B 1 New Mission Orientation and Agility in R&I Policy

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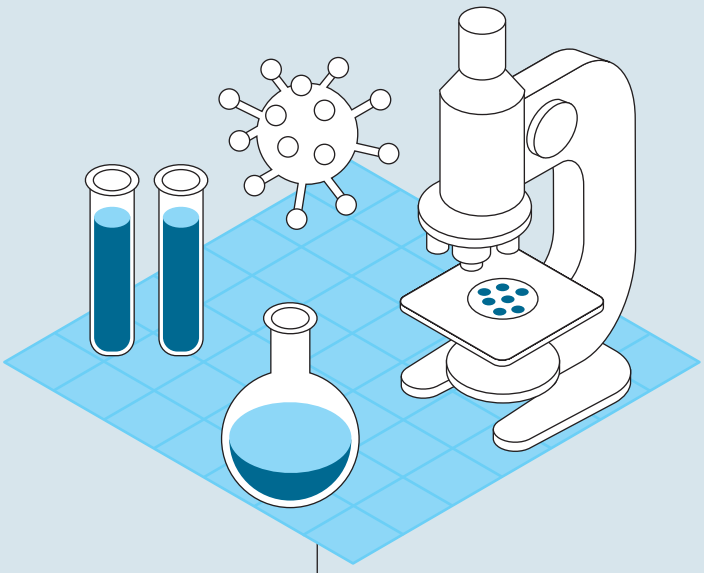
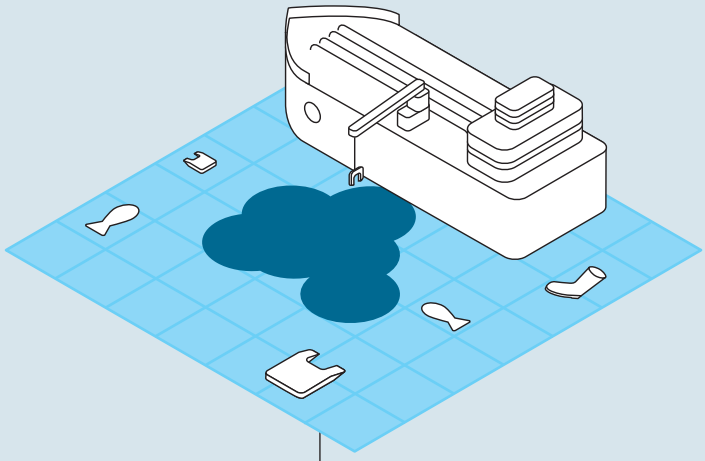
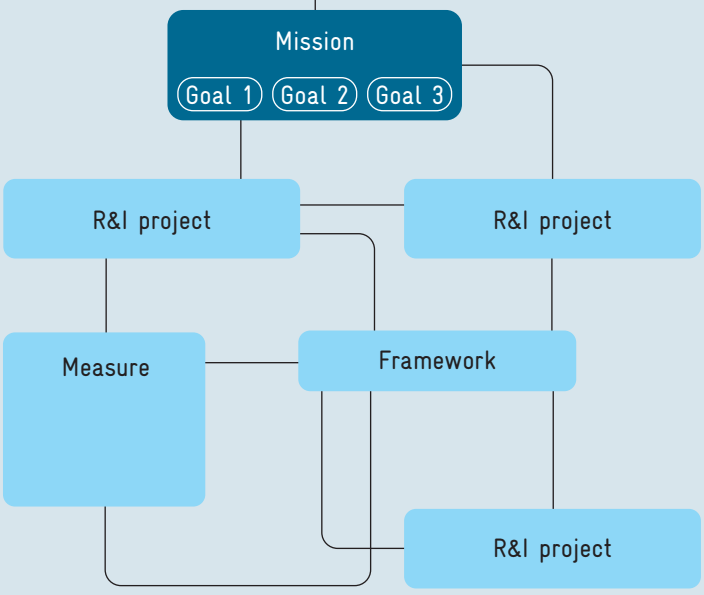
New Mission Orientation is an approach to R&I policy that focuses on addressing grand societal challenges and aims at transformative change in the economy and society. To this end, so-called missions are formulated that specify concrete transformation goals and are to be implemented through R&I projects as well as political measures and frameworks. Agile policy action is required to successfully realise New Mission Orientation.

