



# Mission-Oriented Innovation Policy For Transformative Change

**A toolbox for implementation and impact assessment**



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# Mission-Oriented Innovation Policy

## For transformative change

Missions promise to mobilize science, technology and innovation policy in conjunction with other sectoral policies to address pressing societal challenges. Although they aspire to solve the problems of humankind, the implementation of such transformative approaches remains a challenge to policymakers across the world: multi-dimensionality, a wide array of stakeholders,

long-term horizons and a clear alignment of objectives make it difficult to set up and implement missions. To offer hands-on advice to support mission owners such as ministries, public authorities and agencies, Fraunhofer ISI has developed an innovative toolbox for conceptualizing missions and assessing their impact.

### Definition: Mission-oriented innovation policy

»We understand mission-oriented innovation policy (MOIP) as a cross-sectoral and cross-policy approach to achieving ambitious and clearly formulated goals via the generation and application of knowledge and innovation that address pressing societal challenges.« [1]



# A Toolbox Approach

## For mission-oriented innovation policy

To provide practical support and guidance for policy-makers and evaluators, we propose six toolbox elements as key pillars for setting up missions and monitoring their development over time. Our toolbox builds on insights from the scientific support action to the German High-Tech Strategy 2025. It provides a modular, formative, process-oriented yet flexible and hands-on approach that supports mission owners throughout the whole life cycle of missions: formulation – design – implementation. By breaking down the complexity of missions into the different elements and steps of the toolbox, mission owners can better design and manage their own missions and stimulate reflexivity and learning. At the same time, our approach provides the

foundation for assessing the impacts of missions and thereby empowers those in charge to meet the increased demands for legitimacy that characterize MOIP.

[Link to the website of the scientific support action of the High-Tech Strategy 2020](#)

