands on governments**, which sparked the search for new instruments, approaches and rationales of innovation policy.[2,3,4,5,6]

One approach to orchestrate transformative change concerns *mission-oriented innovation policy* (MIP).[7] In line with Wanzenböck et al. (2020, p.3) we perceive of a 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 European Union's lead, policy makers in various countries have started to set ambitious objectives for topics like affordable health, traffic safety, usage of renewable energy sources, and pollution reduction.[8] These missions use specific objectives to exercise a demand pull force on public and private innovation activities, thus directing and intensifying investments in research, development and demonstration. Such policies may also serve to adapt soft and hard institutions relevant for the viability of promising innovative solutions. The appeal of missions is reinforced by the perceived potential to also spur economic competitiveness.[9]

As MIPs gained momentum as a response to grand societal challenges, innovation scholars have begun to regard them as part of a new generation of innovation policies with the explicit aim of bringing about transformative change.[10,11] However, **the ensuing debate has remained narrow and has yet to scrutinise and substantiate the narratives, promises and practices which underpin missions**. The rapid uptake of MIP by policymakers creates its own challenges, as the inherent tensions of missions need to be considered carefully (see Section 3). It is therefore urgent to address both the conceptual foundations and developing more discerning and reflexive practice in the formulation, conduct and evaluation of missions.

To address these needs, the Copernicus Institute of Sustainable Development at Utrecht University has launched the *Mission-oriented Innovation Policy Observatory (MIPO)*. The core aim of the MIPO is to **promote a critical, empirically informed dialogue with researchers, policy makers and societal stakeholders, in order to spur the development and exchange of knowledge on how missions can be effective**. It sets itself apart from other initiatives by studying missions in their full complexity, variety, evolving shape and degrees of effectivity.

The present document sets the scene for co-creating the observatory's core activities. First it discusses the state of the field and the need for an observatory (Section 2). After describing the different aspects of missions and what tensions they might bring about (Section 3), we introduce our views on how to study them effectively (Section 4). On this basis, we describe the MIPO's initial activities and way of working, as well as the critical debates and demands the observatory may contribute to (Section 5).

2. State of the field

The promises of missions

Recent debates around missions present them as potential policy responses to ongoing societal challenges.[12] Using missions to spark innovation is not new, but the demand they evoke to contribute to complex societal challenges is.[13,14,15] What stands out in the current discourse on missions is the belief that they provide a means to unite actors and innovation activities around a common goal. Contrary to the missions policy makers have pursued earlier, via the machineries of their own governmental bodies, current-day societal missions are supposed to **engage diverse sets of organizations and stakeholders in both the development as well as the adoption of new ways of production, distribution and consumption**.[16]

The concept of a mission lends itself to drive such transformations in various ways, including targeted techno-scientific development as well as empowering societal stakeholders to articulate their needs and use their inventiveness.[8] 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&D utilizes a 'mission-oriented research and innovation' approach to spur multidisciplinary and cross-sectoral research on the concrete problems constituting a mission.[7,16] Linking up with an economic development perspective, missions may inspire new 'smart specialisation approaches' to regional policy in search of promising diversification paths.[17,18] Alternatively, coming from a focus on diffusion, missions offer possibilities to elicit innovative and need-specific solutions via public procurement, testbeds, or even instruments outside the scope of science, technology and innovation.[12,19] 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 wellbeing.[15,20] In this way, missions might trigger (and be triggered by) actors not commonly involved in innovation systems – possibly also affecting the nature and impact of effectuated changes.

In a nutshell, **missions matter because of the promise of engendering dynamics of mobilisation (of resources, people and institutions), innovation and deployment, which are otherwise unachievable, uncoordinated or too slow.** The possibility of inducing various forms of innovation or structural change, in a short period of time, is likely to be highly relevant for policy makers in different domains.

Shortcomings in the debate

A vibrant debate around MIP has emerged in both the academic and policy arena.[9,21] Nevertheless, the nascent debate falls short in explaining which mission formulation, mission designs, governance structures and monitoring approaches are appropriate for ensuring missions achieve envisaged results. Moreover, the empirical basis of many of the claims made about missions is still narrow, with few studies covering the whole 'life-cycle' of a mission.

Another shortcoming of the current debate is its **narrow focus on initiating new missions** (and its early stages). There is a neglect of how the suitability of these approaches varies depending on the context, and on which priorities are implicit to the mission approach (e.g. accelerating technological change or prioritising innovation for societal challenges).[8] This is surprising, as the same literature acknowledges the uniqueness of missions.[9] The debate has too often focused on the choice of policy instruments for steering market parties, overlooking

the role of the government in managing the mission beyond these marked instruments.[13,22] Moreover, the preference for initiating new missions ignores the accumulated experience regarding many pre-existing and analogous policies, such as Green Deals, and the complex social and political issues they bring to surface.