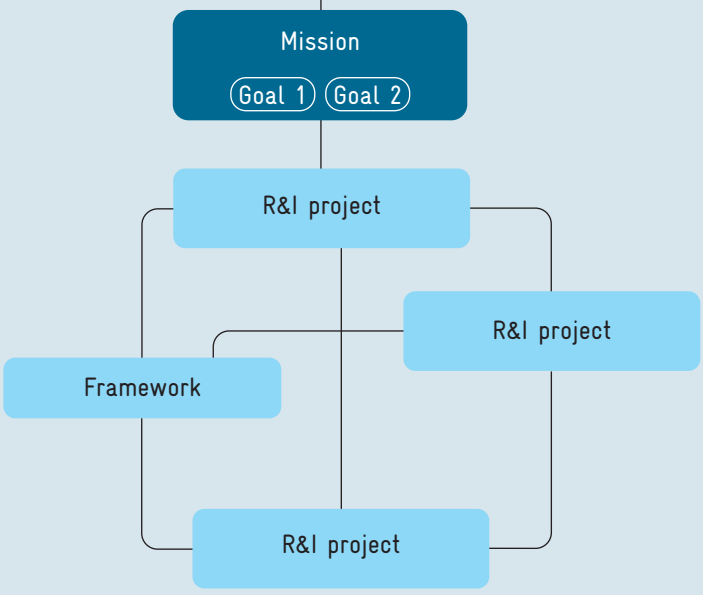


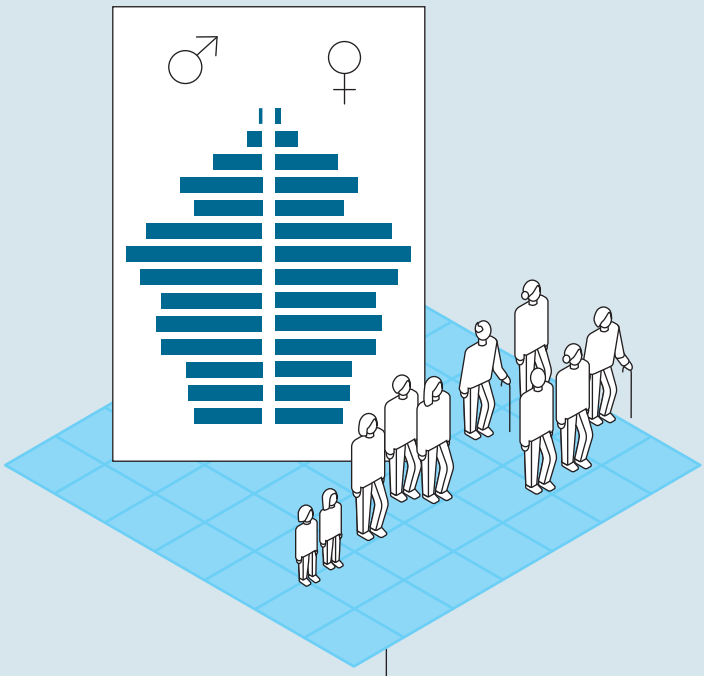
Societal challenge:
Health and well-being



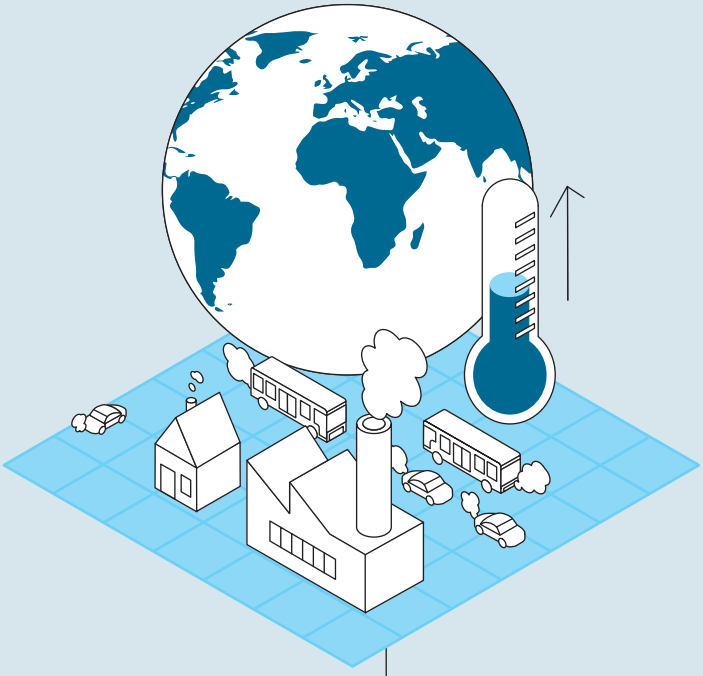
Societal challenge:
Protect life
under water