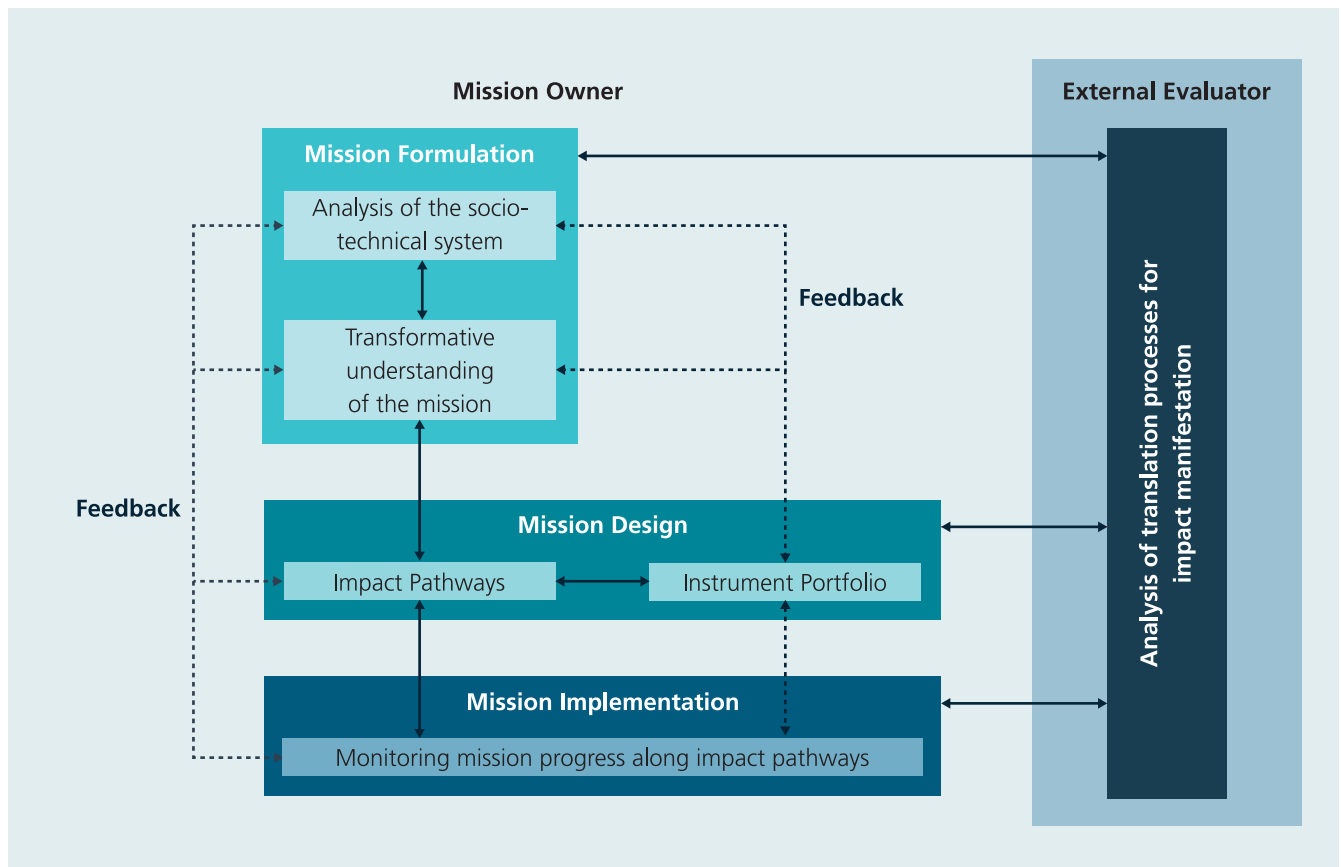


Figure 1: Interaction of different toolbox elements (for mission owners and evaluators)

# Mission Formulation I

## Analysis of the socio-technical system

In striving for systemic change, missions need to take into consideration the overall socio-technical system they aim to transform. Using the approach of system mapping fulfills the purpose of information generation (identification