



Roadmapping and subnational involvement in mission-oriented policies

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Executive summary

As mission-oriented approaches are increasingly being put into practice and implemented internationally as well as in Germany, the question arises as to how the impact of these approaches can be enhanced. A key point – one that has received little attention to date – is the involvement of the subnational level in mission implementation. In the German context, this aspect has gained importance in light of the new federal government's commitment to develop a new "high-tech agenda for Germany with the involvement of the federal states." (own translation; CDU et al. 2025, p. 77).

This study examines this issue based on an analysis of a total of 23 good practice examples in international mission-oriented initiatives (including eight in-depth case studies of selected initiatives). In addition, the insights gained from the analysis were discussed in an international workshop with mission practitioners and academics. The analysis focuses on the following questions:

- What are suitable forms for involving subnational actors?
- How can missions be meaningfully formulated and designed in a multi-level system?
- What are suitable governance arrangements for implementing such missions?
- What contribution can roadmapping or similar processes make to coordination and consultation between different actors?

The analysis identified six different forms of subnational participation, ranging from rather limited involvement in the form of advisors to more decentralized forms of mission implementation in the form of co-creation, regional experimentation, or the development of place-specific subnational solutions. These different forms of participation follow different logics of action and objectives, showing substantial differences not only between countries, but even within individual strategies.

Even when using roadmapping elements (Gebert and Wächter 2024), differences can be seen in the extent of use and in the forms/timing of their integration. Clear goal formulations, measurable milestones/interim goals, the design of an accompanying monitoring/evaluation process, and a visual representation of development paths are common practice in many initiatives, whereas the analysis of catalysts and scenarios is much less common. While there is no clear picture with regard to the involvement of different stakeholder groups, involvement seems to take place particularly in the implementation phase, while participation in the formulation and design of the mission is less common.

The various case studies identified the following key factors influencing the design of the approaches.

- Institutional context and distribution of competences: While a decentralized state structure promotes subnational participation in missions, the decisive factor is ultimately the competences of the respective actors in the mission-relevant field.
- Existing political traditions and existing competences: The majority of initiatives are based on the gradual development of existing structures that have been adapted to the mission context. At the same time, external policy impulses (such as EU missions) can play an important role.
- Actor structures and resources: The available resources/mandates of the mission owner, but also of subnational actors, lead to different strategies for improving incentives. These include sharpening the mission focus and forms of stronger asymmetric participation in order to reduce mobilization and coordination costs.

Based on the analysis results, a number of recommendations for increased subnational participation are derived with regard to the German context:

- **How can subnational actors be involved?** Thanks to its federal structure with strong federal states, Germany has a high – as of yet untapped – potential for greater participation of regional actors, even in demanding cooperation formats. Greater subnational involvement can help to increase the effectiveness of mission implementation, overcome existing mobilization problems, and ensure the long-term stability of mission implementation.
- **What types of missions are suitable for missions with subnational participation?** The specific type of involvement at the subnational level is determined by the mission, its regulations, financing, and distribution of competencies. At the same time, greater synergy with existing EU strategies should be sought and the implementation of missions should be opened up to more differentiated participation opportunities that reflect the varying degrees of involvement/focus of different subnational actors. Possible examples of applications in this context could be regional development/structural change or digitalization.
- **How should the practical implementation of missions with subnational participation be designed?** Important building blocks here could include: more active and continuous involvement of subnational actors throughout the entire mission process, a more dynamic understanding of implementation with a portfolio-based mission approach and flexible forms of participation, and the targeted use of existing structures and networks for stakeholder mobilization.

This report is an English translation of a study conducted on behalf of the Stifterverband, that was published as:

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Available at: https://www.stifterverband.org/sites/default/files/2025-10/missionsorientierte_forschung-_und_innovationsstrategien.pdf

1 Introduction

Mission-oriented approaches have established themselves in the OECD world as a tool for advancing complex transformation processes. In Germany, too, missions have been defined as part of the High-Tech Strategy 2025 (*Hightech-Strategie 2025*) and the subsequent Future Strategy for Research and Innovation (*Zukunftsstrategie Forschung und Innovation*). Mission orientation represents a promising starting point for addressing highly complex, pressing challenges in a targeted manner. However, this policy innovation places considerable demands on formulation, design, and implementation (Lindner et al. 2021). In particular, the necessary coordination across departmental and sectoral boundaries poses serious challenges for stakeholders. Furthermore, the opportunities and conditions for coordinating mission-oriented policy between governance levels have hardly been addressed in the scientific debate to date. Yet it is precisely in federally organized political systems that it makes sense to closely involve the subnational level in the design and implementation of missions.

This awareness of the need for greater cooperation between the federal and state governments is also reflected in the current coalition agreement between the CDU/CSU (*Christlich Demokratische Union; Christlich-Soziale Union*) and SPD (*Sozialdemokratische Partei Deutschlands*). In this agreement, the coalition commits to a mission-oriented 'high-tech agenda for Germany with the involvement of the states' (CDU et al. 2025, p. 77). In doing so, the new federal government is going beyond previous practice, which has primarily understood mission orientation as an instrument of coordination between different federal ministries. Although so-called regional dialogues were already established as part of the High-Tech Strategy 2025 launched in 2018 to involve subnational actors, their impetus could not be translated into strategy formulations or further resources for mission implementation due to inconsistency and openness (Priebe et al. 2024).

Against the backdrop of the observed challenges—some of which are structurally anchored—in implementing mission-oriented policy in Germany (EFI 2024; Lindner et al. 2023) the question arises as to how the subnational level, and in particular the federal states, can be successfully integrated into the German context and what role roadmapping approaches (Gebert and Wächter 2024) can play:

- What are suitable forms for involving subnational actors?
- How can such missions be meaningfully formulated and designed in a multi-level system?
- What are suitable governance arrangements for implementing such missions?
- What contribution can roadmapping or similar processes make to coordination and consultation between different actors?

This research report addresses these issues as follows. After a basic clarification of terms and conceptualization of the implementation of mission-oriented policy in multi-level systems in Chapter 2, an analysis of good practice examples of mission-oriented initiatives from various European and non-European countries is provided (see Chapter 3 on the methodological approach). After a broad screening to understand the forms of cooperation and implementation formats, eight selected case studies are used to analyze which factors supported the design of the corresponding solutions and which facilitating or hindering factors need to be considered during implementation (Chapter 4). The results of the empirical analysis were also discussed and validated in a workshop with international experts on mission-oriented policy and representatives of selected initiatives.

Based on this empirical groundwork, Chapter 5 discusses the implications for the successful implementation of mission orientation in a multi-level system in the German institutional context. In particular, the following questions are addressed:

- What kind of subnational involvement in the implementation of missions is possible in the German context, and which forms are particularly suitable?
- Which types of missions are particularly suitable for subnational participation?
- What needs to be considered in the practical implementation of missions with subnational participation against the background of the specific framework conditions in Germany?

2 Mission orientation in multi-level systems

While the concept of mission orientation has its origins in national research and innovation policy, the role of different logics of action (top-down and bottom-up) has been part of the discussion from the outset. For instance, Mazzucato (2017) points to the interplay between top-down impulses and various bottom-up-driven experimental approaches. In practice, the concept of mission orientation has found its way into various levels of action and is currently being taken up at European, national, regional, and local levels.

Until now, mission-oriented approaches that aim for horizontal policy integration have dominated, such as improved coordination between different departments at the national level (e.g., the High-Tech Strategy 2025 or the Future Research and Innovation Strategy). Similarly, local or regional initiatives (such as the Greater Manchester Climate Mission or the Circular Flanders initiative) are increasingly being used to bring together various interest groups at the respective level and tackle problems jointly (Zenker et al. 2024).

However, given the complex structure of many societal challenges, the question of further **strengthening policy integration across different levels of political action** has become urgent (e.g., the EU mission 100 'Climate-Neutral and Smart Cities' by 2030). Many challenges cannot be addressed by a single level alone but rather depend on the interaction of different levels and their powers and resources. The involvement of subnational actors¹ and the associated vertical policy integration promise a number of advantages:

- **Legitimacy and concretization:** First, the involvement of the subnational level promises increased effectiveness of mission-oriented policy. Joint activities can send a clear signal about the necessity of a mission and thus strengthen its legitimacy if different levels of action join forces to tackle a problem together. At the same time, the involvement of subnational actors can help to translate abstract problems into concrete scopes for action, thereby making missions more tangible for all actors involved and anchoring them in their respective spatial contexts.
- **Resource and competence mobilization:** At the same time, the interaction of different levels can not only generate a 'critical' mass for implementation, but also potentially achieve far-reaching coverage of regulatory and executive competencies that address challenges in a holistic manner. This overcomes the problem of a multitude of missions in which the consolidation of identified solutions fails due to a lack of regulatory powers, for example (Zenker et al. 2024). Ideally, the interaction of different levels can also help to reduce conflicting incentives and funding gaps or remove obstacles to successful implementation.
- **Experimentation and learning:** Thirdly, the increased involvement of subnational actors also opens up the possibility of experimenting with different approaches. Depending on the context, different subnational actors can test and implement different approaches, thereby generating helpful insights for later upscaling at the national level as to which approaches might be suitable in which contexts or under which conditions.

At the same time, a number of obstacles can be identified that confront the already challenging approach of mission orientation (Lindner et al. 2021) with **further requirements**:

¹ In the following, we use "subnational" as a collective term for all territorial units below the national level. This term therefore encompasses regions/federal states (NUTS2/NUTS3 level) as well as municipalities/cities, districts, etc.

- **Increased coordination requirements:** Even horizontal coordination between individual ministries poses one of the major challenges of mission orientation in practice. Taking additional actors into account and increasing vertical policy integration increases the number of actors that need to be considered. This includes a potential increase in divergent interests, starting situations, and needs, as well as different rationales for action, routines, etc. This places additional demands on mission governance and requires additional capacities and resources from those responsible for the mission.
- **Stakeholder mobilization and involvement:** The involvement of actors from different institutional levels also raises the question of stakeholder mobilization. In practice, a 'STI trap' (Polt and Weber 2023) often arises, meaning that missions fail to have an impact beyond the rather narrow circle of research and innovation policy, as other actors do not recognize any ownership or shy away from conflicts of competence. Mobilizing stakeholders at different levels with different approaches to and understandings of roles therefore requires new approaches to involvement and coordination.
- **Different time horizons:** With the addition of further actors, the problem of different time horizons is also exacerbated. While the German High-Tech Strategy and the Future Strategy for Research and Innovation (BMBF 2019; 2023) aim to coordinate the federal ministries within the framework of a legislative period, greater involvement of subnational actors means that different (political) time horizons and dynamics come into play. The challenge of maintaining objectives beyond a single legislative period (EFI 2024) becomes even more important.
- **Asymmetric impact:** The involvement of subnational actors also means that they are affected to varying degrees by different problems, such as climate change. Furthermore, the effects of missions are not distributed evenly across its space. How can different interests be taken into account in this situation, and which stakeholders should be involved? In addition, differences in capacity can mean that some actors can only participate in implementation to a limited extent or, in the worst case, that existing contrasts are further exacerbated.

Although the increased focus on a **mission-oriented approach** offers **many advantages for regional actors**, such as improved mobilization of implementation competencies and resources, as well as the opportunity to promote agenda setting and the acquisition of competitive advantages through early positioning (Zenker et al. 2024), the question arises as to how meaningful cooperation between the national and regional/local levels can be achieved. How can the described challenges be addressed and mission orientation be implemented efficiently and purposefully in a multi-level system?

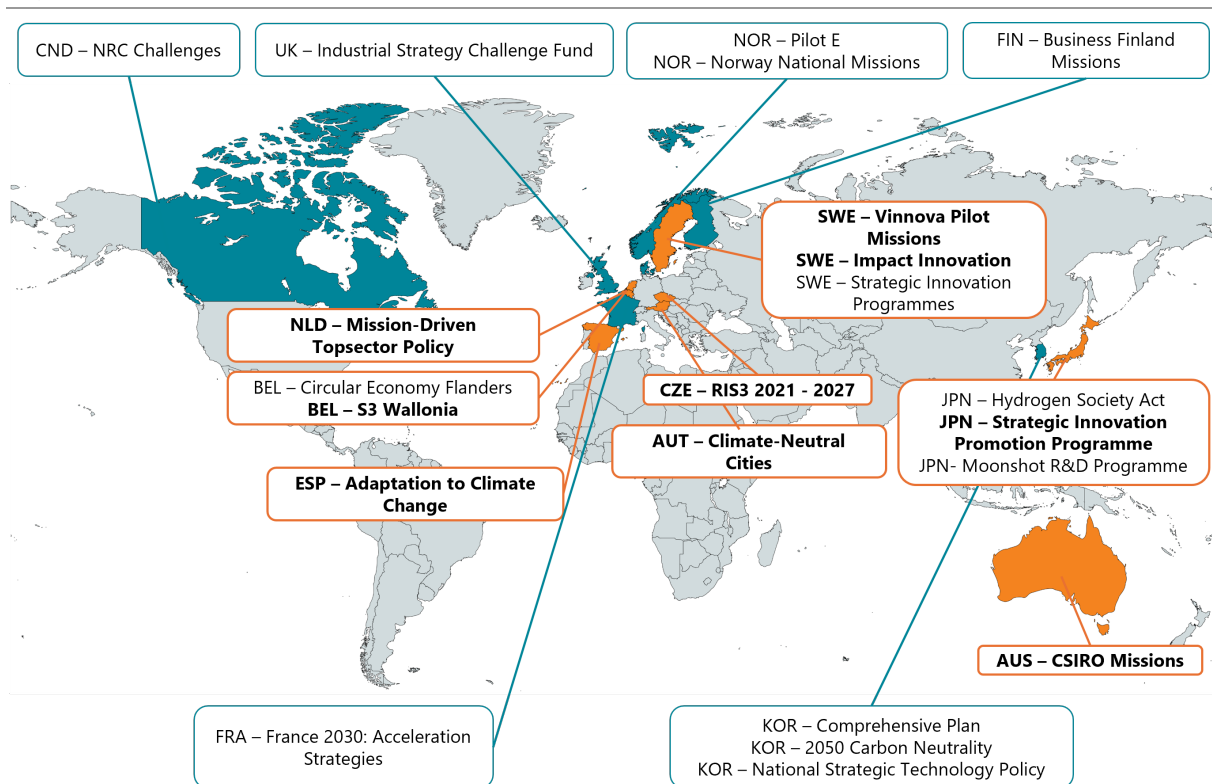
This report builds on an analysis of international practical experience with subnational participation and roadmapping processes and, based on this, develops recommendations for successful implementation by the federal government and, in particular, the states in the German context.

3 Methodological approach and data sources

3.1 Screening of relevant initiatives and in-depth country case studies

The basis for deriving recommendations for action in the German context is the analysis of selected case studies of mission-oriented policies from various European and non-European countries. As part of a **two-stage process**, a **broad inventory (screening)** was carried out, followed by an **in-depth case study analysis of selected initiatives from various countries** (figure 1). While in the first step, 23 examples of initiatives from 16 countries were reviewed and analyzed based on document analysis/desk research with regard to the research topic, a total of eight cases were in a second step selected from this sample for in-depth case studies. For each of these cases, one to three semi-structured expert interviews were conducted with mission managers and experts from the respective innovation system in order to shed light on the factors influencing the design and implementation of the respective missions.

Figure 1: Overview of initiatives



Source: Own elaboration

The selection of the considered cases follows a multi-stage process: In a first step, relevant initiatives were identified on the basis of desk research and the OECD database on mission-oriented approaches, also taking into account several initiatives per country. In a second step, the list of identified initiatives was reduced once more and the focus was placed on eight potentially promising initiatives that contained visible indications of subnational participation and/or roadmapping processes. If a mission initiative consisted of several individual missions, a single mission was selected based on desk research using the same logic.

For the in-depth case studies, the focus was to achieve a balance in terms of the federal structure or degree of (de)centralization, the type of mission (transformer vs. accelerator missions), and

different contexts (embedding in EU missions, RIS3 strategies, national mission-oriented strategies). Relevant cases from the screening were identified and coordinated for this purpose.

Overall, the case selection thus follows a **logic of relevant cases** (crucial cases) (Eckstein 1975) with the aim of maximizing the variance in the design of the missions and the accompanying contextual factors. This sample is **not representative of the spectrum of current mission-oriented initiatives**, as it focuses on already established initiatives that provide at least some indication of regional participation and/or roadmapping equivalents and can thus be understood as **good practice cases** that represent promising forms of subnational mobilization and roadmapping.