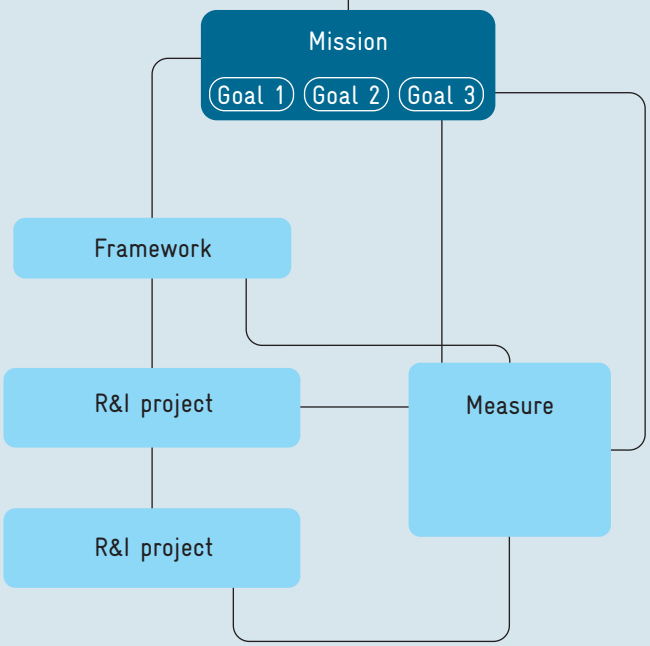


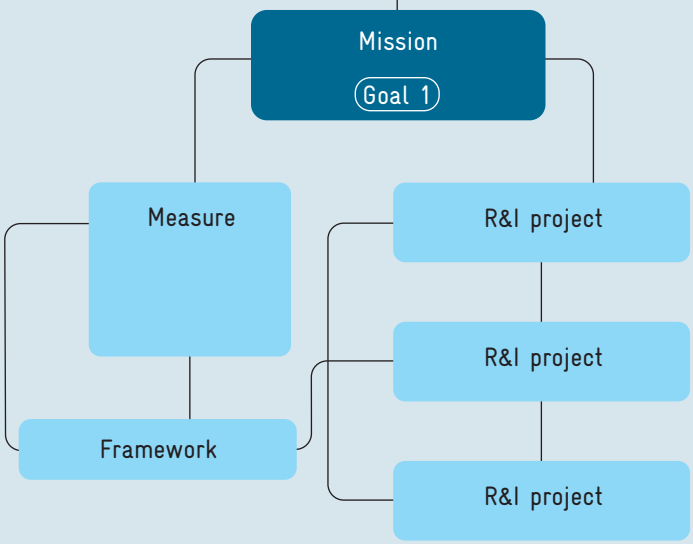


Societal challenge:
Demographic change



Societal challenge:
Implement climate protection





B 1 New Mission Orientation and Agility in R&I Policy

With so-called New Mission Orientation, an approach to R&I policy is developing which, against the background of the Millennium Development Goals (MDGs) adopted by the United Nations in 2000 and the Sustainable Development Goals (SDGs) adopted in 2015, is directed at addressing the grand societal challenges and aims at transformative change in the economy and society. To this end, so-called missions are formulated that contain specific transformation goals to be implemented by way of R&I policy and complementary policy measures. The New Mission Orientation approach was first discussed intensively in the academic environment and in the political sphere. It now has found its way into political practice and is increasingly being implemented.

The grand societal challenges are complex and managing them is a long-term and complex task. This results in high demands on an R&I policy that formulates and implements missions. Its governance requires agility. Agile policy is not only characterized by a quick and flexible response to change, but it is also proactive, involves relevant stakeholders, continuously reviews the measures it has introduced and adjusts these where necessary.

B 1-1 From Classical to New Mission Orientation

Over the past 75 years, different policy approaches have evolved in R&I policy in Germany and other industrialized countries with the aim of removing barriers to innovation and thus promoting growth and prosperity. The individual policy approaches and their justifications have not superseded each other, but rather build on each other additively (cf. figure B 1-1 and box B 1-2).[80]