of key actors, policies, main challenges, systemic dependencies) and

supports the formulation process of missions (achieving a joint understanding about the possible scope and boundaries of a mission). System mapping exercises help to bring together different stakeholders in a participatory process and support the communication of missions.

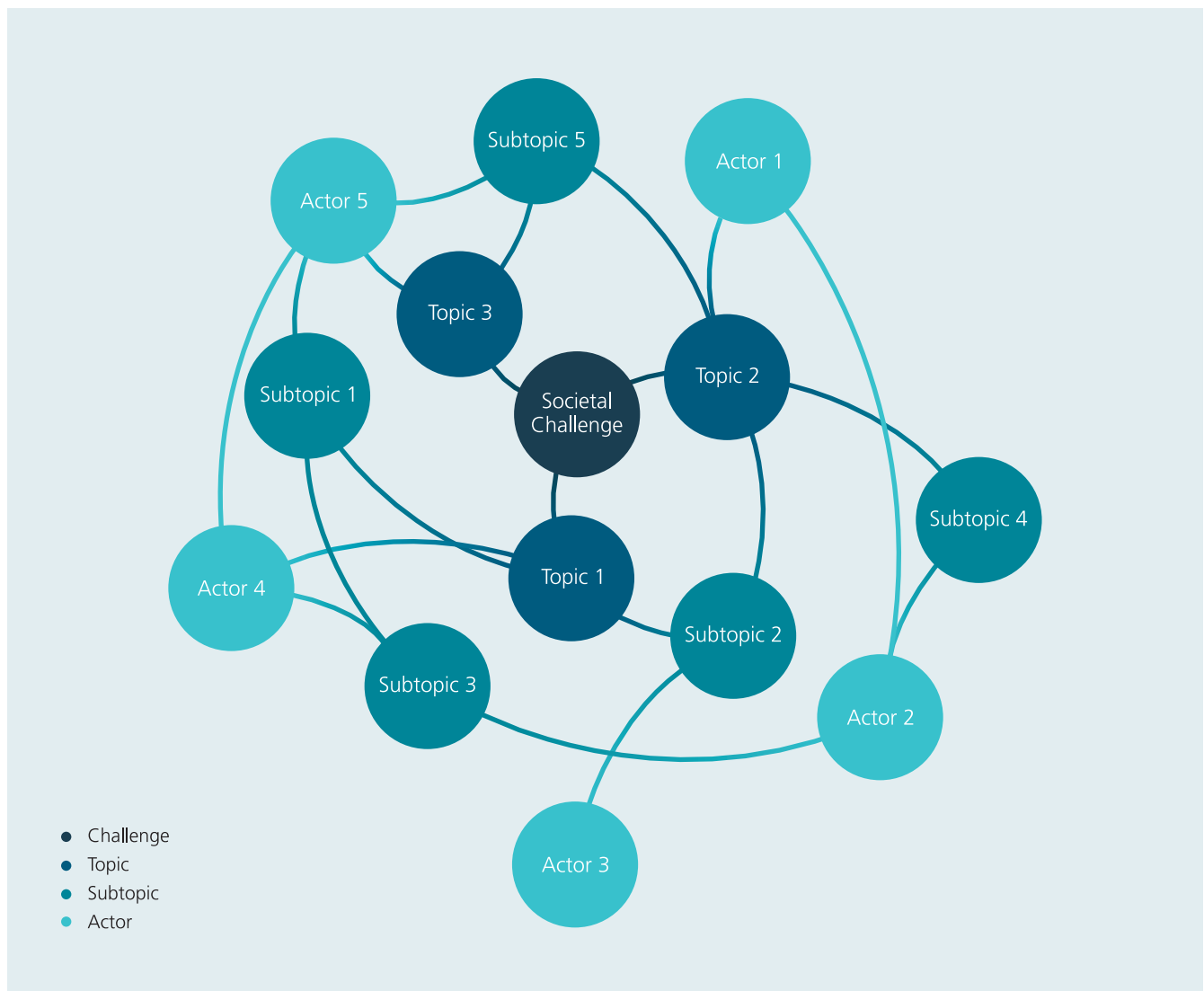
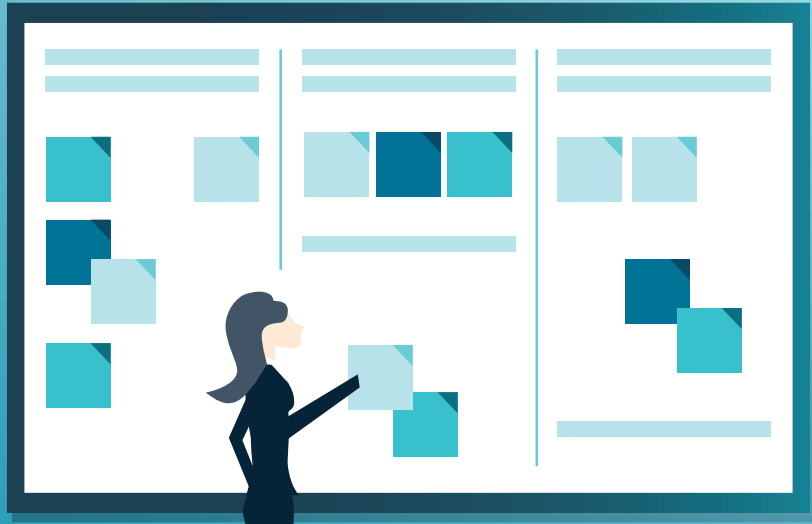