Table 1 (next page) provides a detailed overview of the selection of considered initiatives, in particular the selection of individual missions within the respective initiatives and the participation of subnational actors.

3.2 International expert workshop

As part of the project, an international online workshop entitled '*Mission-oriented R&I policies between national strategies and sub-national implementation*' was organized on March 24, 2025.² The aim of the workshop was to bring together international experts on mission-oriented policy and mission implementation to discuss cross-cutting aspects of mission coordination mechanisms at the interface between national and subnational levels of governance.

The workshop was based on four dimensions of analysis that the project team identified as particularly relevant from the examination of mission processes in the comparative country analyses presented above and which were elaborated in detail in the in-depth studies:

- Dimension 1 – Position of the mission owner within the innovation system (central vs. peripheral)
- Dimension 2 – Culture of cooperation (tradition of cross-sectoral cooperation vs. sectoral/disciplinary communities in STI policy)
- Dimension 3 – Governance culture (state-directed STI planning culture vs. bottom-up approach involving stakeholders)
- Dimension 4 – Political system (centralization vs. decentralization)³

During the international online workshop, dimensions 1 to 3 were discussed in depth in two separate working groups. The discussion was guided by four overarching questions that were systematically applied to each dimension. These questions concerned i) the positioning of missions in the aforementioned areas of conflict, ii) key challenges and opportunities for the efficient design and implementation of missions, iii) the influence of each dimension on implementation in the multi-level system, and iv) general implications and recommendations for mission management. The discussions provided both practical insights from the specific institutional and political implementation conditions of the missions examined and in-depth assessments based on the international expertise of the participating mission experts. The subsequent considerations on transferability to the German context provided valuable impetus for reflection on the situation in Germany.

² For a detailed summary of the workshop results, see appendix, section 7.2.

³ Due to time constraints, this dimension could not be discussed in the workshop.

Table 1: Overview of the selected mission initiatives

Country	Name of initiative	Start date	Sub-mission	Analysis focus (mission)	Subnational participation
Australia	CSIRO Missions	2019	Yes	TowardsNetZero Mission	Yes
Austria	National implementation of EU missions	2022	Yes	Climate-Neutral City Mission	Yes
Belgium	Circular Economy Flanders	2017	No	n/a	Yes
Belgium	S3 Wallonia	2021	Yes	n/a	Yes
Canada	NRC Challenges	2019	Yes	Construction Sector/Digitalization and Productivity	Yes
Czechia	RIS3 2021–2027	2021	Yes	National Mission of Resource Productivity	Yes
Denmark	Innomissions	2021	Yes	Collection and Storage or Use of CO2	Yes
Finland	Business Finland Missions	2021	Yes	Digital Native Finland Mission	No
France	France 2030: Acceleration Strategies	2021	Yes	Decarbonated Hydrogen	
Japan	Hydrogen Society Act	2024	No	n/a	Yes
Japan	Strategic Innovation Promotion Program	2014	Yes	Automated Driving Systems	Yes
Japan	Moonshot R&D Program	2020	Yes	Ultra-early disease prediction and intervention	No
South Korea	Comprehensive Plan	2023	Yes	Ageing Society	Yes
South Korea	2050 Carbon Neutrality	2020	Yes	n/a	Yes
South Korea	National Strategic Technology Policy	2022	Yes	National Strategic Technology Policy	No
Netherlands	Mission-Driven Top Sector Policy	2011	Yes	Circular Economy	Yes
Norway	Pilot E	2016	No	n/a	Yes
Norway	Norway National Missions	2023	Yes	Sustainable Feed Mission: By 2034	Yes
Spain	National implementation of EU missions	2021	No	Adaptation to climate change	Yes
Sweden	Vinnova Pilot Missions	2019	Yes	Food: (school food)	Yes
Sweden	Impact Innovation	2024	Yes	n/a	Yes
Sweden	Strategic Innovation Programs	2013	Yes	n/a	Yes
United Kingdom	Industrial Strategy Challenge Fund	2017	Yes	Clean Growth Strategy	Yes

Source: Own elaboration

4 Overview of insights from international comparison

This section presents the key insights from the screening and in-depth case studies. While the core findings of the screening on forms of subnational participation and roadmapping processes are presented in sections 4.1 and 4.2, section 4.3 summarizes the key insights from the in-depth case studies and provides an insight into the factors that influence the design and implementation of various initiatives.

4.1 Types of subnational participation

Based on the initiatives examined in the screening and the in-depth case analysis, different modes of participation by subnational actors were identified inductively. While cases without subnational (purely national missions) or national participation (bottom-up-driven local/regional missions) were deliberately excluded (see section 3.1), the analysis reveals six basic types of subnational participation, which are characterized by different roles of subnational actors in the mission implementation. In particular, these types differ in terms of i) responsibility for mission management (national vs. subnational), ii) the contribution of subnational actors to mission implementation (expertise, financial/regulatory resources, etc.), and iii) the timing of subnational involvement.

These six types can be understood as ideal types on a continuum representing increasing decentralization of mission implementation and thus increasing delegation to subnational actors. At the same time, these types follow different objectives and implementation logics, making them suitable for different contexts (see also section 5).

- **Subnational actors as advisors:** Missions can involve subnational actors by incorporating their location-specific knowledge or reflecting the impact of missions on different geographical units, e.g., in the form of dialogue forums, consultations with interest groups, etc. Mission management and implementation remain at the national level, with the subnational level being involved on a selective basis, primarily in the formulation process.⁴
- **Subnational actors as beneficiaries:** In this type as well, ownership remains clearly at the national level. Subnational actors primarily act as partners in the implementation of specific activities/projects, e.g., within the framework of funding programs, pilot projects, etc., and are therefore primarily involved during the implementation phase of the mission but have no influence on the formulation or design of the mission.
- **Subnational actors as co-funders:** More extensive involvement in nationally controlled missions results from the participation of subnational actors as co-financiers. By mobilizing their own financial resources for the realization of overarching (national) mission goals and coordinating the provision of resources at various levels, subnational actors can increase the financial leverage of a mission. This includes, in particular, the possibility of earmarking existing funding or realigning financing programs and involves the subnational level in the design and implementation of the mission.
- **Subnational actors as co-creators:** Closely related to the previous type is a form of active participation and co-creation, which involves not only financial resources but also improved interlinking of other policy instruments, e.g., the alignment of subnational regulation with national mission objectives, thereby removing obstacles to mission implementation at various levels. Central responsibility for implementing the mission remains at the national level, even

⁴ This type was not included in the study due to its focus on good practice examples with more advanced participation formats, but can be found, for example, in the German government's High-Tech Strategy 2025 (regional dialogues).

though subnational actors are involved in all phases of the mission (formulation, design, implementation).

- **Subnational actors as experimenters:** In contrast to the previous mission types, which rely on central (national) coordination, this type is characterized by greater decentralization. While the (supra)national level provides an overarching framework and various support instruments, different subnational actors test different approaches in parallel. The decentralization of implementation not only pursues the goal of identifying tailor-made, context-specific solutions, but also, in particular, of supporting policy learning at an overarching level and enabling the basis for broad upscaling in other units. In contrast to pilot projects (see type 'Beneficiaries'), subnational actors play a much more central role, as they can draw on a comprehensive portfolio of measures.
- **Subnational actors as providers of place-specific solutions:** An even more decentralized approach is the type that focuses on developing context-specific solutions to the respective local problems. The role of the national level is primarily to ensure appropriate and helpful framework conditions. However, due to their specificity, there are no intentions to scale up promising solutions.

In practice, different types may overlap, as financing and regulatory powers, for example, are closely linked depending on the context. At the same time, the involvement of various subnational actors means that they may be involved in varying degrees, i.e., there may be different forms of subnational involvement. For example, the participation of the federal states in the Climate-Neutral City Mission in Austria is limited (subnational actors as advisors/beneficiaries), whereas participation at the municipal level is much more pronounced (regional experimentation). Depending on the context, this can result in different combinations of involvement of the various subnational levels.

Figure 2 provides an overview of the location of the 19 mission-oriented initiatives with subnational stakeholder involvement (in four cases (*italics*), the local level was considered).⁵ The underlying mechanisms and findings of the analysis are discussed in more detail in section 4.3.

4.2 Roadmapping processes

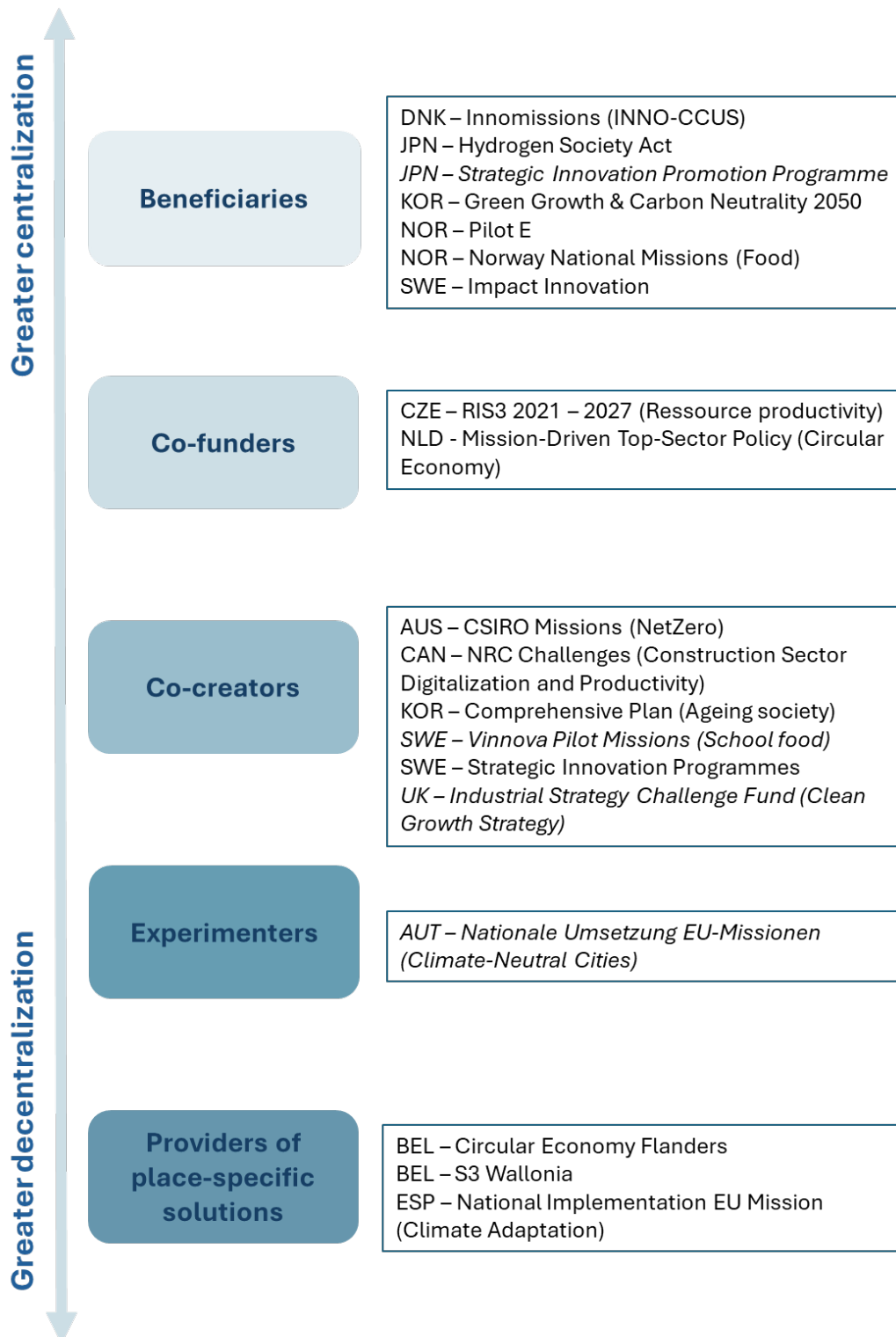
Roadmaps graphically represent planned processes of change over time. They link different levels ('layers'), such as markets, technologies, policies, products, and resources, and their interaction over time (Möhrle and Isenmann 2008). In general, a distinction can be made between technology roadmaps and strategy roadmaps, although there are also other national and sector-specific differences (Cuhls et al. 2015). Roadmaps usually aim to depict targeted paths that are geared towards achieving a vision. As a method of strategic foresight, the development and updating of a roadmap, also known as 'roadmapping,' entails the interactive involvement of key actors and stakeholders.

Roadmaps provide mission governance with a tool for exploring possible paths of development, assessing the evolution and scaling of catalysts over time, and orchestrating stakeholder action (Stifterverband et al. 2023, p. 5). At the same time, they need to be regularly adjusted to take into account changes in context and systems.

In this context, roadmapping is a useful tool for involving subnational actors. It should be noted that roadmapping is only one possible form of many functional equivalents for participation and reflexive learning between governance levels, which ideally interlock: Co-creative participation

⁵ In the case of Moonshot (Japan), France 2030 (France), Business Finland (Finland), and the National Strategic Technology Policy (Korea), there was no visible subnational participation. These cases are therefore excluded from consideration and are only considered in the analysis with regard to roadmapping elements.

Figure 2: Types of participation in studied mission-oriented initiatives



Source: Own elaboration. For strategies/missions marked in italics, the local level was considered instead of the regional level and used as the basis for classification. In the case of Sweden, the ecosystem approach made it impossible to clearly distinguish between the different stakeholder levels.

formats, strategic foresight methods, and formative monitoring and evaluation of impact pathways should be adapted to the concrete, type-specific needs of missions.

Such a coordinated process allows both the utilization of expertise of various stakeholders and the development of a shared vision that is conducive to the objectives.

For an initial overview, desk research was used to analyze the case studies and manually code the extent to which there are indications that corresponding processes are being applied in the context of mission implementation. The analysis is based on the roadmapping approach of the Stifterverband (Stifterverband et al. 2023) and considers a total of three different dimensions of corresponding processes, which are examined in more detail below:

- Roadmapping elements/equivalents
- Type of stakeholder involvement
- Timing of stakeholder involvement

Use of roadmapping elements/equivalents

Figure 3 provides an initial and highly simplified overview of the different designs of roadmapping processes across the considered cases. In particular, it highlights the question of which components of roadmapping or its equivalents are used in mission implementation, without further differentiating between the weighting of individual elements or differences in implementation. The illustration thus provides an initial overview for orientation purposes without making any statements about the quality, relative importance of individual elements, or implementation of the roadmapping process. A distinction is made between the following building blocks:

- Clear formulation of objectives
- Measurable milestones (interim goals)
- Elaboration of paths of development (roadmap/impact pathways)
- Use of scenarios
- Identification of catalysts for implementation
- Monitoring/evaluation process