In addition, as with any new policy theme, policy makers might be simply 'relabelling' traditional policies[23], with **no consistent view on how missions are conducted or evaluated**. While it may be possible to use missions to redirect existing policies, it is likely that complementary policy interventions (or policy mixes) could increase the chances of success. The innovation systems and transitions literature could provide useful leads about what such interventions could be, given their focus on optimizing and transforming systems to create new solutions.[24]

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 views on why and how (through which mechanisms) missions may contribute to transformations**, and how this relates to already present (innovation) policies.[11] 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**[25,26], and **what capabilities come into play when deploying missions**. 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.[14] It might also be overly optimistic to assume missions can readily tap into innovation as an answer for challenges, as science, technology and innovations systems may not always be prepared, available or aligned with new challenges – the **structural foundations for missions to succeed may be missing**.

Finally, from an institutional perspective, missions may create tensions with the existing rationales and routines of government and industries, still geared to economic growth and longstanding sectoral imperatives.[22] This raises a series of issues concerning the **politics of mission-oriented policy as a response to societal challenges**. How missions frame these challenges, foregrounding particular issues while deemphasising others, is a fundamental political matter, involving collectively binding decisions which shape not only the allocation of public funds, but also the mobilisation of societal efforts. While these efforts might present welcome contributions to the search for solutions, they might also reflect vested interests. Tensions thus emerge as the outcome of contestation regarding the ambition, direction and capacities, of the state and beyond. Proponents of missions need to acknowledge that democracies currently face growing unwariness towards technocratic responses and in many cases an ideological polarisation or friction regarding particular 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 which particular tensions might be encountered, and to propose new ways forward when it comes to examining how missions are performing, how they may be better conducted, and whether they are in effect transformative and for whom. It is to these challenges that the MIPO hopes to contribute.

3. What is a mission?

Before elaborating our view on how missions (might) work, it is important to be clear on what a mission really is. As our brief review of the state of the field has shown, there is still unclarity and controversy on this matter. Nevertheless, some key characteristics stand out. Current thinking on challenge-based innovation missions generally focuses on features of the challenge they address, as well as the actions through which the completion of the mission is pursued.[15]

The challenges missions respond to

- **Structural uncertainty and contestation:** The present generation of challenge-based innovation missions is characterized by the ill-understood nature of the problems they address, which invites for the exploration of new innovative solutions outside conventional practice and markets. Such *wicked* challenges, in which even the severity and framing of the problem are contested, mean there are no roadmaps with satisfying answers; they require deliberation of societal values and open search for new solution directions.[1,20,20]
- **Complexity and the need for comprehensiveness:** The key reason for challenges to be seemingly intractable are the interdependencies in the technical and/or socio-economic systems in which they present themselves. Co-evolving trajectories of innovation, production, consumption and policy making might result in intricately interconnected and consequently inert regimes, resistant against change. The challenge of reducing environmental suffering from plastic packaging waste, for instance, might require changes across various industries (production, logistics, retail), policy domains (food, mobility, water management, economy), geographical levels (international regulation, local experiments) and stakeholder types (also including citizen's own recycling behaviour). These interdependencies between fields could inhibit transformation or even create adverse effects.
- **Urgency:** Missions are typically aimed at addressing prominent challenges a society is struggling with. Urgency might stem from the inadequate responses to a seemingly intractable and escalating problem (such as climate change), but also from emerging issues caused by e.g. the rapid spread of potentially disruptive technologies.[a] Urgency is one of the reasons why wicked problems may become 'super wicked' problems.[27]

Principles for managing a mission

- **Setting specific, ambitious goals:** To address urgent problems in pertinent domains, missions often seek to elicit a leap in a society's performance. Slogans like 'thinking big' and 'blue sky thinking' reflect intentions to substantially alter the way a certain challenge would normally be dealt with. They express a sense of possibility and creativity, beyond the usual. A mission can be ambitious both in the objectives it pursues (how much it is 'raising the bar') as well as in the unconventional ways used to meet its objectives.[12] For maximizing a mission's potential to activate efforts contributing to the final objective, it might help if the goal is specific in magnitude and in time (i.e. specifying when what level of improvement needs to be achieved).[9]

[a] Thus, when defining missions as a policy response to societal challenges, a mission on artificial intelligence (AI) or biotechnology would primarily aim to manage any undesirable ethical, social, environmental and economic aspects of their diffusion. If the objective of a policy is to spur rather than control AI or biotech, it would probably demand a support programme rather than a mission. Of course, missions focused on a challenge like reducing industrial pollution might in fact turn out to benefit from solutions based on AI or biotechnology.