Figure 2: Stylized system map of a mission's socio-economic system



# Mission Formulation II

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## Clarification of transformative understanding

Despite the increasing popularity of the concept, missions may vary considerably. They seek to achieve transformative change through the combination of different drivers, ranging from fostering scientific discovery to behavioral changes. These different approaches are associated with distinct strengths, weaknesses and challenges. Clarifying their own understanding of how to achieve changes against the background of the socio-technical system makes it possible for mission owners to critically consider mission formulation and the ambitions of a mission. Throughout the scientific analysis of the German High-Tech Strategy 2025 missions, four common (ideal) types of accelerator and transformer missions were derived.

The distinction of different mission types allows mission owners to position their own mission in a targeted manner and identify potential challenges and bottlenecks [2].



[Link to the abstract/article \(limited access\)](#)



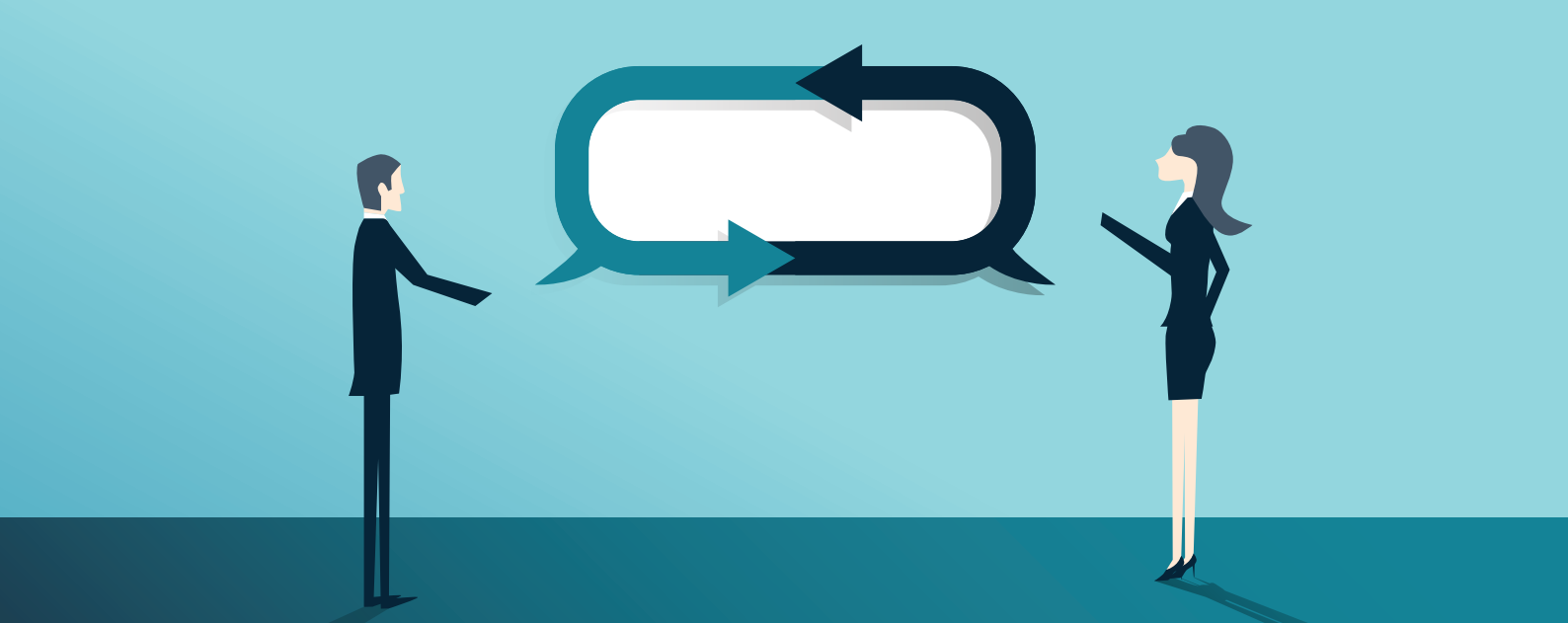


Table 1 illustrates the key characteristics and distinct challenges associated with different mission types. At one end of the scale, Accelerator Type 1 Missions focus primarily on science as the driver for change and therefore draw primarily on science, technology and innovation (STI) policies. While this type of mission requires limited coordination effort, it involves longer periods of uncertainty, non-linear developments, and an insufficient critical mass to spur transformative change.

At the other end of the scale, Transformer Type 2 Missions emphasize a broader understanding, pointing to the importance of behavioral and systemic changes. These transformations, however, require the involvement of a wider variety of actors and a different, broader mix of instruments. As a consequence they are accompanied by increased coordination costs and potential resistance to systemic change by established actors.

	Accelerator Mission		Transformer Mission	
	Type 1 (A1)	Type 2 (A2)	Type 1 (T1)	Type 2 (T2)
<b>Motivation</b>	Problem-driven	Solution-driven	Solution-driven	Problem-driven
<b>Main logic of change</b>	Scientific/technological change	Bringing knowledge to application	Reconfiguration of sectoral logics	System transformation (incl. behavioral change)
<b>Key Stakeholders</b>	Science	Science, Economy	Science, Economy, collective sectoral actors	Science, Economy, collective sectoral actors, civil society
<b>Instrument Mix</b>	Mainly STI (distribution)	Mainly STI (distribution, systemic management)	Broad (distribution, regulation, information)	Broad (re-distribution, regulation, information)
<b>Coordination requirements</b>	Limited	Medium	High	Very High
<b>Main challenges</b>	Uncertainty, long-term horizons, shared understanding of problem, achieving critical mass for change	Ensuring appropriate framework conditions, overcoming existing bottlenecks, achieving critical mass for change	Dealing with path-dependencies/lock-ins, integration of sectoral policies, shift towards systemic change	Re-distribution/compensating potential losers, involving society and different levels, shift towards systemic change

Table 1: Challenges and characteristics of different types of missions, based on [2]

# Mission Design I

## Developing impact pathways

The first step of mission design is the identification of expected and desired mission impacts and the policy instruments provided to facilitate these impacts by mission owners. The development of different (possibly interacting) impact pathways allows mission owners to develop expectations about how the inputs and activities within their sphere of control are linked to immediate outputs, but also to outcomes (influenced by the former) and desired impacts at the systemic level (the overall sphere of interest). To support this process, the toolbox provides a set of eleven stylized impact pathways that are linked to different types of transformative understandings.