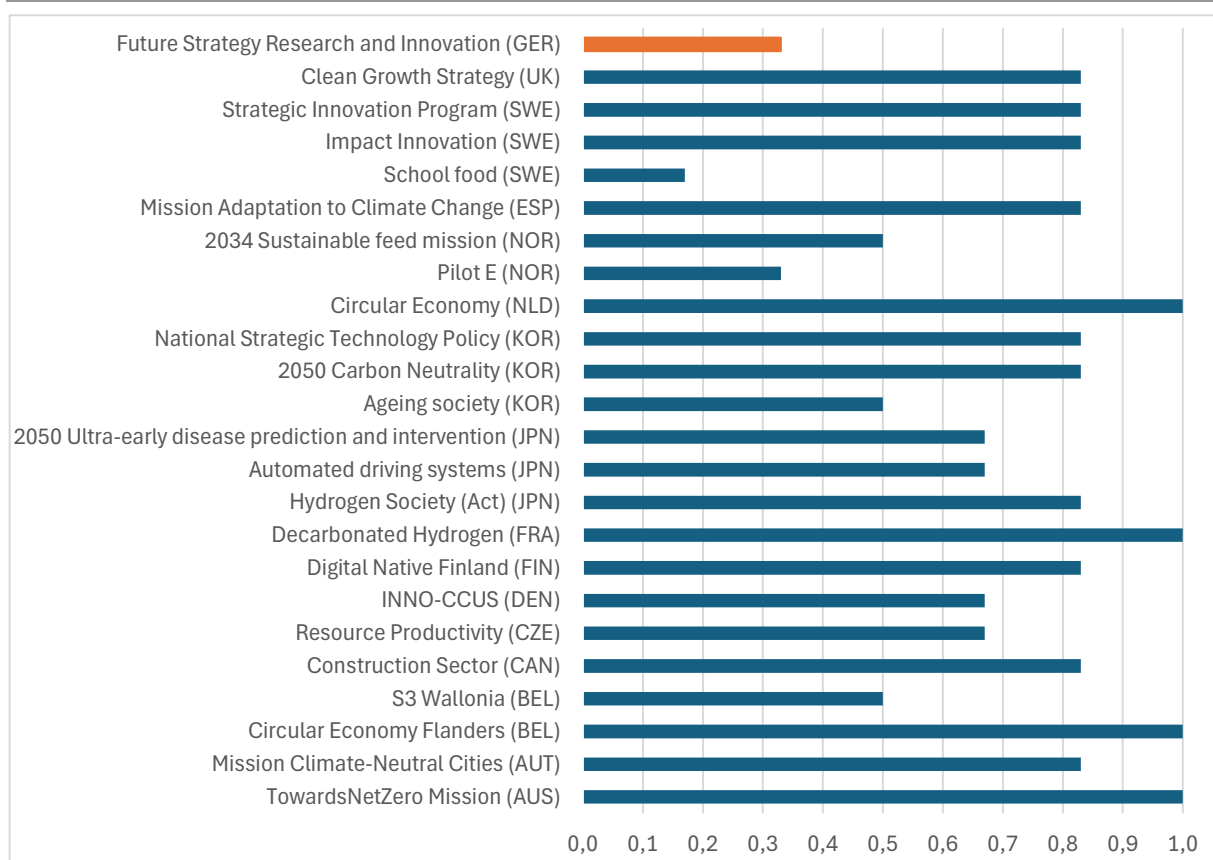
The implementation of the Future Strategy for Research and Innovation was chosen as an additional benchmark. As can be seen from the illustration, many of the initiatives considered make extensive use of roadmapping elements or equivalents. While this extensive use is hardly surprising given the good practice nature of the initiatives considered, the analysis reveals the following insights in particular:

While clear the clear formulation of objectives (23/23), measurable milestones/interim goals (18/23), the design of an accompanying monitoring/evaluation process (18/23), and a visual representation of the paths of development (20/23) are common practice, only a limited number of initiatives explicitly use the possibility of scenarios (8/23). Although the analysis of catalysts for implementation (15/23) generally takes place, the depth of analysis varies considerably between the different cases. As a result, further steps that could strengthen the robustness of the respective roadmaps appear to have been implemented only to a limited extent.

At the same time, the presentation clearly shows that there is also considerable variation between the individual initiatives within countries under review. This can be seen in Sweden, Japan, and Norway, among others, where there are significant differences in the use of relevant elements. One possible explanation for these differences lies not only in the specifics of the respective mission/strategy, but also in the development over time. Both in Sweden and Norway, newer initiatives in particular make greater use of relevant elements, suggesting that continuous learning and development processes are taking place. Accordingly, a trend towards greater use of roadmapping

equivalents can be observed within these countries. For this reason, individual missions rather than countries form the basic unit for analysis.

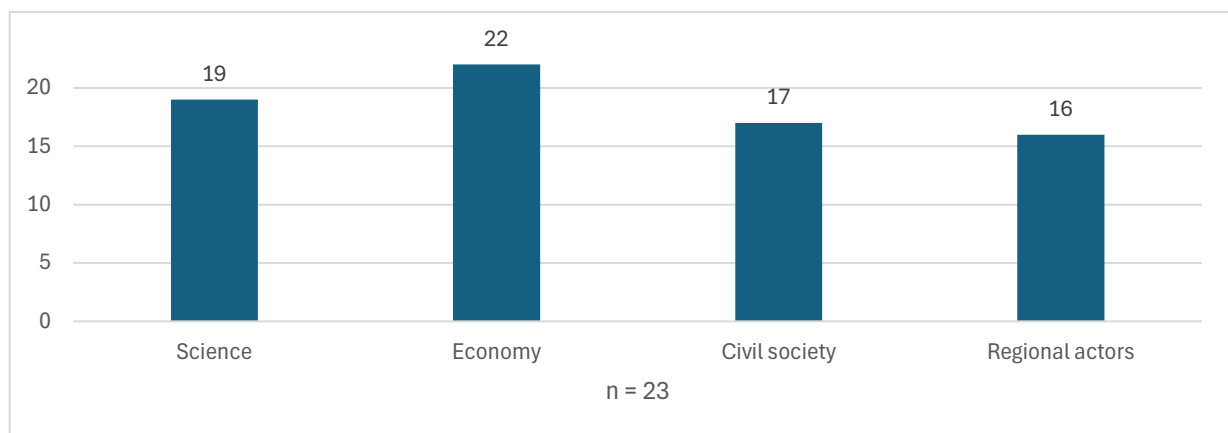
Figure 3: Presence of roadmapping processes/equivalents (additive index)



Source: Own elaboration; additive index with equal weighting of the various roadmapping components

Stakeholder groups

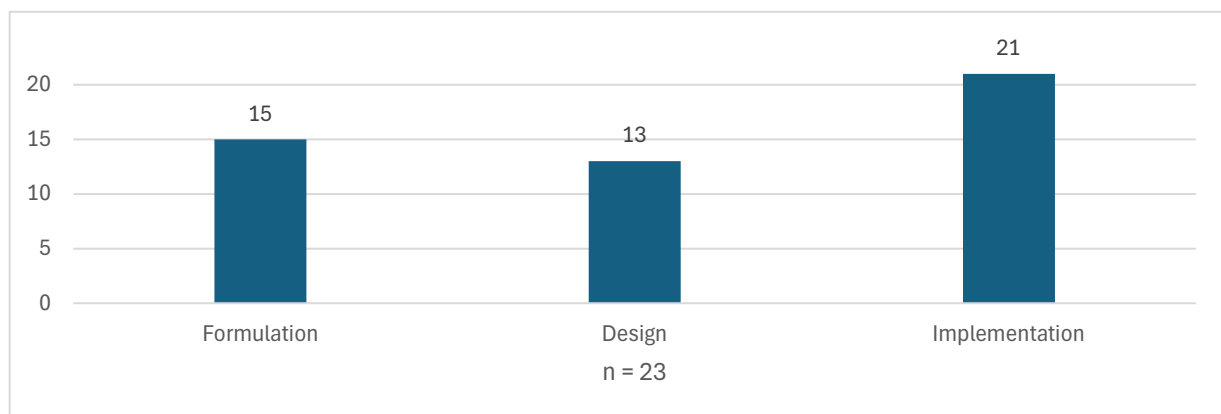
With regard to the stakeholder groups involved, figure 4 shows that economic actors in particular are involved (22/23). In contrast, actors from science (19/23), civil society (17/23), and regional actors (16/23) are involved somewhat less frequently. The limited number of regional actors involved refers particularly to those constellations in which subnational actors are only involved as beneficiaries of funding or missions are primarily implemented as national missions.

Figure 4: Stakeholder groups

Source. Own elaboration

Timing of involvement

A third perspective arises from the timing of involvement. While it would be conceivable to involve stakeholders throughout the entire mission cycle of formulation, design, and implementation, the picture in practice is more nuanced. Whereas stakeholders are involved in all phases of mission implementation in a total of nine initiatives, this is often only the case selectively in the other initiatives. While the strong involvement of stakeholders in the implementation phase (21/23) is often due to the existence of accompanying/advisory committees, involvement in the formulation (15/23) and design (13/23) phases is significantly weaker.

Figure 5: Timing of stakeholder involvement

Source: Own elaboration.

4.3 Factors influencing regional participation and roadmapping

This section summarizes selected key findings on possible factors influencing the design of regional participation and roadmapping, based on the screening and in-depth case studies. The case studies and interviews play a central role here, providing an in-depth examination of how the respective missions work. It should be noted that the analysis focuses only on a selection of established (good practice) examples of missions and can therefore only provide indications of possible influencing factors based on the heterogeneity of the case studies (mission structure, mission type). Table 2 provides an overview of the key findings of the case studies, and a detailed fact sheet on the individual cases can be found in the appendix.

The various case studies identified the following key factors that build on each other and influence the design of the mission approaches:

- Institutional context and distribution of competencies
- Existing policy traditions, competencies, and external impulses
- Stakeholder structures and resources

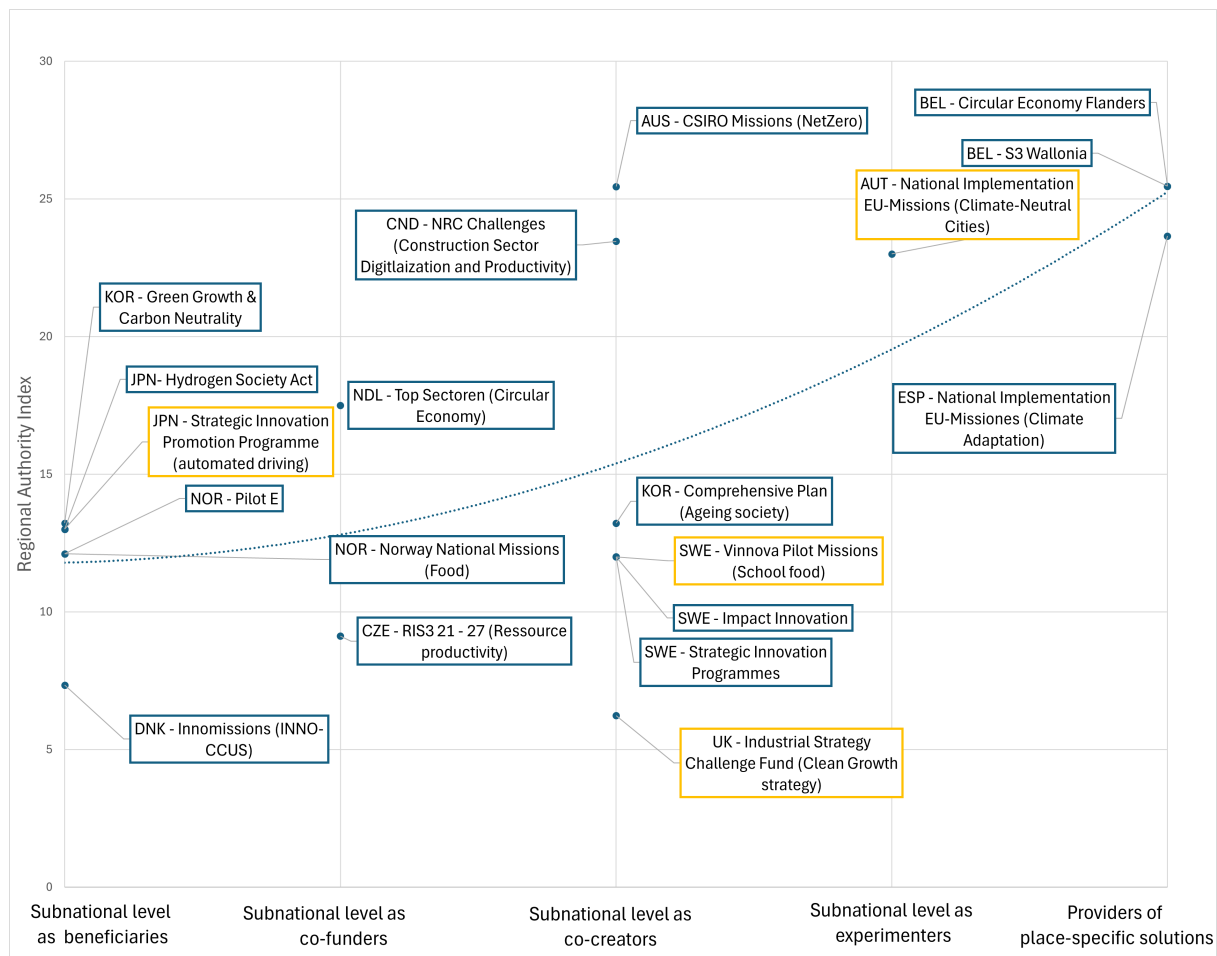
Institutional context and distribution of competencies

A first key insight from the empirical data is the **heterogeneity of implementation structures not only between countries, but also within individual countries**. Structures for stakeholder involvement and participation sometimes differ even within the framework of a single strategy and the characteristics vary depending on the mission. Rather than assuming 'national patterns' of participation, it appears that the specific institutional context is the determining factor. This is further complicated by the fact that many of the missions extend beyond the STI sector and attempt to mobilize the necessary implementation competencies 'on the ground', through the involvement of subnational actors. **A key point in this context is the respective competencies of subnational stakeholders in the mission area.** In the Challenge Program of the National Research Council in Canada, the provinces play different roles depending on the subject area: While provinces only act as partners/recipients of funding in the implementation of projects in many of the challenges, their role is much more pronounced in areas with regional competencies (construction).

Against the backdrop of the varying distribution of competencies **among** subnational actors in different subject areas, generally **equipping subnational actors with competencies and capacities appears to be a necessary but not sufficient factor for decentralization and delegation within the framework of missions**. As Figure 6 illustrates, the examined cases show that subnational actors are more strongly involved in those countries that also have a higher overall degree of decentralization and where the subnational level is equipped with comprehensive competences. In the context of the Czech missions, for example, reference was made to the fragmented nature of the regions, which makes a more decentralized approach appear less promising.

On the other hand, the examples of Australia and Austria illustrate **that strong individual or federal states do not necessarily go hand in hand with strong subnational participation but are also influenced by the structures of the actors involved and existing political traditions**. While in Australia the peripheral position of the mission owner influenced the design of the mission and counteracted more extensive forms of participation, the implementation of the Climate-Neutral City mission in Austria focused on the municipal level as the central player, largely excluding the federal states.

At the same time, a number of initiatives (in particular the UK Industrial Strategy Challenge Fund and Sweden's Pilot Missions/Impact Innovation/Strategic Innovation Programs) show more extensive forms of subnational participation despite limited regional powers. On the one hand, however, this concerns cases in which the municipal level was comprehensively involved with the relevant implementation powers in the respective areas. Additionally, in the Swedish case, a politically and culturally deeply rooted practice of broad stakeholder involvement exists, which relies on the broad mobilization of various stakeholders within the framework of an ecosystem approach.

Figure 6: Forms of subnational participation and decentralization

Source: Own elaboration using the Regional Authority Index (Hooghe et al. 2016; Shair-Rosenfield et al. 2021). The yellow frames indicate missions/initiatives where the local rather than the regional level was considered.

Existing policy traditions, competencies, and external impulses

Apart from the example of Sweden, neither the screening⁶ nor the in-depth case studies reveal any systematic evidence of the influence of political culture on the implementation of missions. Rather, the analysis of the case study **points to the importance of path dependencies**. Most of the initiatives examined build on existing structures and develop them gradually or supplement them in a targeted manner, rather than devising completely new solutions. When it comes to the use of **roadmapping processes**, too, such approaches are often either **embedded in existing policy-making procedures, make use of existing structures** (Japan, Czech Republic), or have **dedicated support structures** in place (cf. Australia). The expert workshop also made it clear once again that, in contrast to more sectoral oriented structures, existing practices of intersectoral cooperation can favor a mission-oriented approach, but that the development of appropriate working modes is lengthy and depends on the respective context. At the same time, several of the observed case studies provide evidence of the **importance of external impulses for mission development**. Overarching policy impulses, especially at the EU level, serve either as a direct catalyst or indirectly as a guide for legitimizing and shaping national missions. This applies, among other things, to the embedding of mission orientation in the respective national/regional innovation strategies

⁶ For example, there is no clear pattern regarding general consensus orientation in the respective countries. For this purpose, Lijphart's executive-party dimension ((2012)) of the countries under consideration (excluding Korea) was related to the participation formats for the reference year 2018 (see Armington et al. 2025).

(Belgium, Czechia) or the orientation towards corresponding EU missions (national implementation missions, e.g., Climate-Neutral City in Austria, climate change adaptation plans in Spain).