- **Providing directionality:** Overcoming the inertia stemming from a challenge's complexity requires change in social, economic and technical structures and deviation from current pathways of development.[28] The primary means of missions to align innovative efforts, geared towards creating momentum and developing complementary (partial) solutions, is by providing directionality regarding prioritized problems.[29] Such directionality allows organizations to reconsider their actions and investments in light of the prioritized goal, thereby anticipating on how their own environment will change its course. Ideally, providing directionality leads to the emergence of newly configured structures of production, consumption and institutions, which will in turn be resistant against forces that might prevent the new system from achieving its desired performance.
- **Involving stakeholders:** To legitimize mission formulation and enactment, broad stakeholder support is needed. Involving different stakeholders early on in the policy process is argued to create co-ownership of the problem, valuable viewpoints, legitimacy for the directionality the mission provides, and commitment to enacting the mission.[7] By resolving stakeholder contestation at the early stage of mission formulation, mission execution may be facilitated later on.[20]
- **Adjusting incentives**: In order to obtain commitment from stakeholders in developing, producing and adopting innovative solutions that help overcome the problem at hand, adequate incentive schemes need to be developed. It is well known that radically new technical solutions to societal problems cannot compete in their early stages of development, with the existing products and services that cause societal problems but often have enjoyed decades of cumulative, stepwise improvements. This justifies policy support that supports these innovations, penalizes the use of problematic existing products and services, or preferably, a combination of both.[30]
- **Coordinating policies:** A failure often hampering transition processes, and possibly also the successful implementation of MIPs, concerns coordination of policies.[2] Geographical policy coordination is required, as missions are not only set at the European level but also at the national and municipal or regional level.[6] Ideally these missions are well aligned, and supportive policy instruments are complementary. As missions involve innovations and behavioural changes, research, technology and innovation policies need also to be in line with sectoral (e.g. transport, health, food) policies, be it structural or temporally. In addition to such horizontal coordination, vertical integration between ministries and implementing agencies is important to prevent operational implementation diverging from strategic intensions (Weber & Rohracher, 2012, p.1045).
- **Evaluating in new ways:** Following the logic of transitions, missions aiming to overcome wicked societal challenges cannot be expected to yield quick, efficient and linear progress towards completing the mission. First, new networks need to be formed, institutional structures developed, societal problems need to be better understood, new technological and behavioural solutions need to be explored and consequently developed as non-linear learning curves set in. In other words, an innovation system around the mission needs to be developed.[11] This takes time and requires novel ways of evaluating, e.g. focusing on the emergence of such a system instead of the hard gains in overcoming the societal problem (like emission reductions). Focusing directly on those hard gains could favour short-term solutions that may reinforce lock-in on existing socio-technical trajectories.

The table below summarizes the identified key features. Based on our literature review and ongoing interactions with policy makers involved in developing missions, we also list some of the most remarkable implications, challenges and tensions associated with each of the key features. Despite their rising popularity, it is still far from clear how missions can best deal with the dilemmas and controversies they might spark.

Table 1: Properties of the challenges missions respond to (1-3), and the principles for managing missions (4-9).