These impact pathways describe the anticipated relationship between a desired impact (e.g. reduction of mortality from a disease) and the inputs of mission owners, such as targeted research funding, including intermediary stages of outputs that

can be directly affected by mission directors (e.g. research outputs of financed programs) and the more systemic outcomes (e.g. development of new therapies).

These stylized impact pathways can be adapted and reformulated to fit individual missions. In combination with the mission types, the toolbox proposes bundles of impact pathways that are particularly suited to specific forms of transformation. The two types of Transformer Missions, in particular, rely on a broad set of several impact pathways that seek to stimulate systemic change processes through awareness building and a change in behavior (that ultimately, for example, results in the breaking of habits and banning of certain practices). In contrast, Accelerator Missions rely on a more narrowly defined set of impact pathways, focusing mainly on the area of science and technology transfer.

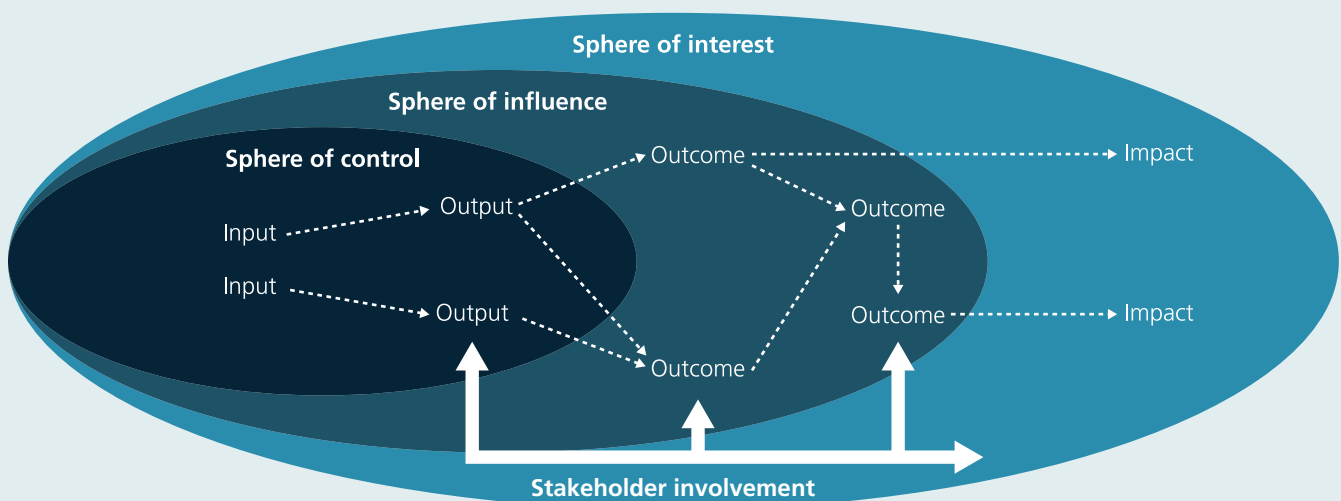


Figure 3: Stylized impact pathways (with different spheres), based on [3, p. 11]

# Mission Design II

## Crafting an instrument mix

Missions are built upon a carefully designed and aligned combination of existing and newly established policy instruments and inputs. Building upon the previously derived impact pathways, mission owners need to determine how inputs can contribute

to individual impact pathways. A helpful tool to understand the composition and interplay of different inputs can be an inventory of policy instruments, compiling key characteristics of instruments such as budget and key target groups.