Stakeholder structures and resources

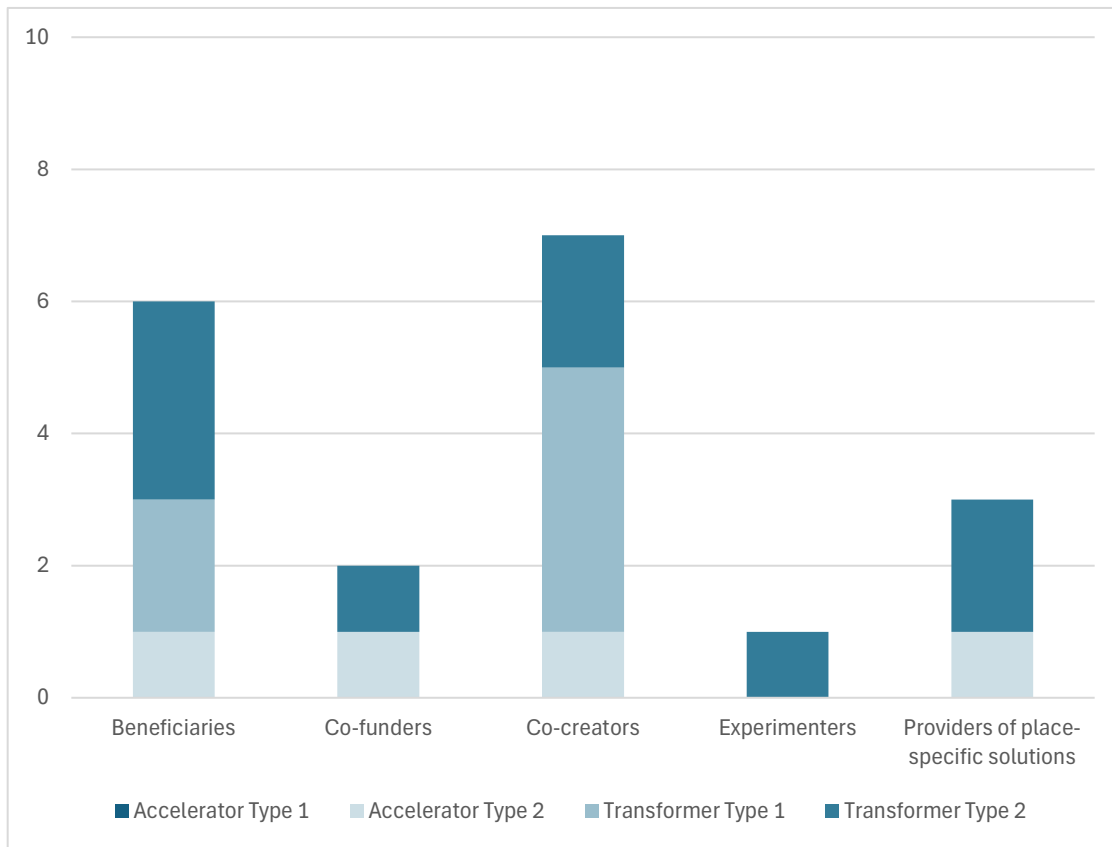
Another set of influencing factors can be found in the resources available to those responsible for the missions and the stakeholder structures, which act as context-specific and constraining factors. Depending on their mandate, mission owners sometimes only have limited ability to comprehensively orchestrate all potentially relevant subnational actors (peripheral vs. central position in the innovation system) and thus have different positions for action and mobilization (see also the discussion in the international workshop). At the same time, subnational actors differ in terms of their level of involvement, but also in terms of their implementation competencies and resources.

As a result, these limitations were often compensated for by various adaptation strategies, in particular:

- The often deliberately increased focusing of the mission, either as a result of a roadmapping process (cf. Australia) or through a strong initial focus on clearly defined problems. By starting such processes with a clear focus or demarcation, scarce resources can be concentrated and used with the greatest possible leverage in terms of activating subnational actors. This approach enables, for example, the Czech RIS3 strategy to activate local resources through targeted focus, while in the Australian case, a detailed and granular roadmapping process directly involves subnational actors and motivates them to make regionally relevant contributions to the mission.
- Approaches to differentiated mission participation, particularly in the form of **asymmetric participation**. Only in very few cases do missions aim for the equal participation of all territorial units at a given level (e.g., states/regions); instead, they rely on a more interest/needs-driven motivation, so that only individual subnational units are deeply involved in the mission. Such approaches are driven in particular by the motivation to keep transaction costs low through low-threshold and flexible participation opportunities (NetZero Mission in Australia, RIS3 Strategy in Czechia) or to focus on motivated/committed pioneers as an intermediate step towards upscaling (Climate-Neutral City mission in Austria).

In contrast, there is no systematic correlation between the basic type of mission (accelerator/transformer, cf. Kuittinen et al. 2018; Wittmann et al. 2021) and participation or roadmapping processes. In practice, therefore, a more comprehensive focus on transformative goals does not necessarily go hand in hand with stronger subnational participation or the use of roadmapping elements. Figure 7 illustrates this using the different forms of subnational participation. This once again underscores the relevance of the previous findings, which make it clear that the specific context (subject area, actors, competencies) is a key influencing factor in the design and the alignment of the implementation with different objectives. This also becomes clear in the context of roadmapping activities, which are **often** characterized **by multiple, overlapping motivations**. In addition to the obvious function of ensuring the coordination and participation of various stakeholders, this also includes the objective of using roadmapping to enable clear external communication and, thus, to mobilize new/additional actors and support them in finding their place in the mission.

Figure 7: Mission types and subnational participation



Source: Own elaboration

Table 2: Overview of the in-depth case studies

Country	Initiative/mission	Subnational level	Type of subnational participation	Roadmapping Index	Key insights
Australia	TowardsNetZero	Federal states	Co-creators	1	<ul style="list-style-type: none"> • Development of an approach that takes into account the challenges (position of mission owner, resources) and focuses on stakeholder involvement and consensus building • Process support: Mission owner responsible for implementation • Need-based asymmetric participation with utilization of political windows of opportunity
Belgium	S3Wallonia	Region	Providers of place-specific solutions	0.5	<ul style="list-style-type: none"> • Strong equipment of regions with competencies • Political support and use of existing structures • Embedding in multi-level dynamics (EU/national/regional)
Japan	Strategic Innovation Promotion Program (Autonomous Driving)	Local (municipalities, metropolitan regions)	Beneficiaries	0.67	<ul style="list-style-type: none"> • Top-down coordination overcomes silo structures and enables horizontal cooperation • Networks of stakeholders and formal and informal communication among them • Active involvement of industry (including competing companies) • Positive perception of central government policy initiatives
Netherlands	TopSector (Circular Economy)	Provinces	Co-funders	1.0	<ul style="list-style-type: none"> • Heterogeneous, context-specific implementation approaches (supported by rather small-scale definition of interim goals) • Building on existing structures (transition teams, top sectors) and gradual further development
Austria	Climate-neutral city	Municipalities	Experimenters	0.83	<ul style="list-style-type: none"> • Public-public partnership between a strong mission owner (ministry) and local actors with active ownership supported through opportunities for co-creation • Good cooperation in the partnerships; reporting specific needs from cities to STI resorts for targeted tenders • Previous funding programs paved the way for Climate-Neutral City Mission by providing resources and building a community of practice

Roadmapping and subnational involvement in mission-oriented policies

Country	Initiative/mission	Subnational level	Type of subnational participation	Roadmapping Index	Key insights
Sweden	Impact Innovation	Regions	Co-creators	0.83	<ul style="list-style-type: none"> • Joint commitment of a 'coalition of the willing' • Comprehensive support and monitoring process
					<ul style="list-style-type: none"> • Selection process following the structure: Grand Challenges > Missions or > Soliciting proposals and > Implementing topic-related STI projects • Ecosystem approach: (early) involvement of diverse stakeholders and long-term funding prospects • Combination of strategic openness, regional anchoring, and continuous evaluation • Learning-oriented instruments such as impact logics, portfolio analyses, and formative evaluation for adaptability and strategic governance
Spain	Climate Adaptation	Regions	Providers of place-specific solutions	0.83	<ul style="list-style-type: none"> • Successful implementation through integrative multi-level governance approach that closely involves subnational actors and creates trust-based networks and governance mechanisms between different policy areas at an early stage. • Political traditions and federal structures lead to varying degrees of regional progress in the implementation. • Clear regulatory frameworks and innovative financing models contribute to the anchoring of sustainable measures. • Political and cultural factors (e.g., perception climate risks) promote participation of local actors and emergence of innovative approaches.
Czechia	Resource Productivity	Regions	Co-funders	0.67	<ul style="list-style-type: none"> • Creation of a differentiated and flexible approach to participation, even with limited institutional resources • Overarching policy-making (EU) as source of impetus and reference • Gradual and evolutionary development process drawing on existing resources and structures

Source: Own elaboration

5 Conclusions and policy implications for the German context

Based on the preceding analysis of selected international good practice cases, this section develops recommendations for the German context. While international examples can provide hints for possible solutions, these must always be discussed against the backdrop of Germany's political and institutional context (box 1). At the same time, the results of the analysis highlight the high degree of context and mission specificity of the selected implementation approaches with regard to roadmapping and subnational participation. In consequence, roadmapping and participation usually result from a combination of institutional context, existing policy traditions, external impulses, and the respective stakeholder structures and resources.

Box 1: Key features of the German federal context

- Strong role of the federal states with a high degree of political interdependence between the various levels, which often requires close cooperation between the different levels in implementation (executive and cooperative federalism)
- Dominance of a consensus-oriented model that relies on comprehensive participation of all federal states (symmetrical participation)
- Mission orientation has so far primarily been used as an instrument of federal policy within the framework of the research and innovation strategy (High-Tech Strategy 2025, Future Research and Innovation Strategy, High-Tech Agenda for Germany), although approaches to involving the federal states can also be observed in other strategies (National Circular Economy Strategy, 7th Energy Research Program)
- Experience with the implementation of mission-oriented approaches since 2018, but fundamental challenges regarding the existing political and administrative structures in implementation remain

Against this background, it should be noted that the various institutional approaches cannot be directly compared with each other, as different participation approaches follow different objectives and logics of action. While more decentralized forms of mission implementation promise more comprehensive mobilization and involvement of subnational actors per se, all forms of subnational participation are conceivable or sensible, depending on the specific context. Table 3 provides an overview of various forms of participation. This shows that the increasing decentralization of mission implementation is accompanied by changes in the role of the mission owner, who takes on a more orchestrating instead of a governing role. Depending on the nature of participation, this results in new challenges for mission governance, requiring adjustments to the previous model of top-down control by individual ministries (see for example, the discussion of various innovative institutional approaches in Wittmann et al. 2025).

Table 3: Objectives and framework conditions for various forms of subnational participation

	Form of participation	Objective of participation	Suitable for	(Organizational) requirements for the mission owner
Central control	Beneficiaries	<ul style="list-style-type: none"> Inclusion of subnational perspectives 	<ul style="list-style-type: none"> Areas with limited subnational implementation/regulatory powers Testing pilot projects (without intention to scale) 	<ul style="list-style-type: none"> Coordinating and managing implementation Design of measures that enable the effective involvement of subnational actors Independent further development of mission
	Co-funders	<ul style="list-style-type: none"> Bundling/alignment of funding activities at various levels Increasing critical mass and buy-in among relevant actors 	<ul style="list-style-type: none"> Policy areas with funding instruments that are located at several levels Issues with limited regulatory powers of subnational actors 	<ul style="list-style-type: none"> Coordination with subnational actors to jointly align funding activities Creating incentives for relevant actors to participate (added value of participation)
Mixed control	Co-creators	<ul style="list-style-type: none"> Mobilization of implementation and regulatory powers 	<ul style="list-style-type: none"> Challenges that require cross-level activity, including with regard to regulation/framework conditions, etc. 	<ul style="list-style-type: none"> Creating incentives for relevant actors to participate (added value of participation) Moderation of the interaction between various activities with regard to the objectives Provision exchange platform for stakeholders
Decentralized implementation	Experimenters	<ul style="list-style-type: none"> Identification and trialing of promising solutions Derivation of further implementation strategies 	<ul style="list-style-type: none"> Issues in which subnational actors have expertise (and resources) and can develop ownership Similar cross-cutting problems 	<ul style="list-style-type: none"> Creation of an action/support framework for subnational actors Provision of selection criteria for promising instruments (target setting) Ensuring policy learning beyond individual activities Derivation of measures for upscaling or changing framework conditions

Form of participation	Objective of participation	Subnational Suitable for	(Organizational) requirements for the mission owner
Providers of place-specific solutions	<ul style="list-style-type: none"> • Development of context-specific solutions with limited coordination 	<ul style="list-style-type: none"> • Regional-specific problems that require regional-specific solutions • Areas with comprehensive subnational competencies • Limited need for national coordination 	<ul style="list-style-type: none"> • Provision of an operational framework • Enabling policy learning and exchange beyond individual cases

Source: Own elaboration

5.1 What kind of subnational involvement in mission implementation?

The analysis of international practice in the implementation of missions reveals a wide empirical range with regard to the involvement of subnational actors (see section 4). This ranges from the participation of subnational actors as funding beneficiaries to active co-creators of missions. Federal or decentralized structures are a key prerequisite for their involvement, as these are usually based on the respective distribution of competences in the particular mission context.

Thanks to its federal structure with strong federal states, Germany has a high – as of yet untapped – potential for greater participation by regional actors, even in demanding cooperation formats. There are three key reasons for the active and direct involvement of the federal states in the implementation of missions:

Firstly, in the context of 'cooperative federalism' (Benz 2017; Kühl 2020; Münch 2012; Seckelmann 2021) with its intertwining competences at various administrative levels and the implementation of laws and regulations by the state or even municipal level, there is great **potential for increasing the effectiveness of mission implementation** if the existing (implementation) competences and resources are pooled and focused on a common goal. In contrast to many of the countries considered, where subnational participation aims to mobilize implementation capacities, the need for stronger policy coordination is gaining importance in the German context. The federal states already play an important role in research and innovation policy, but the potential for synergies has not been sufficiently exploited to date, and a critical mass is therefore rarely achieved (see also Gebert et al. 2024). Especially against the backdrop of increasingly scarce resources, there is considerable potential here for synergies and more efficient use of funds.

Secondly, greater involvement of subnational actors can help to **overcome the mobilization problems of mission-oriented policy** and free it from the 'STI trap,' i.e., the narrow focus on research, technology, and innovation policy that has hampered the implementation of mission orientation in Germany to date (EFI 2023; Roth et al. 2021). Greater involvement of subnational actors can strengthen the legitimacy of the respective missions and enable subnational actors to better contextualize their own local problems within the broader challenges, thereby also mobilizing resources (see also section 4.3).

Thirdly, the involvement of subnational actors can serve as a stabilizing element in the implementation of missions. As noted by the Commission of Experts for Research and Innovation (*Expertenkommission Forschung und Innovation*), the short time horizons of current mission-oriented strategies are one of the challenges of mission implementation in Germany, as they appear unsuitable for achieving ambitious long-term goals (EFI 2024). The involvement of subnational actors could strengthen the binding nature of corresponding objectives at all levels and also anchor them beyond the asynchronous legislative periods at the various levels of government.

What kind of subnational involvement: The goal formulated in the coalition agreement of the current coalition to involve the states in the implementation of mission-oriented policy should serve as a guideline. In developing the High-Tech Agenda Germany and similar strategies, care should be taken to ensure that the federal states in particular can play an active role in their formulation, design, and implementation, for example as co-creators or experimenters.

5.2 Which missions are suitable for subnational participation?

In line with the analysis of international case studies, it can also be noted that not every mission is equally suitable for subnational participation in its various forms. Overall, there is no 'national' pattern of subnational participation. Instead, the picture that emerges is one of context-specific forms of subnational participation depending on the distribution of competences and problem constellations of the respective missions (cf. section 4.3). **The focus should therefore be on the targeted involvement of subnational actors in suitable missions, rather than on formulating a uniform model of participation across different missions.** The following principles can be identified, which provide guidance for possible involvement:

First, the involvement of subnational actors should offer added value. In the case of Germany, this means that the existing competences and resources of the federal states should be used as complementary, potentiating factors in the implementation of missions. Depending on their competencies in the respective subject area, the federal states can assume **various roles in the implementation of the mission** (e.g., as initiators, potential implementers of (pilot) projects, providers of additional funds, actors with additional implementation-relevant competencies, e.g., in regulation, or as independent developers of specific solutions (Wittmann et al. 2021). The institutional context and the constellations of actors provide a rough framework for this (since some participation formats will fail due to a lack of resources and capacities), nevertheless different participation approaches may emerge from the respective context. For example, the start of a European funding period could provide a good starting point for greater coordination of funding activities, while missions with a narrower thematic focus could benefit from a more co-creative approach that incorporates not only funding activities but also other competencies and regulation of the actors involved.