	Description	Tensions (non-exhaustive)
1. Uncertainty and contestation	Wicked societal challenges are characterized by uncertainties on both the nature of the problem and the nature of solutions. Framing the problem is itself contested.	Problem-side tension arises when moving quickly without fully understanding the problem or without dealing with contesting stakeholders, vs. moving deliberately (with broad stakeholder support) but too slowly after fully understanding problem.
		Solution-side tension arises from uncertainty about which solution works best in the long run, and which one maximizes effectivity over the short and long term combined.
2. Complexity and comprehensiveness	Complexity stems from interdependencies in the technical and/or socio-economic systems in which problems reside. This asks for 'leaps' involving changes in many system elements.	When developing solutions encompassing all relevant systems and fields, there is a tension between involving everyone versus making speed with just some parts of the system. The latter might ask for leadership and strong mandates, but can conflict with democratic principles (as probably not all interests can be aligned).
3. Urgency	Quick escalation of intractable problem (e.g. climate change) or rapid technological disruption, putting pressure on a society's core values.	When problems are increasingly urgent one might revert to known but unsatisfactory responses (possibly reinforcing lock-ins), rather than opening up costly and time-consuming exploration of more structural solutions.
4. Setting specific ambitious goals	Missions need to be ambitious and specific in terms of goals (levels and timing) to generate mobilization and societal legitimacy	Tension arises between setting ambitious targets vs. realistic and feasible targets. Innovation goals focused on spurring novelty might conflict with diffusion goals focused on spurring widespread adoption.
5. Providing directionality	Missions need to coordinate and align innovative efforts by providing directionality regarding prioritized problems; this can create momentum and spur the development and adoption of complementary solutions.	Tension arises in providing strong directionality towards meeting the end-goal but selecting out unforeseen solutions or ones that could help you get there, vs. providing weak directionality but keeping open to all possible solutions.
6. Involving stakeholders	Missions need to engage stakeholders in innovation processes like mobilizing resources, developing and sharing new knowledge, building production capacity, using the innovations and adopting new behaviours.	Apart from the tension related to involving many stakeholders (causing cumbersome processes and lack of consensus), there is a tension that powerful incumbents or industry associations could either provide essential support to or block particular solutions.
7. Adjusting incentives	Incentive schemes should favour desirable solutions and behaviours, and penalize undesirable alternatives.	Incentive schemes (dis)advantages the use of particular solutions can encounter the tension between market creation and unwarranted market disturbance due to excessive state support.
8. Coordinating policies	Missions and associated policy actions need to be aligned with policies in different societal domains and geographical levels.	Aligning policies is easier when there is a clear focus on promising solution paths, which is in tension with maintaining openness regarding new solution directions. Top-down implemented mission strategies might meet resistance when assigning priorities to other policy domains or regions.
9. Evaluating in new ways	Monitoring and evaluation frameworks for assessing and reorienting missions should capture the actual changes missions and policy actions strive for, and bring about.	Accountability-oriented evaluations might be add odds with assessments focused on learning how missions can be improved. The use of specific key performance indicators is in tension with an adaptive policy approach aimed at mobilizing resources and activities best fitted to problems currently at hand.

4. When is a mission effective?

The identification of key features of missions helps to set the boundaries of the object which we aim to follow in our observatory. However, in order to advance the debate, we propose to look past these characteristics, and investigate in practice what affordances are made possible through these processes. Rather than sticking to the essentialist view on 'what are missions?', we propose to consider also the question 'when are missions?'. That is, when and under which circumstances are particular policy initiatives effective in engendering the dynamics of change (in the form of mobilisation, activation, coordination, etc.) which they seek to unleash?

From a first approximation **we understand missions as policy-led attempts to engage a (wide) spectrum of stakeholders around a particular goal, with the objective of activating and/or catalysing these stakeholders' (innovative) activity in service of that goal**.[11] The acts of formulating and pursuing a mission is sensed to instigate directionality, as it prioritizes problems and possibly also solution directions. Setting such objects of directionality is supposed to reinforce coordination across policy and practice fields. When operating in this way, missions should allow policy makers from different governance levels (e.g. regional, national, supranational) as well as broad ranges of e.g. firms, knowledge institutes and societal organizations to align their activities. As we know from literatures on system building[31], strategic niche management[32] and small wins[33], this involves activating dynamics of collaboration, knowledge creation, innovation, and institutional change otherwise unachievable. For a lack of a comprehensive set of dynamics relevant for missions, we call them '*mission impacts'* for the time being. Through such first order impacts, missions should mobilize resources and synergies not emerging from the natural way system actors and structures interact. 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.

Each of the points in this approximation can be implemented in diverse ways, creating a diverse set of permutations and parameters for designing and conducting missions. This begs many questions such as who is setting missions, how wide is the network of stakeholders involved in engendered dynamics, how inclusive must it be, how specific is the goal set, how is it timed? We understand that these questions cannot be answered a priori, and are not static, but are rather an emergent, negotiated outcome of the process of formulating and conducting missions. Nevertheless, more clarity is needed, upon mission formulation, and about the theory of change (logical framework of problems, inputs, outputs and outcomes) upon which they stand.

Here, we propose missions should be understood as embedded in and in tension with the structures of the science, technology and innovation systems and different systems of provision (production-consumption). **Missions emerge as a negotiated outcome between different interests, concerns and imperatives.** This implies that they are neither apolitical in their formulation, nor neutral in their conduct, and requests a better **understanding of the politics of missions.** Moreover, they are not fixed but rather dynamic engagements, whose conduct is (desirably) 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. In this respect, it should be noted that

missions interact with other approaches, structures and policies in complex ways, which may undermine their execution and have negative consequences elsewhere. Missions always address challenges partially, engaging some systems and sectors and publics but not others, and therefore always exclude particular paths, possibilities and concerns. How this partiality is negotiated, and who decides, is a critical feature worthy of scrutiny and transparent debate.