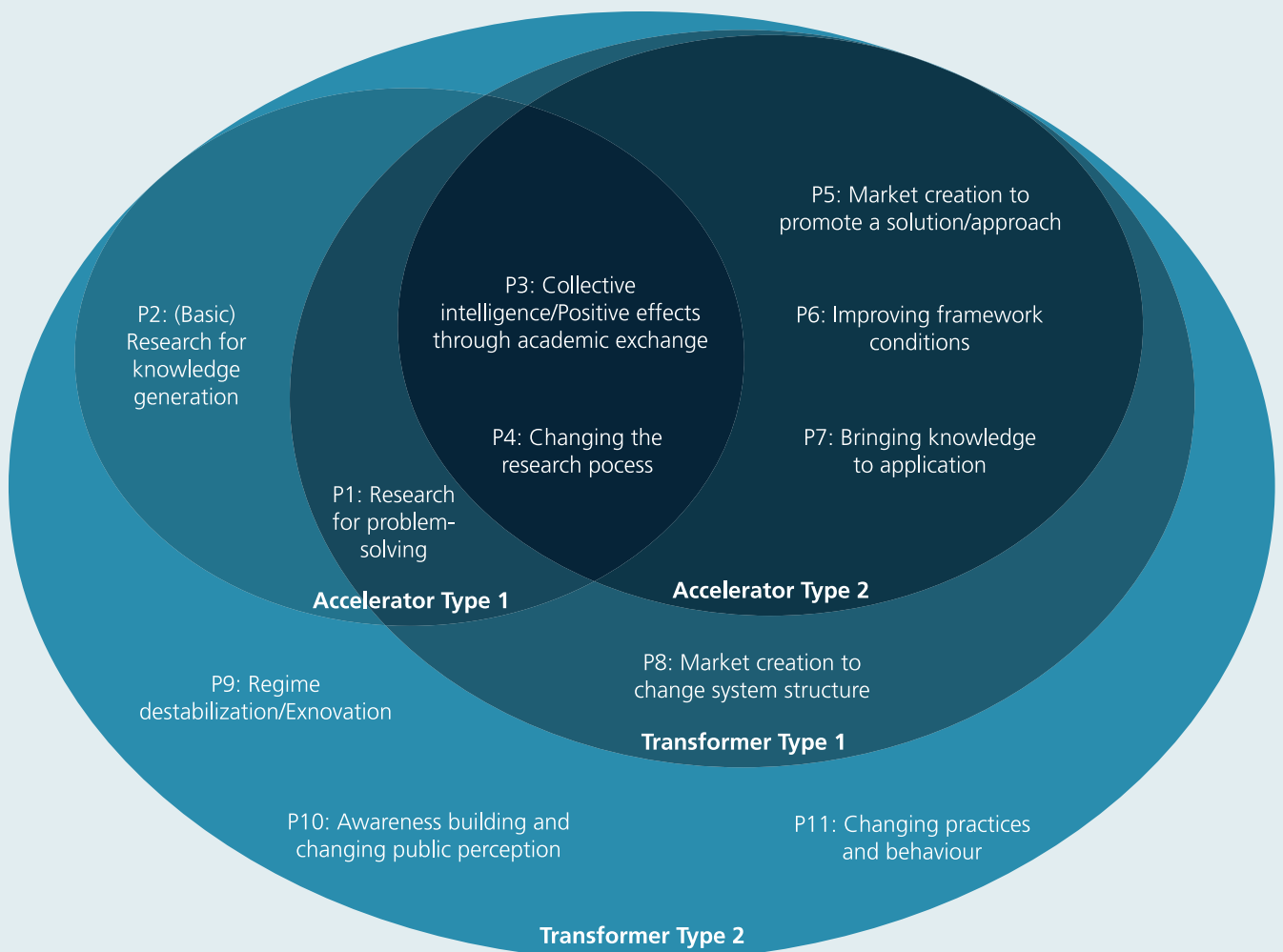


Figure 4: Sets of impact pathways for different types of missions, based on [4]

# Mission Implementation

## Monitoring the mission progress

The mission-specific set of impact pathways which has been developed forms the foundation for the monitoring of mission progress. Being able to derive indicators that measure the progress of missions along the impact pathways allows mission directors to gauge whether the mission is »on track«, moving toward creating the desired impacts or whether adjustment is required. To support the process of indicator development, the toolbox entails a comprehensive list of analytical dimensions for the stylized impact pathways that can guide mission owners in this process.