Secondly, embedding missions in existing (framework) strategies (such as EU missions) offers considerable potential for synergy and orientation through conscious alignment with overarching strategies and active consideration of relevant strategies in formulation processes. Instead of repeatedly reformulating missions in isolation or duplication of existing strategies and framework programs, potential synergies and links to overarching strategies should be exploited, and it should be clearly specified during the formulation process in which areas existing strategies are to be supplemented by additional measures and to what extent priorities are to be taken up and implemented in the specific German context. In addition to an interdepartmental approach, this also requires a longer-term orientation of missions that goes beyond the respective legislative period (EFI 2024) and is not simply replaced by a successor strategy with entirely new priorities. For the development process, this particularly means the need for a systematic analysis of the current strategic landscape as a basis for deriving own priorities, as well as a more open formulation process to avoid thematic or ministerial restrictions.

This avoids the duplication of structures for similar priorities and makes it easier for the subnational actors (with limited capacities) involved to orient themselves and exploit synergies (e.g., by bundling funding measures across different levels), which can also increase their level of mobilization. Particularly in the German context, where subnational actors in the form of the federal states have varying capacities, leveraging such synergies is crucial. This would also enable Germany to take on a stronger leadership role than before in the EU's STI policy, as called for by the OECD (OECD 2022).

Austria has also decided to formulate its own national missions, which tie in with the five missions defined by the EU and develop them further within a national framework. In the case of the 'Climate-Neutral City' mission, this is achieved by identifying additional pioneering cities within the national mission to complement Klagenfurt, the only city in Austria directly involved in the EU mission. These

cities are supposed to benefit from Klagenfurt's experience and provide insights into different implementation contexts.

Integration into existing strategies:

In the case of the Smart Specialisation Strategies for Research and Innovation (RIS3) in **Czechia** and **Belgium**, the national implementation of RIS3 was linked to mission elements that create potential links for subnational (or subregional in the case of Wallonia) actors, allowing them to initiate relevant projects and measures themselves. The overarching RIS3 structures, in turn, prevent these specific projects from fragmenting national implementation. The respective higher-level institutions coordinating the strategy ensure that existing resources are pooled, structural duplication is avoided, and synergies are leveraged by making successful subnational approaches transferable and linking them to additional resources (e.g., from other European, national, or regional funding sources).

Thirdly, instead of striving for comprehensive, uniform coordination with all subnational actors at one level, it seems promising to allow the focus not only on thematically (Wittmann et al. 2024) **but also on spatially focused missions.** Internationally, there is a strong trend toward forms of **asymmetric participation**, i.e., the involvement of selected subnational actors in implementation. Such 'coalitions of the willing' or the targeted involvement of actors particularly affected by a problem offer the advantage of increased mobilization and implementation willingness, reflect the varying degrees of concern/relevance for different actors, and reduce the (initial) need for coordination.

In the German context in particular, however, such a differentiation of participation opportunities requires a fundamental rethinking of the previously prevailing practice of broad-based coordination processes involving all subnational actors at a given level. In order to prevent such approaches from becoming isolated structures of individual actors (and thus counteracting further mobilization) or further exacerbating the (economic) differences between regions because structurally weaker actors are unable to participate sufficiently, two principles appear to be central: i) Voluntary (non-)participation, i.e., no top-down selection of actors to be involved and flexible participation options with varying degrees of intensity, and ii) Strengthening a project-based portfolio approach (see section 5.3), which enables different actors to contribute according to their capabilities.

Possibilities for asymmetric participation:

The missions of **the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO)** have been deliberately positioned as mediators between the various levels of government (national, state, and local), with CSIRO as mission owner using established regional leadership and network structures to increase its credibility and mobilization potential. Through the broad strategic framework of its missions, the use of local networks, and its perception as a neutral, apolitical actor, CSIRO is able to address and engage individual states, municipalities, and local stakeholders in a context-specific manner, depending on their local circumstances (e.g., regions with a fossil fuel or agriculture-based economic focus) and resources (e.g., in economically weak Tasmania).

The **Austrian mission 'Climate-Neutral City'** involves selected cities, known as 'pioneer cities,' in the form of public-public partnerships between the federal government and the cities. The mission started with ten pioneer cities (>50,000 inhabitants) and twelve other smaller cities (10,000-50,000 inhabitants). Forty-seven cities are now participating in the Climate-Neutral City mission, covering about 40% of the Austrian population. This represents a highly asymmetrical level of participation at the outset; however, the steady increase in participating cities, even those with lower populations, is leading to a significant expansion of mission participation at the subnational level. The initial focus on individual pioneer cities as a starting point for system transformation created space for context-sensitive learning and strategic depth.

Which missions are suitable for subnational participation in Germany?

In principle, a number of topics offer themselves as starting points for mission formulation, including issues such as structural change, digitalization, the circular economy, healthcare, etc. The following questions can serve as a guideline:

- Do subnational actors in the respective area contribute additional implementation-relevant skills, responsibilities, and resources?
- Can additional funds be mobilized from existing structures, and what synergies exist with existing strategies and funding programs?
- Which subnational entities are particularly affected or motivated?

One example of an area of application for missions with subnational participation is the policy field **regional development and structural change**: a broad-based portfolio mission in this area can build on the existing interaction between the federal and state governments (in ensuring economic development and equal living conditions) and bundle the existing offers for further support through the EU's structural/cohesion policy. This results in a variety of institutional interfaces (RIS3 strategies, Improvement of Regional Economic Structures (*GRW*), etc.) that allow for the active integration of subnational actors into the mission processes and, at the same time, make it possible to respond to the highly heterogeneous needs of the various subnational units (existing structural weaknesses, structural change as a result of the coal phase-out/restructuring of the industrial structure, etc.).

There are also significant synergies in the area of **digitalization**, particularly with the RIS3 strategies at the state level and the expiring Future Research and Innovation Strategy. At the same time, the federal states have extensive competencies in this area (including data protection, digital infrastructures, higher-level education, and administrative digitalization). While digitalization is a cross-cutting issue that affects all federal states, there are major differences between the federal states in how it is currently being addressed.

5.3 What needs to be considered in the practical implementation of missions with subnational participation?

Closely linked to the approach of more asymmetrical participation of the subnational level in missions is the challenge **of leveraging** the respective **momentum for a mission**. As the case studies have shown, context-specific windows of opportunity may arise that should be exploited. The basic prerequisite for this is greater agility in policy-making (Weber et al. 2021), especially at the national level, and thus a willingness to further develop and adapt strategies and their missions in the course of implementation.

This also includes the provision of structures that develop potentially relevant topics at a low threshold and can then quickly scale them to a higher level in the respective context. Conversely, this means that the mission development process must be conceived in a more open and agile manner. Missions do not have to be developed in parallel at the same pace from the outset; instead, a long-term strategy should be formulated that includes planning tools and processes that allow missions to be developed and adapted situationally as needed.

Political windows of opportunity:

CSIRO's current mission-oriented approach **in Australia** was able to build on a combination of various windows of opportunity in the Australian political system. On the one hand, increasing pressure from external factors (trade conflicts, the Covid-19 crisis, etc.) led to a growing consensus among stakeholders that a concise transformation effort was necessary for the economy. At the same time, Australia saw a political shift away from a previously neoliberal focus in economic and

science policy toward a growing acceptance of government intervention. This was facilitated by the strengthened position of the Labor Party at the state and national levels, which led to greater congruence between political priorities at different levels.

Another building block for the successful integration of subnational actors can **be the targeted use of existing structures and networks for stakeholder mobilization and involvement**. Their relevance has already been emphasized in the context of implementing subnational missions (Zenker et al. 2024) and was also evident in the case studies and in the international expert workshop (see appendix, in particular Dimension 3 Governance culture). Instead of developing support structures from scratch, existing structures should be used wherever possible and appropriate in order to benefit from already established processes and capacities. It should be noted that the use of such structures is only effective if they are adapted and further developed for the new mission (e.g., by involving additional actors) so that existing structures are not simply reproduced. (Wittmann et al. 2025). The use of existing structures therefore does not replace the mission formulation and design process but supports it within a narrow framework.

Use of existing structures

In **the Austrian context**, earlier funding programs paved the way for the **Climate-Neutral City mission** by providing resources and establishing a community of practice (such as the 'Smart Cities' networking platform⁷). Similarly, the locally based Climate-Neutral City mission is backed at the regional level by existing structures that serve the content of the (European) Cities Mission on the part of the federal states but are not part of the Climate-Neutral City mission.

In the case of **the Czech missions**, it was possible to build on the existing structures of RIS3 strategy development and implementation. The two missions were deliberately used to complement the established elements of the RIS3 strategy in order to test the new instrument in clearly defined subject areas without overburdening the existing structures with a complete reorientation of the approach.

The **Swedish Impact Innovation** program builds directly on the experiences and structures of its predecessor, the Strategic Innovation Program (SIP), and develops it further in a targeted manner. Established approaches are used and transferred to new goals and challenges. While SIP was characterized by a bottom-up approach, Impact Innovation pursues system innovations along self-selected grand challenges. Missions were derived from these and identified for long-term STI funding. Existing processes, competencies, and structures are used in a targeted manner and transferred to new contexts.

As the case studies show, the use of roadmapping approaches or sub-elements was also often based on existing structures and processes. Nevertheless, some points are particularly noteworthy regarding the German context. On the one hand, the explicit integration of appropriate approaches with sufficient resources is an important prerequisite. On the other hand, such approaches are particularly suitable when a basic orientation towards the target direction has already been defined (e.g., through an overarching political impetus or a consensus on goals/problems, cf. Wittmann et al. 2024). Against this backdrop, the rather vague mission areas in the previous Future Research and Innovation Strategy appear too broad and too unspecific to be able to have a mobilizing or engaging effect through roadmapping processes.

Prerequisites for successful roadmapping approaches

In the context of autonomous driving, **Japan** also uses roadmaps tailored to different goals. These roadmaps, based on pilot tests and implementation plans, served as shared visions of the future

⁷ National networking platform Smart Cities - Smartcities

to coordinate stakeholders. They were carefully structured to align with both technological milestones – from driver assistance systems to fully autonomous driving – and evolving legal requirements. Crucially, the roadmaps were reviewed annually and updated based on ongoing assessments to ensure their continued relevance and adaptability.

Swedish Impact Innovation focuses on major societal challenges. Based on these, concrete missions are derived as instruments for system innovation. The entire program is based on an intervention-wide theory of change, which, however, is to be reviewed repeatedly over time. Core elements are the preparatory mission proposals by consortia, which not only serve strategic planning purposes but also form the basis for selection, monitoring, reorientation, and evaluation during the course of the program. The theory of change is continuously reviewed and further developed.

In the case of **the Australian CSIRO missions**, a design approach was adopted that advanced the formulation of the missions in several phases and made opportunities for participation explicit using the Mission Design Canvas. At the same time, the design process at CSIRO was supported by a dedicated department within the organization that contributed process knowledge.

The successful involvement of subnational actors in the practical implementation of missions requires a comprehensive paradigm shift in terms of process and understanding of roles in mission-oriented policy as currently practiced in Germany. **It is crucial to identify suitable forms of incentives in order to win over subnational actors not only as recipients of funding, but also as active co-creators.** The discussions in the international expert workshop also underscore the need for an approach based on broad co-ownership by various stakeholders. This section describes the key requirements for this and focuses on concrete implementation.

A key prerequisite for successfully incentivizing the participation of subnational actors is to design missions in such a way that they offer subnational actors points of reference to specific local challenges and needs, thereby enabling these actors to develop an understanding of their own role in the overall mission context. This can range from various forms of participation and agenda setting to project-driven asymmetric participation approaches. **The specific added value for subnational actors should therefore be considered from the outset, rather than focusing solely on abstract, overarching objectives.** Planning methods such as roadmapping are useful for achieving this level of specificity across space and time. **Mission orientation in the context of multi-level systems should therefore be thought of as an instrument with flexible participation options.**

Setting incentives:

The **Czech RIS3 strategy** is characterized by a flexible format for mission formulation that involves subnational actors. Regions can develop their own missions, which, if they are relevant at the national level, give them access to national funds. This provides strong incentives for subnational actors to contribute to meeting societal challenges with their own initiatives. Similar processes can be found in the Australian CSIRO missions, where regional needs can be addressed directly within the portfolio approach and embedded in the respective mission context.

In the **Austrian mission 'Climate-Neutral City,'** the pioneer cities are also regarded as active partners within the framework of public-public partnerships. The aim is to activate and empower Austrian cities and municipalities to actively shape the necessary system transformation. This is also supported by the legal requirements, as many regulatory powers, such as spatial planning, are located at the municipal level. In general, it can also be argued that the synergy potential of missions and EU regional fund measures has been recognized for the implementation of EU missions in Austria, and that initial steps have been taken to improve the integration and operational implementation of both strands.

Similarly, Japan's **SIP-adus project** was from the outset designed with a broad range of objectives related to autonomous driving systems in order to address pressing societal challenges such as urban traffic congestion and labor shortages in logistics and transportation, especially in rural areas. This comprehensive approach to agenda setting enabled local actors to tailor tests of the project to their specific regional contexts, taking into account factors such as climatic conditions, geographical constraints, population size, and the level of community engagement.

In the case of **Sweden's Impact Innovation**, regional involvement builds on existing networks and implementation experience of the responsible agencies, particularly from the earlier Strategic Innovation Programmes (SIP). Regions were actively involved through a selection process and were able to submit their own mission proposals. Projects are required to involve regional actors. This was supported by targeted dialogue formats, regional co-financing, and trust-based, cross-sectoral cooperation.

In addition to successfully incentivizing participation, the continuous involvement of subnational actors in the implementation of missions is necessary. As the analysis (Chapter 4.1) shows, this is not yet an established standard internationally. Only by involving subnational actors in the feedback process as well will it be possible for subnational actors to help shape the entire process and not be reduced to a role as initiators or local implementers.

Continuous involvement in feedback processes:

The Austrian mission 'Climate-Neutral City' is supported by a comprehensive, continuous evaluation and monitoring process. This monitoring, including a scientific support process, is a special feature of the Austrian implementation compared to other national implementations of the European mission 'Climate-Neutral and Smart Cities.' The interviews with local actors made clear that cooperation within the partnerships is working well. Particular emphasis was placed on the effective feedback on the specific needs of the cities to the responsible STI departments, which enables targeted, needs-based design of tenders and is perceived as very useful.

Japan's mission for autonomous driving systems also promoted a unique model of feedback and regional involvement. Through symposia and workshops, the project brought together a wide range of stakeholders—including the core project team, (international) experts, politicians, industry partners, and regional practitioners—for joint dialogues. These meetings enabled the exchange of insights and experiences across different levels, from national policy to local implementation. The feedback gathered through these interactions was crucial for the annual refinement of the project roadmap and design.

The **ecosystem approach of Swedish Impact Innovation** enables the continuous involvement of the implementation consortia entrusted with the mission – including regions, municipalities, and regional universities – which actively convey their needs and expertise. This is supported by targeted mobilization formats and regional networking arenas.

Closely linked to this is the **understanding of missions as a portfolio of activities and measures.** Such an approach allows subnational actors to address specific sub-areas with their own activities and measures tailored to their regional contexts and needs. **However, this approach also means that the role of the mission owner must change: away from being the central decision-maker and provider of funds for mission implementation, towards an understanding of the mission owner as a conductor who coordinates and connects the various strands of activity and contributions of subnational stakeholders in order to identify synergies and anticipate and counteract negative interactions.** Instead of viewing missions as the primary domain of a single actor (ministry), this means (partially) delegating implementation and further development to other (subnational) actors who can actively help shape the mission.

This shifts the conception of mission implementation toward a **dynamic understanding of implementation** that encompasses various sub-goals and approaches and is continuously evolving.

The mission owner, as the central coordinator, thus continues to play a key role in the successful implementation of missions (Lindner et al. 2023). However, it should be noted that, as was also clarified in the international expert workshop, **the role of a mission owner must adapt over time**. For example, a top-down mission can be delegated to subnational actors for implementation in the long term, so that the mission owner must transform from an initial initiator to a role primarily as a moderator and mediator. Against the backdrop of deeply rooted challenges in interministerial coordination (Lindner et al. 2022), the question arises as to whether the mission owner can act with sufficient agility within the existing structures, or whether institutional innovations, such as a mission agency, would be better suited (Wittmann et al. 2025).