Preliminary framework for the analysis of missions

Why a mission is brought forward, how it is carried out, by whom and for whom are essential questions for any constructive analysis and reflexive practice. Building on the interpretation sketched above, we provide the elements of a preliminary framework for conducting analyses that might support practitioners in developing, pursuing and monitoring missions.[b]

Interacting governance spheres

As represented in Figure 1 we understand missions as positioned at the interface of two systems, that might both create change as well as be subjected to change.[34] 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 mobilized for solving that challenge. While the socio-economic system entails the overall set of technologies, infrastructures, behaviours and values relevant for production and consumption patterns in a social domain, the innovation system consists of the actors and structures relevant for developing new knowledge and ideas and applying them in novel products, processes and services. Linking activities in both these systems, missions are the product of interactions between four governance spheres (depicted within the oval in figure 1).

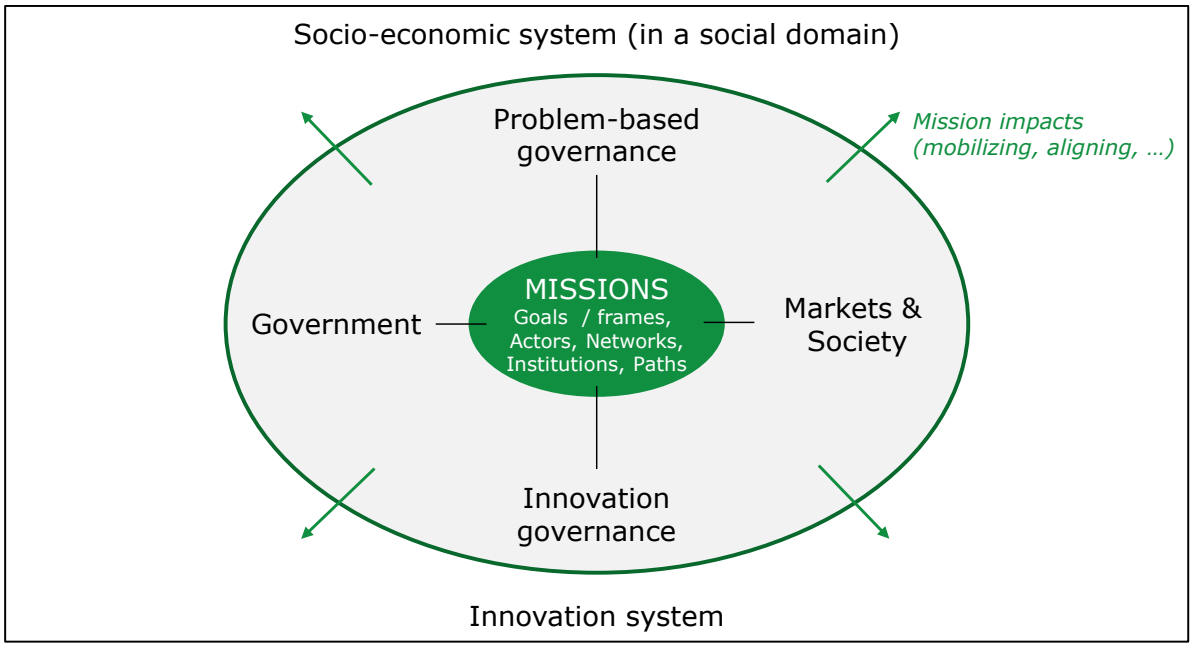

Figure 1: Outlines of a preliminary framework; the dynamics through which missions engender changes in socio-technical and innovation systems are subjected to the governance structures that affect (and are affected by) a mission's nature.

[b] The framework described draws some inspiration on Penna and Geels' (2012) view of how industry responds to grand societal challenges, whilst being embedded in multiple environments at once (e.g. industry, economy, politics).[34] Our adaptation of this view to missions for engaging actors and transforming systems draws on literature on governance in decentralised systems,[35] combined with perspectives on how transformative policies connect innovation policy to governance of socio-technical systems[26]. Finally, we build on evolutionary governance theory to reflect how different relevant governance spheres might continuously influence various key characteristics of the impulses through which missions generate impacts.[37]

On the upper side of the circle we find ***problem-based governance*, which encompasses the various efforts focused at directly adapting socio-economic systems dealing with the societal challenge**. This includes both efforts such as the United Nation's initiative to establish Sustainable Development Goals, but also the wide range of policies, civil society initiatives and business initiatives, and how they are governed. We hypothesise that the extent to which policy initiatives take into account and can catalyse the state of play in this domain is strongly correlated with the likelihood of achieving their goals, and that in such situations missions are less likely to engender considerable resistance.