**Compilation of suggested analytical dimensions (pp. 39-43)**



### Mission Formulation

#### Mission formulation

- Definition of scope of the mission
- Definition and operationalization of goals
- Relationship between different goals

#### Legitimacy, urgency and process of mission formulation

- Legitimacy of goals
- Embedding/Inclusiveness in political and administrative context
- Suitability to enhance mobilization and legitimacy among stakeholders (actors representing society, science and industry)

### Mission Design

#### Impact pathways (intended impact)

- Process of pathway development
- Fit between pathways and postulated goals
- Consistency of pathways
- Coherence of pathways

#### Instrument mix

- Fit between pathways (intended impact) and instruments
- Character of policy instrument mix
- Leverage of instruments
- Process of instrument mix development and commitment by authorities and other actors
- Coordination of policy mix and governance structure

Figure 5: Key analytical areas for the analysis of mission translation processes

# Analysis

## Translation processes of missions

The whole process of bringing missions into practice is accompanied by a tool to analyze and reflect on the key steps of missions (formulation, design, and implementation). The phrase mission translation is used as a cipher for keeping an eye on the processes and feedback loops between each of the steps throughout the analysis. For mission owners the comprehensive questionnaire can serve as a tool for reflection, pinpointing pitfalls or shortcomings at each stage. Evaluators can use it as a guiding tool to assess the potential for realizing the desired impacts. Thereby, allowing the detection of challenges at an early stage, it enables mission owners to readjust the mission. Drawing on empirical insights and the analysis of scientific literature, the questionnaire provides more than 140 individual

questions related to key aspects for the realization of missions (see [4], pp. 46-54 for an overview of the analytical questions).

These analytical questions are structured along the three main phases of MOIP, which are divided into different analytical dimensions (see Figure 5). For example, for mission formulation, the analysis distinguishes between categories of goal formulation (scope, definition of goals and underlying concepts, existence of multiple goals and their hierarchy) and the legitimacy, urgency and the process of mission formulation. This includes, for example, an analysis concerning the societal consensus on the underlying problem or the credibility of those responsible for the mission to drive the intended changes.

### Mission Implementation

#### Contribution of key instruments

- Characteristics of key policies
- Effectiveness of instruments and activities
- Efficiency
- Unintended consequences

#### Mission management

- Coordination activities
- Robustness of implementation
- Flexibility
- Responsiveness
- Spill-over effects and mobilization
- Monitoring structures
- Transparency
- Feedback and learning



## References

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- [2] Wittmann, F.; Hufnagl, M.; Lindner, R.; Roth, F.; Edler, J. (2021): Governing varieties of mission-oriented innovation policies: A new typology. In: Science and Public Policy, 48 (5), S. 727–738.
- [3] Belcher, B. M.; Davel R.; Claus, R. (2020): A refined method for theory-based evaluation of the societal impacts of research. In MethodsX, 7, 100788.
- [4] Wittmann, F.; Hufnagl, M.; Roth, F.; Lindner, R.; Kroll, H. (2021): A Framework for Formative Evaluation and Impact Assessment of Mission-oriented Innovation Policies. Final report of the Scientific Support Action to the German High-Tech Strategy 2025 – volume 2. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research ISI.

## Suggested Reading

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Roth, F.; Lindner, R.; Hufnagl, M.; Wittmann, F.; Yorulmaz, M. (2021): Lessons for Future Mission-oriented Innovation Policies. Final report of the Scientific Support Action to the German High-Tech Strategy 2025 – volume 1. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research ISI.

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Wittmann, F.; Yorulmaz, M.; Hufnagl, M. (2021): Impact Assessment of Mission-Oriented Policies. Challenges and overview of selected existing approaches. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research ISI.

Wittmann, F.; Roth, F.; Hufnagl, M.; Lindner, R.; Yorulmaz, M. (2022): Towards a framework for impact assessment for mission-oriented innovation policies. A formative toolbox approach. In: fteval Journal for Research and Technology Policy Evaluation, 53, 31–42.

# Imprint

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# Use Our Know-How

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The toolbox is part of Fraunhofer ISI's broad services in support of transformative policies. We have over 50 years of experience in evaluation, monitoring, policy support, and impact assessment. In various projects, we apply the latest scientific methods, from bibliometric to system analyses and participatory foresight processes.

Our broad sectoral know-how throughout the Institute, with internationally renowned experts in different domains, among others in energy infrastructures, mobility, health and emerging technologies is unique. This unique topical and methodological portfolio provides for a systemic and comprehensive understanding of complex transformation processes. A more detailed description of the toolbox can be also found here:

"Towards a framework for impact assessment for mission-oriented innovation policies. A formative toolbox approach", in fteval 53, 31-42



Final report of the scientific support action for the German High Tech Strategy 2025 – volume 2



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