Currently, numerous windows of opportunity appear helpful for realigning the mission-oriented approach with the involvement of the federal states and could be exploited. These include explicit reference to the involvement of the federal states in the context of the High-Tech Agenda Germany, the creation of special assets for infrastructure and climate neutrality (*Sondervermögen für Infrastruktur und Klimaneutralität*) and developments in individual subject areas (e.g., the creation of a strengthened digital ministry at the federal level, current development processes of the RIS3 strategies, and Horizon Europe).

While the specific design always depends on the respective subject area and the constellation of actors involved, a number of key steps can be identified that could be relevant both for the development process of the German government's new High_Tech Agenda and for independent missions, but which also require a break with previous practices, as they rely from the outset on co-creative mission development involving the federal states and other subnational actors:

Identification of potentially relevant mission topics that promise high synergy potential in terms of competencies and, where applicable, existing structures, and in which (individual) federal states have a high level of interest/need for participation (see Chapter 5.1).

- In-depth mapping of issues/challenges, actors, and existing competencies/policy structures, for example, within the framework of a system mapping approach

Co-creative development of mission goals by national and subnational actors, taking into account the following questions:

- Which specific aspect of the respective areas should be addressed?
- What role can/should federal states and other subnational actors play in the implementation of ambitious missions in the multi-level system (co-creators, co-funders, experimenters, etc.)?
- What different (region-specific) sub-goals may be necessary?

Development of an implementation concept for the mission:

- Who is suitable as the responsible mission owner, able to ensure sufficient mobilization and, if necessary, also to adapt their own role over time?
- Who can credibly organize a suitable process for developing interim goals, cause-and-effect relationships, and possible obstacles, and bring the various stakeholders together?
- How can synergies with existing strategies and implementation measures be exploited? What adjustments to existing instruments, etc., are necessary for this?

- Are conceptual support activities (roadmapping support, monitoring, and evaluation) provided by the mission owner or by other actors?
- What resources and contributions are provided by the respective actors?
- What are the different strands of activity/focus areas in the mission? How do they interact?

How can the continuous involvement of relevant stakeholders be ensured, for example in the form of evaluation/monitoring or the further development of implementation plans and roadmaps?

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Appendix

Fact sheets of the case studies

Australia	
	Federal state with six states (and three territories/seven external territories).
Initiative	CSIRO Missions
Specific mission	TowardsNetZero Mission
Key actor	Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Relationship of the mission to the national STI landscape	
	<ul style="list-style-type: none"> • CSIRO's long-term experience with classic mission orientation, challenge-oriented approaches (since 2010), and mission-oriented approaches (since 2019) • Special position of CSIRO in a decentralized/small-scale innovation system with often rather traditional innovation policy instruments
Regional participation	
Type of participation	Co-creator
Level under consideration	Federal states (regional)
Asymmetric participation	Y
	<ul style="list-style-type: none"> • Participation of highly affected individual regions with (industrial production, etc.) in specific projects under the umbrella of the mission
Success factors of regional participation	
	<ul style="list-style-type: none"> • Low thresholds and interest-oriented participation reduce barriers and compensate for limited resources and the mission's restricted mandate • Political change: depoliticization of the conflict (urgency of climate change and changes in voting behavior) • Window of opportunity: Political alignment across multiple levels strengthens policy coherence and simplifies cooperation
Roadmapping/planning equivalents	
Timing	<input checked="" type="checkbox"/> Formulation <input checked="" type="checkbox"/> Design <input checked="" type="checkbox"/> Implementation
Stakeholder groups involved	<input checked="" type="checkbox"/> Politics <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> Economy <input checked="" type="checkbox"/> Civil society <input checked="" type="checkbox"/> Regional actors
Roadmapping equivalents	<input checked="" type="checkbox"/> Clear formulation of objectives <input checked="" type="checkbox"/> Measurable milestones (interim targets) <input checked="" type="checkbox"/> Elaboration of development paths (roadmap/impact pathways) <input checked="" type="checkbox"/> Use of scenarios <input checked="" type="checkbox"/> Identification of catalysts for implementation <input checked="" type="checkbox"/> Monitoring/evaluation processes
	<ul style="list-style-type: none"> • Comprehensive design-thinking process (including mission canvas, roadmap, use of annual KPIs) for the (further) development of missions with a self-developed concept (mission playbook) • Roadmapping activities as a tool for coordination, mobilization of stakeholders, and communication support
Success factors of roadmapping	
	<ul style="list-style-type: none"> • Focus on consensus building as a key prerequisite for mobilizing actors with limited resources/political mandate • Established role of CSIRO with perception as a neutral actor (periphery of innovation system) • Exploratory nature of the missions with low costs of failure

- Process support for the missions by CSIRO's own department

Overall assessment of success factors

- Established mission owner in a rather peripheral position
- Development of an approach that takes the challenges (peripheral position, low budget, low political profile) into account and focuses on stakeholder involvement and consensus building
- Process support Mission owner responsible for implementation
- Needs-oriented, asymmetrical participation with use of political windows of opportunity

Belgium

Federal system characterized by three strong regions (NUTS1) with their own parliaments, regional governments, and extensive powers. Below is the level of the 10 provinces (& Brussels) (NUTS2) and the 43 arrondissements (NUTS3).

Initiative	Wallonia Smart Specialization Strategy (S3Wallonia)
Specific mission	Agri-food Chains & Circular Materials (SIAs)
Key actor	Ministry of Economy, Digital, Research, and Innovation

Relationship of the mission to the national STI landscape

Many years of experience within the framework of the S3 strategy, refocusing/evolution towards a mission approach in 2021 (previously cluster focus). Special position as a purely regional mission with extensive competencies and resources, while also having strong links to the European level

Regional participation

Type of participation	Providers of place-specific solutions
Level under consideration	Sub-states (regional)
Asymmetric participation	N

S3Wallonia is a purely regional mission initiative and thus occupies a special position. The Wallonia region discussed here has extensive powers, while federal influence is limited. In contrast, the role of the EU is very central. The initiative is currently very successful in involving regional stakeholders (quadruple helix) and mobilizing regional resources.

Success factors of regional participation

- Strong political support from key political actors (ministries)
- Regional context facilitates easier involvement and networking of stakeholders (existing networks)
- EU programs and funding instruments serve as an incentive for regional stakeholder participation (perception of increased opportunity for funding through cooperation)

Roadmapping/planning equivalents

Timing	<input checked="" type="checkbox"/> Formulation <input checked="" type="checkbox"/> Design <input checked="" type="checkbox"/> Implementation
Stakeholder groups involved	<input checked="" type="checkbox"/> Politics <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> Economy <input checked="" type="checkbox"/> Civil society <input type="checkbox"/> Regional actors
Roadmapping equivalents	<input checked="" type="checkbox"/> Clear formulation of objectives <input type="checkbox"/> Measurable milestones (interim targets) <input checked="" type="checkbox"/> Elaboration of development paths (roadmap/impact pathways) <input type="checkbox"/> Use of scenarios <input type="checkbox"/> Identification of catalysts for implementation <input checked="" type="checkbox"/> Monitoring/evaluation processes

Roadmapping serves as a method for defining SIAs and regional societal challenges. Its role in implementation is to define strategic goals, promote cooperation, and optimize and pool existing resources/instruments. Roadmapping plays a lesser role in active implementation.

Success factors of roadmapping

- Focus on societal challenges with specific regional framing
- Focus on pooling, optimizing, and increasing the efficiency of existing instruments and mechanisms by actively addressing implementing stakeholders (or their needs)
- Focus on regional stakeholders, facilitated by existing networks

Overall assessment of success factors

S3Wallonia benefits from the strong regional competencies of the region itself, enabling regional projects and experiments that would not be feasible in other systems. At the same time, strong political support and the use and further development of existing measures, policies, and networks, as well as reference to EU instruments and objectives, ensure that there are strong incentives for stakeholder participation.

Japan

A rather centrally organized state consisting of 47 prefectures and a municipal level of cities, villages, and (special) districts in Tokyo.

Initiative	Strategic Innovation Promotion Programme
Specific mission	Automated Driving Systems (Adus 1 & 2)
Key actor	Cabinet Office Council of Science, Technology, and Innovation

Relationship of the mission to the national STI landscape

The mission was unique in terms of decision-making processes, budget size, and scope of implementation. Centralization at the government level strengthened cooperation between ministries and the public, private, and academic sectors on issues considered national priorities.

Regional involvement

Type of participation	Beneficiaries
Level under consideration	Metropolitan regions (local) and municipalities (local)
Asymmetric participation	Y

Regions with motivated leaders and innovative agendas were selected. Workshops and conferences facilitated horizontal and vertical communication between the regions and the project team. A feasibility study prior to the official participation of the regions led to successful implementation (pilot trials (1st term). Pilot trials and implementation (2nd term).

Success factors of regional participation

Formal and informal communication channels between regional leaders and project members. Cross-departmental cooperation, supported by the project team's leadership, enabled smooth implementation, e.g., of guidelines. Effective coordination among stakeholders, a culture of harmony, and strong stakeholder networks are relevant success factors.

Roadmapping/planning equivalents

Time	<input checked="" type="checkbox"/> Formulation <input checked="" type="checkbox"/> Design <input checked="" type="checkbox"/> Implementation
Stakeholder groups involved	<input checked="" type="checkbox"/> Politics <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> Economy <input checked="" type="checkbox"/> Civil society <input checked="" type="checkbox"/> Regional actors
Roadmapping equivalents	<input checked="" type="checkbox"/> Clear formulation of objectives <input checked="" type="checkbox"/> Measurable milestones (interim targets) <input checked="" type="checkbox"/> Elaboration of development paths (roadmap/impact pathways) <input type="checkbox"/> Use of scenarios <input type="checkbox"/> Identification of catalysts for implementation <input checked="" type="checkbox"/> Monitoring/evaluation processes

The roadmap was originally developed by the subcommittee in the Prime Minister's Office in collaboration with industry and regional stakeholders. The roadmap was evaluated and amended each year based on the program's progress.

Success factors of roadmapping

Active involvement of stakeholders, especially the automotive industry, which had not previously been involved in the political arena. The roadmap was aligned with technological regulations that corresponded to the categories of traffic regulations.

Overall assessment of success factors

A top-down style of project management overcame divisive role distribution and a lack of cooperation between ministries and regions. Networks of stakeholders and formal and informal communication between them. Active participation of industry, including competing companies.

Netherlands

The Netherlands is a decentralized unitary state consisting of 12 provinces (NUTS2), each with its own parliament and government.

Initiative	Mission-driven Top Sector Policy
Specific mission	Circular Economy Mission / Transition agenda Consumer goods
Key actor	Mission teams, Knowledge and Innovation Covenants (KICs), transition teams

Relationship between the mission and the national STI landscape

TopSectors as a central focus point for STI policy with a long tradition of stakeholder participation. Building on existing structures and further developing them into a mission-oriented approach.

Regional participation

Type of participation	Co-funder
Level under consideration	Provinces (regional)
Asymmetric participation	Y

Topic-specific approach: Ranges from bottom-up-driven participation approaches (transition team consumer goods) to approaches at the national level within a mission that are more focused on mobilization/coordination

Success factors of regional participation

- Breaking down national/complex missions to the respective spatial context as an opportunity to ensure connectivity.
- Regional participation opportunities vary due to the heterogeneity of regions (size, economic power, potentially influential (large) cities).
- Spatial and content-related opportunity structures: Thematic starting points through institutional competencies or localization of concrete implementation projects

Roadmapping/planning equivalents

Timing	<input checked="" type="checkbox"/> Formulation <input checked="" type="checkbox"/> Design <input checked="" type="checkbox"/> Implementation
Stakeholder groups involved	<input checked="" type="checkbox"/> Politics <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> Economy <input checked="" type="checkbox"/> Civil society <input checked="" type="checkbox"/> Regional actors
Roadmapping equivalents	<input checked="" type="checkbox"/> Clear formulation of objectives <input checked="" type="checkbox"/> Measurable milestones (interim targets) <input checked="" type="checkbox"/> Elaboration of development paths (roadmap/impact pathways) <input checked="" type="checkbox"/> Use of scenarios <input checked="" type="checkbox"/> Identification of catalysts for implementation <input checked="" type="checkbox"/> Monitoring/evaluation processes

- Different approaches of the respective transition teams with a more top-down (construction) vs. bottom-up (consumer goods) orientation
- Concrete implementation components of roadmapping also depend on data availability and available resources (use of secondary data)

Success factors of roadmapping

- Context-specific approach for respective transition agendas
- Strong academic support through extensive expertise in transition management in the Netherlands
- Uptake of inputs also depends on staffing in the respective ministries

Overall assessment of success factors

- Heterogeneous, context-specific implementation approaches (supported by rather detailed definitions of sub-goals)
- Building on existing structures (transition teams, top sectors) and gradual further development

Austria

Federally organized but weak federal state consisting of 9 federal states (NUTS2), 79 districts and over 2000 municipalities (grouped at NUTS3 level).

Initiative	National implementation of EU missions based on preliminary work by cities and ministries
Specific mission	EU mission 'Climate-neutral city'
Key actor	Ministry (formerly BMK, now BMIMI) and Mission Action Groups (MAGs), staffed by stakeholders from research, ministries, local government, (in part) industry, and NGOs, coordinated by MAG co-chairs (STI & sectoral) and funding agencies (FFG, KLIEN), agencies tasked with the accompanying process.
Relationship of the mission to the national STI landscape	
Austria has traditionally pursued an input-oriented STI policy without a mission character (OECD study 2020). The implementation of the EU missions therefore represents an adjustment to the previous STI policy, but is embedded in the Austrian STI Strategy 2030 (<i>FTI-Strategie 2030</i>) launched in 2020, which establishes cross-sectoral STI governance.	
Regional participation	
Type	Experimenters
Level under consideration	Cities (local)
Asymmetric participation	Y
<ul style="list-style-type: none"> • Establishment of public-public partnerships between the federal government and ten cities (>50,000 inhabitants) as part of the Pioneer City Initiative • Support for other small and medium-sized pioneer cities • Implementation of climate-neutral urban districts • 35 cities in total 	
Success factors of regional participation	
<ul style="list-style-type: none"> • Pioneer cities are regarded as creative partners within the framework of public-public partnerships. • The aim is to activate and empower Austrian cities and municipalities to actively shape the necessary system transformation • Autonomy of the city as a central component; cities as active partners in STI and thus also significantly more often partners in STI projects • The federal state level is not integrated into the public-public partnership, which makes decisions less complex and more agile and creates ownership at the local level 	
Roadmapping/planning equivalents	
Timing	<input checked="" type="checkbox"/> Formulation <input checked="" type="checkbox"/> Design <input checked="" type="checkbox"/> Implementation
Stakeholder groups involved	<input checked="" type="checkbox"/> Politics <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> Economy <input checked="" type="checkbox"/> Civil society <input checked="" type="checkbox"/> Regional actors
Roadmapping equivalents	<input checked="" type="checkbox"/> Clear formulation of objectives <input checked="" type="checkbox"/> Measurable milestones (interim targets) <input checked="" type="checkbox"/> Elaboration of development paths (roadmap/impact pathways) <input type="checkbox"/> Use of scenarios <input checked="" type="checkbox"/> Identification of catalysts for implementation <input checked="" type="checkbox"/> Monitoring/evaluation processes
<ul style="list-style-type: none"> • Strategic coordination of the Climate-Neutral City mission through action plans (2025) based on the earlier implementation framework (2023) • Elaboration of development paths/impact pathways • Monitoring and evaluation (e.g., impact and evaluation plans, annual review meetings, ongoing evaluation of climate-neutral cities) • Accompanying evaluation for the mission 	
Success factors of roadmapping	
<ul style="list-style-type: none"> • Action plans build on existing instruments (e.g., 'People in STI' from the STI strategy) and self-initiated measures (own contribution) 	

- Focusing on a few pioneering cities as a starting point for system transformation creates space for context-sensitive learning and strategic depth

Overall assessment of success factors

- Public-public partnership between a strong mission owner (ministry) and local actors with active ownership through creative freedom
- Good cooperation in the partnerships; feedback on specific needs from the cities to FTI resorts for targeted calls for proposals
- Previous funding programs paved the way for the Cities Mission in Austria by providing resources and building a community of practice
- Joint commitment of a 'coalition of the willing' as a resource (due to limited funds)
- Comprehensive support process

Sweden

Rather centralized state consisting of 21 provinces (NUTS3) and (below that) 290 municipalities (LAU). Eight regions form the NUTS2 level but are mainly used for statistical purposes.