Missions are also in dialogue and tension with the **structures and arrangements involved in innovation governance, which impact upon the rate, direction and quality of activities in the innovation system**. Again, this involves policies (e.g. for public and private R&D, knowledge transfer, entrepreneurship) as well as other stakeholder's own or joint initiatives for influencing what new products, services, etc. emerge from the innovation system. These initiatives could include, for instance, the innovation roadmaps of industry associations or the focus areas of a regional development boards. Most missions presuppose the possibility of activating and mobilising this sphere, 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 governance arrangements. First, the **government itself, which might take the lead in prioritizing problems and setting performance goals, but which also often has other competing priorities and internal complexity**. Second, **markets and/or civil society at large, which may have substantial influence on which priorities are being pursued (and how)**. Exemplary are the climate protests witnessed in many countries over the past few years, asking for more stringent regulations and forward-looking policy initiatives, or the protests challenging climate-related taxation. The horizontal axis in Figure 1 thus reflects tensions and dialogues that take place between inside-out governance led by policy makers and politicians alone, and outside-in governance responsive to the perspectives of other stakeholders.[35]

In our view, **missions are understood as emerging from and interacting with the interests, demands and structures of these four governance spheres**. Missions form a link between problem-based governance focused on solving societal challenges and innovation governance steering the development and deployment of novelty; the scope and performativity of missions is subjected and has to navigate the demands of both governmental institutions and the socio-economic context. In this sense**, they are not a static, predetermined and closed-off instrument, but a series of engagements that have to be maintained and built on**.

The provided representation aims to show that different rationales for (and nature of) MIPs are articulated by distinct governance spheres. A government-led mission targeted primarily at guiding the innovation system might lean on implementing R&D programs, whereas market/society-led governance would probably rely more on setting up local large scale experiments harnessing innovative practices from a wider basis of participation.[36] Similarly, green-deal-like arrangements might originate from missions pressured by the right-upper corner of Figure 1, in contrast to sustainability-enhancing fiscal support schemes stemming from influences originating in the left-upper corner. Ultimately, by impinging on the formulation and deployment of MIPs, the governance forces bearing on a mission influence the dynamics through which it effects changes in socio-economic and innovation systems.

Depending on what type of governance is more dominant at a certain point in time, the four spheres can 'pull' the missions more towards their corner. For example, although a given mission might originate from a government's ambition to transform production-consumption patterns and institutions relevant for fighting obesity, actor groups like industry associations or societal organisations can affect the course of a mission as it unfolds. Moreover, having a mission in place will in turn also feed back on what happens in the respective spheres. Once a government has launched a mission it might also adjust other interventions featuring in the relevant policy mix (for e.g. reducing obesity) - or even the way it is governing seemingly distinct policy issues. Again, **for understanding the overall 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**.

Substantive actions and their characteristics

The only part of the framework in Figure 1 not discussed so far is the content of the 'missions'-box right in the middle. Recognizing that missions are more than just a clear goal, the box is to be seen as a container of *substantive actions* in which the mission is embodied.

One such substantive action, and perhaps the most visible one, is the public announcement of a mission, captured in for instance a strategic document and a letter to parliament. The documents will perhaps not describe literally from which governance pressures it has emerged, but they are likely to provide information on the motivation for the mission, the scope, the actors that involved in formulating the mission, the networks participating in bringing about desired changes, and the solution directions that are deemed promising in this respect. A mission sorts effect when its creation is followed by subsequent substantive actions, from a variety of actors, which can e.g. be strategies, policies, events or investments lining up with the mission. In fact, it could even be the case that the impact of a mission is also depending on substantive actions preceding its launch, like public engagement practices or strategic agendas (including the ones of a problem-owning governmental body itself) feeding the mission formulation.