Initiative	Impact Innovation (launched in 2024)
Specific mission	Entire program (currently 5 IMIN programs)
Key actor	Coordinated by three agencies (Vinnova, Formas, Energy Agency)

Relationship of the mission to the national STI landscape

Impact Innovation is the continued development of the Strategic Innovation Programmes (SIP, 2013–2029) with a focus on societal challenges and the application of an ecosystem approach. Missions are derived from three 'grand challenges' and topics are specified.

Regional participation

Type	Co-creator
Level under consideration	Regions (regional)
Asymmetric participation	Y

The actors involved formulate their theory of change in the respective IMIN program. Regional networks of actors were already involved in the development of mission proposals in the first phase (IMIN selection process). The ecosystem approach promotes regional responsibility, and subnational authorities can participate as partners in programs. Consortia introduce regional needs and expertise to the programs. This is supported by targeted mobilization formats, networking arenas, and supplementary funding at the regional level.

Success factors of regional participation

The involvement of many stakeholders dates back to earlier SIP initiatives. Regional involvement through an open selection process in which regions submit their own mission proposals. Projects must actively involve the respective region. Trust-based, cross-sectoral cooperation, targeted dialogue, information, and exchange formats, competence building, regional co-financing, and the involvement of regional innovation stakeholders promoted participation.

Timing	Roadmapping/planning equivalents
Stakeholder groups involved	<input checked="" type="checkbox"/> Formulation <input checked="" type="checkbox"/> Design <input checked="" type="checkbox"/> Implementation <input checked="" type="checkbox"/> Politics <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> Economy <input checked="" type="checkbox"/> Civil society <input checked="" type="checkbox"/> Regional actors
Roadmapping equivalents	<input checked="" type="checkbox"/> Clear formulation of objectives <input checked="" type="checkbox"/> Measurable milestones (interim targets) <input checked="" type="checkbox"/> Elaboration of development paths (roadmap/impact pathways) <input type="checkbox"/> Use of scenarios <input checked="" type="checkbox"/> Identification of catalysts for implementation <input checked="" type="checkbox"/> Monitoring/evaluation processes

The entire program is based on an intervention-wide and continuously evolving theory of change. Roadmapping over a longer period of time is considered too rigid. Core elements are the preparatory mission proposals, which not only serve strategic planning purposes but also form the basis for selection, monitoring,

reorientation, and evaluation during the course of the program. The formulation took place in a preliminary study phase before the five IMIN programs were launched. This also requires more agile and adaptable evaluation systems.

Success factors of roadmapping

Small, early grants for the development of mission proposals. The participatory approach, long-term funding prospects, and clear evaluation criteria that were reviewed regularly created incentives for strategic planning. Politically and culturally, trust in self-organized processes and open calls for proposals encouraged broad participation. Methodological support services such as systemic perspectives, impact logic, formative evaluation, and foresight.

Overall assessment of success factors

- Selection process, following the structure: Grand Challenges > Missions or > Soliciting proposals and > Implementing topic-related RTI projects
- Ecosystem approach: (early) involvement of diverse actors and long-term funding prospects
- Combination of strategic openness, regional anchoring, and continuous evaluation
- Learning-oriented instruments such as impact logics, portfolio analyses, and formative evaluation to enable adaptability and strategic control over the term

Spain

Spain is a decentralized unitary state with 17 autonomous communities and 2 autonomous cities that have extensive legislative powers but do not correspond to a classic federal system. At the NUTS2 level, Spain comprises 19 regions, while the NUTS3 level consists of approximately 47 provinces.

Initiative	National implementation of climate adaptation missions
Specific mission	EU Mission Climate Adaptation
Key actor	Spanish Office for Climate Change, Fundación Biodiversidad (Biodiversity Foundation), National Parks Autonomous Agency, Spanish Meteorological Agency (AEMET), Portuguese Environmental Agency

Relationship of the mission to the national STI landscape

The mission builds on previous national strategies, integrating scientific findings and measures at various levels into a more comprehensive governance framework. Impulses come in particular from the Spanish government (climate adaptation as a national priority) and from the European Union (financial support and guidelines). The decentralized administrative structure requires close coordination between the levels to ensure coherent further development.

	Regional participation
Type	Providers of place-specific solutions
Level under consideration	Regions (regional)
Asymmetric participation	Y

Spain's autonomous communities develop and implement adaptation strategies at the regional level. The autonomous communities work closely with local authorities, civil society, and other stakeholders to assess climate risks, improve early warning systems, and promote climate-resilient measures. Their legislative autonomy enables the communities to drive forward innovative solutions.

Success factors of regional participation

- Existence of vertical and horizontal coordination bodies (Comisión de Coordinación de Políticas de Cambio Climático (CCPCC); Red Española de Ciudades por el Clima (RECC)).
- National adaptation strategies (PNACC) promoted greater cross-sectoral integration and financing through European programs (e.g., ESF+).
- Scientific and civil society actors provide knowledge and promote participatory processes.
- Institutional coordination and political will as decisive factors

	Roadmapping/planning equivalents
Timing	<input checked="" type="checkbox"/> Formulation <input checked="" type="checkbox"/> Design <input type="checkbox"/> Implementation

Stakeholder groups involved	<input checked="" type="checkbox"/> Politics <input checked="" type="checkbox"/> Science <input checked="" type="checkbox"/> Economy <input checked="" type="checkbox"/> Civil society <input checked="" type="checkbox"/> Regional actors
Roadmapping equivalents	<input checked="" type="checkbox"/> Clear formulation of objectives <input checked="" type="checkbox"/> Measurable milestones (interim targets) <input checked="" type="checkbox"/> Elaboration of development paths (roadmap/impact pathways) <input checked="" type="checkbox"/> Use of scenarios <input type="checkbox"/> Identification of catalysts for implementation <input checked="" type="checkbox"/> Monitoring/evaluation processes
	<ul style="list-style-type: none"> • Roadmapping equivalent: Plan Nacional de Adaptación al Cambio Climático (PNACC), which is implemented through multi-year work programs. Serves as a strategic planning tool and includes measures for identifying risks, implementing adaptation measures, and evaluating and assessing them. • The PNACC's success is assessed based on indicators that measure progress in adaptation, sectoral measures, and integration into national and regional policies. (Planning, monitoring, evaluation)
Success factors of roadmapping	<ul style="list-style-type: none"> • Support through institutional regulations and integration into the national strategy, in particular through the National Climate Adaptation Strategy (PNACC) 2021-2030. • European Union support programs and regulatory guidelines create a framework for long-term planning. • Scientific institutions and civil society actors provide data and participatory processes for the development of roadmaps.
Overall assessment of success factors	<ul style="list-style-type: none"> • Successful implementation through an integrative multi-level governance approach that closely involves regional and local actors and creates trust-based networks and control mechanisms between different policy areas at an early stage. • Political traditions and federal structures lead to varying degrees of regional progress in implementation. • Clear regulatory frameworks and innovative financing models contribute to the anchoring of sustainable measures. • Political and cultural factors (e.g., public perception of climate risks) promote the participation of local actors and the emergence of innovative approaches.

Czechia

Rather centralized state with 14 small regions (NUTS3) as self-governing territorial units. NUTS2 only statistical unit.

Initiative	National Research and Innovation Strategy for Smart Specialization (RIS3)
Specific Mission	National Mission of Resource Productivity
Key actor	Czech Ministry of Industry and Trade

Relationship of the mission to the national STI landscape

- First-time integration of a mission-oriented approach in the form of two missions within the framework of the Smart Specialization Strategy as a supplement to thematic priorities (gradual expansion)
- Impetus provided by EU focus on missions

Regional participation

Type	Co-creator
Level under consideration	Kraje (regional)
Asymmetric participation	Y

- Different forms of regional participation:
 - i) Participation: Support for national missions by regions in the form of contributions, in particular through earmarking of funds in OPs (IROP) and participation in steering committees, currently used by 5 of the 14 regions
 - ii) Regions can submit proposals for national missions

Success factors of regional participation

- Limited regional capacities as motivation to establish a common framework and thus remove barriers to participation (and avoid fragmentation)
- Mission orientation as an opportunity to bring topics closer to the specific needs of regional units/create connectivity/establish a framework for the implementation of potentially relevant projects

Roadmapping/planning equivalents

Timing

- Formulation Design Implementation

Stakeholder groups involved

- Politics Science Economy
- Civil society Regional actors

Roadmapping equivalents

- Clear formulation of objectives Measurable milestones (interim targets)
- Elaboration of development paths (roadmap/impact pathways)
- Use of scenarios Identification of catalysts for implementation
- Monitoring/evaluation processes

- Roadmapping approaches as a tool for coordination and participation, less for the development of new instruments (lack of mission budget)

Success factors of roadmapping

- Targeted search for support from the middle political level
- Combination of top-down (meta-analysis) and bottom-up elements (resource provision by regional actors)
- Use of existing experience and expertise from the RIS3 development process

Overall assessment of success factors

- Creation of a differentiated and flexible approach to participation, even with limited institutional resources
- Influence of overarching policy-making (EU) as a source of impetus and point of reference
- Gradual and evolutionary development process drawing on existing resources and structures

Summary: International Workshop 'Mission-oriented R&I policies between national strategies and sub-national implementation'

Objectives and structure of the workshop

The implementation and execution of mission-oriented R&I strategies and policies continue to present major governance challenges. One key challenge concerns the alignment processes between national missions and their sub-national implementation. The German Stifterverband has commissioned the Fraunhofer Institute for Systems and Innovation Research in cooperation with AIT Austrian Institute of Technology and Joanneum Research to investigate international practices of how alignment processes in relation to missions are governed in a multi-level setting, and how these practices are influenced and conditioned by political institutions and culture, but also by domain- and sector-specific context conditions.

The objective of this workshop was to bring together international practitioners and experts in mission realization to discuss the cross-cutting aspects of coordination mechanisms at the intersection of national and sub-national governance levels. The discussion was based on dimensions identified based on an analysis of individual mission implementation processes from more than 20 countries worldwide and was further deepened through in-depth case studies of missions in eight selected countries.

The following table presents the eight missions that were focused on in depth:

Mission	Country
Towards NetZero Mission	Australia
Climate neutral cities	Austria
Smart specialization Strategy (S3)	Wallonia (Belgium)
National mission of resource productivity	Czech Republic
Climate Adaptation Mission	Spain
Strategic Innovation Promotion Program	Japan
Circular Economy Mission	Netherlands
Impact Innovation	Sweden

Participants

In addition to the project team, the workshop participants consisted of eight experts with specific knowledge of the implementation of missions in the selected country cases and their respective institutional environments, six generalist experts with a broad overview of mission-oriented innovation policies, and three experts from the German Stifterverband.

Four key dimensions in focus

The following four dimensions were identified as particularly relevant to the practices of aligning national and sub-national activities related to missions and were therefore discussed in the workshop.

- **Dimension 1** - Position of mission owner within the innovation system (central vs. peripheral):
- **Dimension 2** - Cooperation culture (tradition of intersectoral cooperation vs. sectoral/disciplinary communities in STI policy)
- **Dimension 3** - Governance culture (government-led STI planning culture vs. bottom-up stakeholder involvement-oriented approach)
- **Dimension 4** - Political system (centralization vs. decentralization)⁸

The participants were divided into two groups to discuss the identified key dimensions, with Group A starting with Dimension 1 and Group B starting with Dimension 3.

For each of the four dimensions, the following guiding questions were discussed:

Positioning – How missions are positioned within the spectrum of the respective dimension and identifying typical trends in positioning.

Challenges – Identifying challenges in mission design and implementation related to the dimension and discussing potential solutions.

Influence on multi-level implementation – How is the respective dimension influencing multi-level implementation?

Implications for Germany – Consolidating the insights gained and reflecting on their broader implications.

The discussion was facilitated using a Miro board to capture and structure the results. The present synthesis report brings together the findings from both groups.

Summary of key discussion outcomes

Dimension 1 – Position of mission owner within the innovation system (center vs. periphery)

Description

Missions are usually driven by a set of key guiding actors (mission owners). Depending on the position of these mission owners within an innovation system (e.g., peripheral agency vs. key ministry with vast resources and regulatory power), this position has multiple implications for the way a mission owner can shape a mission, mobilize further stakeholders for action, or experiment with novel approaches.

Q1: Positioning of the mission owner

In response to the first question, participants were asked to position their mission along a continuum from 'central' to 'peripheral,' indicating where they perceive the owner of their specific mission to be located.

Overall, we saw a tendency towards missions being led by central actors; exceptions are CSIRO (AU) and Finland (in general) as well as SIP (JPN). In the latter two cases, central oversight and control was kept at the top level of entire programs, while specific promotional agencies or other decentralized management structures steered the activities at the level of individual themes.

- **Peripheral:** Implementation depends strongly on the content and structure of a mission and how collaboration between different actors is organized in practice (e.g., through cooperation

⁸ At the workshop, observations regarding Dimension 4 were included in Dimension 3.

of central mission owner with peripheral actors on key mission issues) – AU, Finland (partially), Japan (partially).

- **Central:** CZ, currently central but using missions towards regional presentation etc. (though outside the scope of this dimension) – mostly towards implementation.

Mission ownership is subject to dynamic positioning, i.e., the distinction between central and peripheral mission owners may evolve over time; in Austria, the reorganisation of responsibilities at the ministry in charge of mission policy led to a shift toward a more decentralized approach and a strengthening of the role of thematic units.

Further aspects related to the positioning of the mission owner:

- Emergence of new actor groups can challenge binary central-peripheral logic
- Research institutions, such as those in Flanders, increasingly initiate and execute missions independently (or at arm's length) from government, reshaping traditional governance roles.
- Positioning of mission owners is strongly influenced by mission phase
- Early design phases tend to feature centralized leadership, while implementation is often delegated to peripheral or regional actors. However, the effectiveness of implementation may suffer if regional actors lack the necessary resources and competences, highlighting the need for their early involvement in the mission design process.
- Effective regional outreach is essential despite centralized governance
- Even in highly centralized systems, regional engagement is critical for the successful operationalization of missions. A disconnect between mission objectives and local priorities often hinders uptake, especially at the municipal level.
- Formalized local partnerships offer promising solutions
- Instruments such as contractual agreements with municipalities can help ensure joint ownership and stronger alignment with local interests

Q2: Challenges to mission owner based on positioning regarding the different phase of mission orientation

Challenges in the formation phase:

- **Establishing clear legitimacy** to lead, particularly when institutional support is fragmented and political interest in the mission concept remains low.
- Determining the **appropriate degree of centralization** is critical, as early dominance by central actors can streamline design but risks sidelining regional implementers essential for later stages.
- **Balancing ambitious goals with the need for incumbent buy-in** proves difficult, while missions' cross-cutting nature limits political incentives for leadership engagement, requiring strong backing from central executive offices.
- **Securing participation from sectoral ministries** requires formalized coordination structures and even extensive stakeholder engagement efforts, but often leaves critical groups, such as industry actors, underrepresented.
- Finally, **aligning top-down authority with bottom-up dynamics** remains a challenge, particularly in decentralized systems where vertical coordination across political levels is harder than horizontal stakeholder integration.

Challenges in the design phase:

- Effectively involving important stakeholders in co-creation while maintaining alignment with existing sectoral strategies, and simultaneously building entirely new mission frameworks, including intervention logics and intermediary goals.

- Structured approaches such as developing Theories of Change are crucial, but **governance models must remain flexible to accommodate mission evolution** during scaling.
- **Preventing 'mission capture' by dominant incumbents** requires broad stakeholder engagement beyond the research sector.
- **Political buy-in must be secured early on**, particularly in multi-level governance systems, ensuring coherent policy frameworks across government levels.
- Addressing the needs of cities **demands innovative instruments** like equitable public-public partnerships between federal and local actors. Early involvement of implementing actors is critical to enhance mission relevance and feasibility.
- **Sufficient preparation time combined with adaptive design processes** is essential for developing robust implementation strategies across technological, business, governance, human resource, and societal dimensions.

Challenges in the implementation phase

- High expectations contrasted with insufficient political backing, resulting in **limited mobilization**.
- **Diverging political priorities** between national and regional levels complicate partnerships, while rigidities in adapting or combining existing policy instruments hinder operational flexibility.
- **Coordinated adjustment of funding** mechanisms across governance levels is essential.
- Missions often struggle to mobilize and orient large-scale funding and regulatory frameworks toward their goals and face the **risk of misalignment with local needs**.
- Identifying and engaging local mission owners and practitioners through existing networks, and **deploying structured public-private roadmaps**, are critical to fostering effective implementation collaborations.

Challenges in monitoring and learning

- Legitimising **new approaches to performance assessment** even within mission-owning organisations.
- Early establishment of **monitoring, evaluation, and learning frameworks** with indicators and data structures enables systematic learning; absence of such structures hampers adaptation.

Q3: How does the mission owner's position influence the multi-level implementation of mission realization, and how did this unfold in your specific mission context?

Central mission owners:

- Central mission owners benefit from **easier access to political support, high-level approval, resources, and instruments**, which facilitates the legitimisation of missions.
- Being positioned close to the political center enables **faster coalition-building across governance levels** and makes it easier to translate mission ideas into actionable steps.
- However, central owners **face significant challenges in mobilizing and aligning distributed and sectoral actors**, particularly during the design phase when operationalizing missions requires broader collaboration.
- Without mechanisms for inclusive engagement, central leadership **risks creating missions that are politically endorsed but poorly grounded in operational realities**.

Peripheral mission owners:

- Peripheral mission owners, by contrast, often struggle with **limited political legitimacy** and weaker resource access but gain strategic advantages through **greater flexibility, stronger engagement at local levels**, and the ability to operate with lower political visibility.

- Their position **enables experimentation, early piloting of approaches**, and stronger adaptation to regional and community needs, thus fostering system learning and local ownership.
- They face the challenge of translating abstract mission goals into tangible issues relevant to local actors and of **coordinating efforts without strong formal mandates**.
- Effective peripheral leadership requires the combination of governance, funding, and ambassadorial roles to build credibility and **mobilize action across decentralized systems**.
- Leveraging existing networks, maintaining momentum through early successes, and **anchoring missions in concrete local priorities** are critical strategies for overcoming structural disadvantages in political weight.

Conclusion:

- Central mission owners have advantages in political mobilization and resource access but must develop mechanisms for inclusive engagement.
- Peripheral mission owners, while facing legitimacy and resource challenges, are crucial for fostering experimentation, grassroots anchoring, and long-term adaptability of mission frameworks.

Q4: Implications for Germany

Situation in Germany

- Mission orientation lacks political backing: Although six missions were outlined under the Zukunftsstrategie, missions have not become a strategic political focus.
- Responsibility was pushed to lower ministerial levels, weakening momentum and leadership.
- Cross-departmental structures exist but lack effective decision-making power; horizontal coordination without authority.
- There is no strong top-level political framework supporting mission realization.
- Missions lack concrete, operationalized roadmaps guiding implementation.
- Mission terminology (e.g. MOIP) does not appear in recent coalition discussions; the term is politically 'burned' and absent from major strategies.
- However, topics such as technological sovereignty and leadership, or defense play an increasingly important role in political discourses and call for a more extensive use of mission-oriented approaches, though without necessarily using that terminology.

Potential starting points for learnings for Germany

- **Mission orientation requires visible political ownership at all levels.** Without strong top-level commitment—national and EU—missions risk remaining administratively fragmented; political momentum must be built systematically across governance levels, and should not be taken for granted.
- Isolated mission initiatives lack traction; connecting missions to established regional strategies (e.g., Smart Specialization) or national umbrella programs (e.g., Top Sector Mission strategy in the Netherlands, or Strategic Innovation Programs in Japan), and aligning them with dominant policy narratives (**embedding missions in mainstream policy architectures**) enhances their viability.
- Successful mission realization hinges upon creating **institutional frameworks** that combine central oversight with delegated agency and resources at regional levels; system positioning is as critical as the mission content itself.
- In an environment where the mission-oriented approach is politically sensitive or marginalized ('burned term'), advancing missions thinking depends on **showing practical, policy-compatible successes rather than promoting abstract concepts**. The term 'missions' is not needed for advancing missions thinking, as long as key features of mission orientation (e.g., clear and

ambitious goals, impact orientation, clear timeframe, cross-sectoral bundling of resources and instruments, multi-level coordination, stakeholder mobilization, etc.) are retained.

Conclusion for Dimension 1: Position of mission owner within the innovation system (center vs. periphery)

The position of the mission owner—whether centrally anchored or more peripherally located—**critically shapes the practices of aligning national and subnational mission activities.**

Overall, the analysis shows a **predominance of central ownership structures**, where proximity to political centers **facilitates mission legitimization, political support, resource mobilization**, and the **articulation of mission frameworks**. However, strong centralization often **challenges the mobilization of distributed actors** and risks weakening operational alignment at regional and local levels, particularly if inclusive engagement mechanisms are lacking.

Peripheral positioning, though **associated with weaker political authority and less legitimisation** and resource access, offers strategic advantages for **building stronger local ownership, fostering experimentation**, and adapting missions to community needs. Effective mission realisation thus depends not only on political positioning but also on the **ability of mission owners to dynamically combine central coordination with delegated authority and support for regional actors.**

Mission ownership is not static but evolves over time and across mission phases: central leadership tends to dominate early design stages, while implementation often requires stronger regional engagement.

The **emergence of new actor groups** and the necessity for flexible governance models **challenge the traditional central-peripheral dichotomy**, underscoring the importance of adaptability in mission governance structures.

Successful alignment between national and subnational levels further hinges on early and systematic stakeholder involvement, the establishment of formalized cooperation mechanisms (e.g., public-public partnerships), and the **translation of overarching mission goals into regionally relevant and operational frameworks.**

Dimension 2 – Cooperation culture (Tradition of intersectoral cooperation vs. sectoral/disciplinary communities in STI Policy)

Description

While mission-oriented policies aim to push for a cross-departmental approach, many countries are still strongly embedded in a tradition of sectoral/disciplinary communities, making it difficult to reach out beyond STI policy ('STI trap', 'policy trap'). Countries may therefore differ with regard to the prevalence of (an already established) tradition of intersectoral cooperation and the extent to which interlinkages between STI policy and related fields have already been achieved.

Q1: Where do you position your specific mission with regard to the cooperation culture?

Tradition of Intersectoral Cooperation

Some participants argued that political systems with a **strong tradition of intersectoral collaboration** provide a favorable environment for mission-oriented work.

- Missions inherently require intersectoral cooperation, and where political-level cooperation is weak, agencies can compensate for this top-level cooperation if they have adequate resources and competencies.
- Countries such as Norway, the Netherlands, and Sweden are cited as examples of good practice, where cross-sectoral collaboration is institutionally anchored and culturally embedded.

Moderate or Emerging Cooperation

Several participants report improving but still incomplete cooperation patterns, indicating that while progress has been made, cooperation culture is still developing or context-dependent.

- In the Czech Republic, the 'Resource Efficiency' mission uses a flexible system of updating RIS3 priorities, which improves the understanding of national and regional trends, though it primarily strengthens alignment rather than full integration across sectors.
- In Japan's SIP program, a coordination mechanism is established under the Cabinet Office. However, effective intersectoral collaboration depends heavily on the commitment and urgency perceived by individual ministries and stakeholders. On the implementation side, cooperation among agencies and stakeholders is growing.
- In Austria, intersectoral collaboration has been strengthened during recent years of mission implementation; earlier more fragmented patterns have started to be overcome (e.g., in terms of inter-ministerial cooperation). Collaboration success often hinges upon common interests in the context of targeted initiatives and instruments.
- At the local level, cooperation strongly depends on the leadership of mayors and the historical experience of the respective cities. In many municipalities, siloed structures still prevail, making bottom-up mission efforts uneven.

Participants in this group acknowledge positive dynamics but stress that cooperation is not yet systemic or fully reliable.

Dominance of Sectoral or Disciplinary Communities

Some participants experience persistent sectoral fragmentation, making mission implementation significantly more difficult.

- In Germany, mission orientation is strongly challenged by entrenched sectoral and disciplinary communities, limiting cross-sectoral work.

- In Flanders (FL), there is an active push for interdisciplinary and cross-sectoral stakeholder consultations within R&I (Research and Innovation). However, these consultations remain largely driven by R&I interests, suggesting that broader cross-sectoral cooperation beyond the research system is still limited.

Dimension 3 - Governance culture (Government-led STI planning culture vs. bottom-up stakeholder involvement-oriented approach)⁹

Description

The formulation, design, and implementation of missions may be embedded into different STI governance approaches that may differ across countries. On the one hand, countries may rely on a strong role of (central) government pursuing a hierarchical top-down approach that prioritizes an overarching strategy/goals. On the other hand, countries may rather rely on a bottom-up driven approach trying to develop priorities based on the interplay of different stakeholder groups. Depending on the prevailing governance culture, different modes of policy development might be dominant.

Q1: Where do you position the cases within the spectrum covered by the dimension, and why?

In many cases, mission ownership reflects a hybrid of top-down steering and bottom-up engagement. European missions increasingly combine government-led direction with stakeholder-driven input, resulting in diverse governance patterns across regions.

Relevant aspects related to the configuration of mission ownership:

- Mission development displays both **centralized and decentralized dynamics**. National-level formulation remains common (e.g., Spain, where mission goals were defined by the government), yet many regions witness significant local initiative shaping mission pathways.
- **Ownership, dialogue, and collaboration**. Regions such as Wallonia and Valencia illustrate stakeholder-driven approaches, with strong involvement from local governments, SMEs, and civil society actors.
- National strategies are evolving toward greater **inclusivity**. The Netherlands illustrates a shift from an industry-centred model to one that increasingly integrates regional actors, municipalities, and knowledge institutions.
- **Fragmentation** remains a persistent governance challenge. While numerous mission-related initiatives exist at EU, national, and regional levels, coordination and strategic alignment across these tiers remain limited.
- Stakeholders call for improved **cross-domain coordination**. Effective mission governance requires linking thematic missions with broader policy fields such as industry, agriculture, and regional development to enhance coherence and impact.
- Early involvement of **civil society and local actors** is critical. Missions benefit when local stakeholders are engaged not only during implementation, but also in the co-design and agenda-setting phases.

Country-specific illustrations: In Spain, a nationally led 'mirror' approach guided by the CDTI aimed to align with EU missions but struggled to connect with regional and local dynamics. , Valencia launched an initiative linking mission cities with climate adaptation, which lost momentum due to

⁹ Including observations regarding Dimension 4 (Political System – Centralization vs. Decentralization).

political shifts. In Wallonia and France, missions evolved from EU-driven beginnings to regionally owned strategies emphasizing local priorities. The Netherlands transitioned from a top-down, industry-focused model to a more decentralized approach, increasingly involving cities and academic institutions in mission design and implementation.

In sum, there is growing recognition that missions must be co-owned by society, not just led by government. Bottom-up governance is increasingly valued for its legitimacy, adaptability, and ability to engage diverse stakeholders. Yet, civil society and SMEs, despite being key actors, remain under-involved. Local political leadership is crucial for ensuring coherence and uptake, particularly at the municipal level. Better integration across governance levels is needed to align EU missions with national and regional agendas.

Q2: What were the most significant challenges encountered during mission implementation in relation to this dimension, and what patterns can we observe across cases?

Mission development often remains top-down, with governments (e.g., Spain) setting priorities without broad societal input. Even where national missions align with EU frameworks like Horizon Europe, ministries and agencies frequently lack a stronger sense of ownership. Progress might be slow, as missions must navigate existing systems and structures, delaying their translation from early concepts into actionable plans.

Despite these challenges, some patterns emerge: Many countries broadly align with the EU's mission logic, though national adaptations differ in terms of inclusivity and organizational structure. In regions such as Wallonia and the Netherlands, missions are increasingly embedded into existing strategic frameworks, like roadmaps and innovation strategies. Some countries, particularly the Netherlands, build on national agendas and established innovation ecosystems to structure mission formation more systematically.

Specific Challenges in the formation, design, and implementation phase:

Coordinating across national departments and regions is difficult, often leading to misalignment between national mission goals and strong regional agendas. There are often tensions between the need for trustful cooperation on the one hand and the necessity of control on the other hand, as decentralized innovation ambitions clash with the need for centralized oversight. Political shifts (e.g., in Valencia) can disrupt continuity, highlighting the fragility of early-stage mission momentum.

Designing appropriate support structures proves complex, particularly where institutional capacity and bureaucratic processes are not suited to agile, mission-oriented approaches. The lack of mission-specific indicators (e.g., Spain) limits effective design, though countries such as Sweden show interest in learning models like the Theory of Change. Building coherent evaluation systems that are adaptive and learning-focused remains a challenge, with limited emphasis on impact in some cases (e.g., Wallonia).

Alignment issues persist during implementation, especially in linking city-level missions with broader adaptation initiatives. Institutional rigidity often hampers operationalization, as traditional structures struggle to match mission-driven goals. Where evaluation frameworks exist (e.g., Japan's annual reviews), they increasingly serve as learning tools rather than merely tracking outputs.

Overall, missions frequently build on existing national frameworks (e.g., Top Sectors and Knowledge Innovation Agendas in the Netherlands), though regional variation remains significant (e.g., Sweden, Japan). Multi-level governance is recognized as essential but is inconsistently integrated. Countries often adapt existing monitoring frameworks (e.g., National Plan for Adaptation to Climate Change PNACC in Spain) to missions, with structured, theory-driven approaches gaining traction (e.g., Netherlands, Japan).

Concrete practices show how countries modify their approaches to roadmapping and strategic planning. In the Netherlands, and to some extent also in Sweden, a structured roadmapping process was developed, combining a theory of change with a detailed monitoring and evaluation agenda. This approach was guided by a National Support Structure that actively engaged public and private stakeholders early in the process. Japan's Cabinet Office coordinated a five-year roadmap for mission-oriented science, technology, and innovation (STI) policies, with annual reviews and continuous revisions to maintain strategic alignment. In Wallonia and France, mission strategies were built through bottom-up processes, with extensive stakeholder consultations ensuring that regional priorities and local expertise were embedded into the design of mission initiatives.

Challenges in monitoring and learning

Approaches to monitoring vary from agile, indicator-based monitoring in Spain to learning-focused evaluations in Wallonia.

Q3: How does the governance culture shape multilevel implementation of missions?

A risk-averse and bureaucratic culture continues to slow down urgent mission action. Traditional institutions often lack a mission-oriented mindset, making them increasingly 'unfit for purpose' in dynamic contexts. The persistent tension between control and trust creates systemic bottlenecks, while siloed structures hinder cross-sector collaboration, particularly in bottom-up efforts like those seen in Wallonia. Misalignments across governance levels, such as between Dutch cities' 2050 targets and the national 2030 goals, reveal challenges in synchronizing different mission types and timelines. Translating broad EU missions into effective regional action also remains difficult. Early government-led approaches, such as in the Netherlands and Japan, streamlined decision-making but often lacked deep local engagement, risking disconnects in mission uptake.

In response, emerging ideas call for more risk-tolerant and flexible approaches. Missions should be anchored locally through concrete, shared problems, such as housing, to build relevance and ownership. Embedding missions into existing regulatory frameworks is seen as key for ensuring continuity and resilience. More broadly, missions are increasingly viewed not just as innovation policy tools, but as strategic instruments to strengthen Europe's future economic autonomy and resilience.

Q4: Implications for Germany

Administrative buy-in is critical for the success of missions but remains difficult to achieve. Rigid political and institutional structures often limit the flexibility and innovation that mission-oriented approaches require. At the same time, simply setting up a mission and stepping back is somewhat unlikely to succeed in the Germany context. Stronger regional involvement will be necessary, but this requires clearer roles, targeted incentives, and supportive structures to be effective.

Specifically for Germany, caution is advised against creating entirely new institutions without first considering reforms to existing structures. Leveraging and aligning established frameworks could provide a more stable foundation for mission-driven policies. It is also crucial to integrate local and regional inputs more systematically, in line with Germany's strong federal and regional competencies. Aligning mission strategies with broader economic and environmental goals, such as strategic autonomy and green competitiveness, will be essential. Also, carefully managing the balance between trust and control will be vital to avoid bureaucratic bottlenecks while promoting innovation, particularly in public procurement and stakeholder engagement.