Substantive actions may be regarded as the means through which a mission impacts upon socio-technical and innovation systems. Just like the way a mission is formulated carries a certain framing and scope, also the substantive actions it spawns possess characteristics that determine their mobilization potential. Drawing inspiration from evolutionary governance theory[37], a substantive action can be considered as a configuration of dimensions like the scope and framing (legitimization) of the goals, the actors that are supporting it, the power and knowledge sources that dominate the directionality and intensity of impacts, the path dependencies that determine their scope, the new paths they are creating, and the governance models that are in place. Rather than being independent from each other, these dimensions are strongly interlinked; for instance, which actors are dominating a substantive action (and according to what governance arrangement) is likely to influence how it is framed and which paths are considered as legitimate and viable. Because missions are always embedded in a landscape of diverse interests, the configuration of a particular substantive action might change over time. While some actions are always primarily managed and framed by a certain actor (group), actions like innovation or lobbying agendas can evolve with the proceeding of a mission or a turn in the societal debate.

As a mission's substantive actions result from the interplay between distinct governance spheres, it is unlikely that they all share an identical and static configuration. Regarding missions as aggregates of interacting actions implies that categorizing missions into archetypical categories has only limited relevance for analytical purposes. Instead, more is to be learned from studying **the content and coherence of the various substantive actions through which a mission is building its momentum**.

Based on the above, our preliminary approach for analysing a mission consists of monitoring, for various phases in its lifetime, how exactly its current configuration is linked to the 'mission impacts' it intends and manages to activate. Using a structured approach for characterizing the ensemble of actions underlying a mission is an essential first step towards further examination of how missions may fulfil their potential.

5. Ways forward and intended activities

Now that policy makers at different levels, in different countries and policy domains have started to launch MIPs, time has come to develop a more refined, actionable understanding of how, when and under which circumstances missions may actually help address societal challenges. This is what MIPO sets out to do in the coming years.

Premises of our observatory

Responding to the identified issues in the existing scholarly debate, the MIPO aims **to go beyond narrow conceptualisations of what missions are and how they operate**. This implies that the label 'mission' should not be taken face-value. A large number of incongruent activities have received this label, many of which are conventional programmes which might perhaps achieve nothing different. At the same time, other forms of policy change achieve much of what missions are supposed to do, but are neglected because they lack the label. In the MIPO we are particularly interested in missions geared towards addressing specific societal challenges, of widespread relevance, which require a deviation from current paths of development. However, we understand missions as only a part of efforts to induce transformations and respond to societal challenges. Whether and how missions contribute to transformative governance (combining problem-based governance and innovation governance) is an open question requiring empirical, conceptual and transdisciplinary work.

Our academic work builds on innovation studies, transitions studies and environmental governance to develop a perspective that is distinct from the more 'economics of innovation'-oriented mission approaches to investment-led growth (cf. Mazzucato, 2018[9]) or the policy planning approach to societal problems (cf. Newman & Head, 2017[38]). Yet, we remain open to other ways of approaching this subject. We will follow primarily missions with an explicit concern for inducing innovation (in its different forms, ranging from technological to behavioural innovation), but remain attentive to other approaches which may be relevant. **We examine missions as a narrative for challenge-oriented policies, as a rationale for directional policies engendering change, and as an instrument for governing distributed innovation efforts**.

Acting as an observatory we propose to study missions comparatively, considering how they are conceptualised, formulated and conducted, in different domains and contexts, thus developing a more refined and nuanced understanding of their potential. As the field is

changing rapidly, we deem it essential to engage continuously with stakeholders and other academics while monitoring particularly relevant mission initiatives.

Critical debates and demands to which we hope to contribute

As we have argued, MIPs can be formulated and carried out in radically different ways, with distinctive policy and political dynamics. Thus, from an analytical as well as practice-oriented perspective, we deem it fruitful to assess how missions vary in e.g. the agenda setting processes they result from, their scope, their logic, their adaptability, and the social legitimacy they do or do not enjoy. Our observatory hopes to contribute to scholarly debates and policy demands, addressing the following themes and questions:

- **Governance:** How do missions mobilise/coordinate multiple stakeholders in addressing particular challenges? How does this change over time, what path dependencies are holding back change, which new paths are being created, etc.

- **Narratives:** How are the narratives which underpin and legitimise mission-oriented innovation policy deployed, and how are they evolving? What frames and assumptions guide the development and uptake of MIP? How does the advent of missions change the narratives about the underlying challenges (e.g. inspiring optimism or 'solutionism')?

- **Policy rationales:** What policy rationales prompt the adoption of missions in different sectors and policy fields? Are these rationales aligned with the practical achievements in these fields? Is the rhetoric around missions put to practice, and how? How is the adoption of missions influencing the way policymakers approach certain challenges? Does the legitimization of policy action change due to mission approach?

- **Impact (assessment):** What types of dynamics missions seek to unleash? Under which circumstances are missions (in)effective instruments, and how is this affected by who is managing the mission? How well do formal indicators capture what the mission aims to achieve? How can the 'success' of missions be understood and evaluated, moving away from the traditional success/failure dichotomy? How to open up evaluation tools to more processual understanding of the dynamics that are activated and catalysed by missions? How to clarify MIP's often implicit theories of change and trace the connections between 'higher order' objectives (solving societal challenges) and intermediary outcomes of missions?

What we do

The Observatory will engage the various stakeholders directly involved in MIP, to develop the empirical and conceptual basis for characterizing, comparing and reviewing governance and policy arrangements organized around challenge-based innovation missions.

Characterizing missions and mission-oriented innovation policies, by understanding and differentiating the objectives and working mechanisms. Such characterization is based on analysis of the various dynamics through which missions are formed and in turn are affecting changes in socio-technical and innovation systems. The characterization would concern at least the following dimensions:

1. **Wickedness of the challenge**, and how the challenges/solutions are understood and prioritized;
2. **Mission design**, including:
    - Theory of change, connecting rationale for interventions, intended effects and implicit mechanisms for change;
    - Scope, in geographical (local, national, supranational) and temporal terms;
    - Focus and emphasis: on technological vs institutional vs behavioural solutions; on transforming systems vs optimising them; on working with incumbents vs involving challengers;
3. **Mission governance**, including:
    - Decision making and participation processes used to prioritize and to select/legitimize solution directions;
    - Arrangements of responsibilities, accountability, and learning efforts (including use of indicators and learning activities);
4. **Mission conduct (incl. instrumentation) and evaluation**, concerning to what extent the design, governance and instrumentation are being put to use practically, in the pursuit of the theory of change.

Comparing different types of missions and MIPs, and their appropriateness for different types of challenges. Creating an evolving overview of how missions have been designed and how they are targeted allows for mapping variety (in scope, rationales, instruments, etc.), as well as for analysing the consistencies between the ways various mission dimensions have been designed. We hope to be able to recognize commonalities across missions and contexts, and to distinguish common mission features and challenges from idiosyncratic ones.

Reviewing policy adoption and effects: One the one hand, the reviewing consists of monitoring and analysing how 'missions thinking' is diffused and implemented within governments, and on the other, whether (and on what account) missions and MIPs yield observable changes. Besides developing and applying an assessment framework, part of the reviewing is also the identification of best practices as well as success and fail factors.

How we work

The observatory will first and foremost facilitate a dialogue between scholars and relevant stakeholders, following the principle of co-creation. The observatory engages in in-depth and comparative analysis of cases that are of relevance for practitioners dealing with governance or policy questions, whilst also asking critical questions that may be absent from policy debates. Thus, MIPO's activities depend on maintaining a close link between practice and theory, and working in close collaboration with other institutions in this domain. As from spring 2020, we are organizing various roundtables, workshops and webinars for researchers and policy makers to learn from each other's expertise, questions and experiences. The MIPO has a broad scope in terms of country, government-level and policy domain missions can pertain to, as long as they are currently active.

MIPO also serves to regroup researchers which are engaged in self-initiated as well as commissioned research projects, building on that portfolio of projects as its evidence based. Current projects concern theoretical explorations (e.g. on the problem-solution space and mission-pathways, or legitimacy and spillovers of different types of mission-oriented innovation policy) as well as case studies (e.g. on missions in the Dutch mission-driven Topsector Policy, on Vision Zero in Sweden, and on missions in relation to nuclear fusion or regional energy systems). Utrecht University is already one of the hotspots for this kind of research.

In the future the MIPO also aims to be agenda-setting, by initiating and structuring debates around vital policy issues encountered in interactions with practitioners. Set up as an experimental laboratory, more activities might be added later on (also depending on the interests of relevant stakeholders).

More information can be found at: www.uu.nl/en/research/copernicus-institute-of-sustainable-development/mission-oriented-innovation-policy-observatory

Who we are

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- **Dr. Joeri Wesseling** is assistant professor in innovation studies. His work focuses on sustainability transitions in the automotive, energy and energy-intensive processing industries, which he studies from an innovation systems perspective.
- **Dr. Jonas Colen Ladeia Torrens** is an inter- and transdisciplinary researcher working at the interface between innovation, sustainability and systemic change. His work is primarily associated with sustainability transitions but draws from urban studies, governance and innovation policy.
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- **Prof. dr. Koen Frenken** is professor in innovation studies. His interests include evolutionary economics, institutional sociology, complexity theory, economic geography, platform economy, innovation policy, and breakthrough innovation.
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