– The policy approach of classical mission orientation was first established after World War II, focusing on the provision of public goods (cf. box B 1-2). In classical mission orientation, R&I policy is aimed at promoting the development of large-scale technologies for government needs, for example, in the fields of nuclear power and space travel, in addition to basic research. This approach saw, for instance, the creation of thematically specialized large-scale public research facilities in the 1950s, such as the Munich Research Reactor and CERN near Geneva.[81]
– Since the 1960s, the classical mission orientation has been supplemented by a diffusion-oriented approach that focuses on civilian key technologies with great commercial application potential. This promotion of civilian key technologies aims at the utilization of knowledge spillover (cf. box B 1-2). The funding is intended to address a broad target group from the fields of science and industry and to intensify R&I activities there. The policy approach is also reflected in national technology programmes. For instance, the Federal Government launched the first specialist programme to promote data processing in the late 1960s.[82] Current examples are the AI Strategy and the Blockchain Strategy.
– Since the 1990s, systemic R&I policy has adopted relevant concepts from innovation research, such as the innovation system approach and the cluster approach, emphasizing functional aspects of the innovation system such as cooperation between science and business, innovation activities in SMEs and start-ups, regional networks, and innovation-friendly framework conditions. This policy approach aims to overcome system failures (cf. box B 1-2) and thereby increase

Approaches to R&I policy over time

Fig. B 1-1

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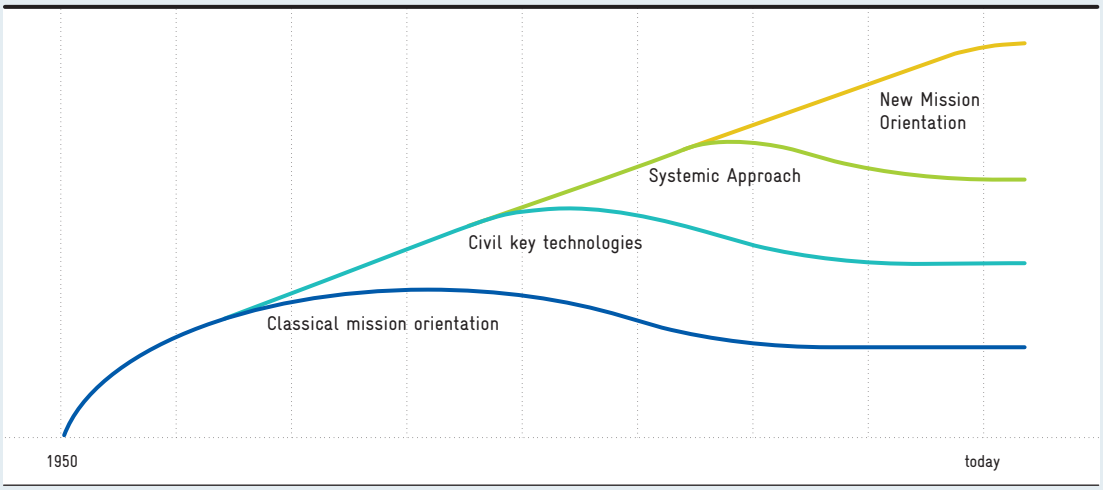

Source: Own representation based on Gassler et al. (2006).

the level of innovation activity. A wide range of instruments are used. Examples include the BMBF's Leading-Edge Cluster Competition, now expired, the BMBF's Innovation and Structural Change programme family and the BMWi's go-Inno programme.

– The policy approach of New Mission Orientation has been increasingly discussed in the academic environment and in the political arena for about 20 years.[83] However, the implementation of the approach is only just beginning and is more recently being explicitly reflected in strategies and programmes. New Mission Orientation addresses the difficulties of the R&I system to pursue completely new paths of innovation and develop technologies that are necessary for a socially desired transformative change. R&I policy measures should help overcome existing transformation failures (cf. box B 1-2) and accelerate the achievement of the SDGs. Although New Mission Orientation, like the other policy approaches, focuses on intensifying innovation activities, it primarily targets fundamental societal objectives, such as climate protection, preserving biodiversity, combating widespread diseases, and strengthening social cohesion.

New Mission Orientation: R&I Policy Requirements B 1–2

The starting point of an R&I policy geared towards overcoming societal challenges are missions[84] that specify concrete transformation goals and are to be implemented through R&I policy and complementary policy measures. Missions constitute the policy approach of New Mission Orientation and are to be regarded as a link between the grand societal challenges and specific R&I projects (cf. infographic chapter B 1).[85]

Mission implementation is about solving urgent problems within an appropriate time frame and budget.[86] Missions have a catalytic function[87] – they serve to redirect towards a new development path and are fulfilled when this is achieved. However, missions cannot usually be fulfilled through the contributions

Box B 1-2

Rationale for R&I Policy Measures

Market Failures

Market forces do not always ensure that R&I is conducted to the economically optimal extent. There are important forms of market failures that have a negative impact on the incentives of private sector players to undertake R&I activities:[88]

Public goods: Public goods are characterized by non-rivalry in consumption and non-excludability. The use of the good by one player does not reduce the possibilities of use by other players. Moreover, these players cannot be excluded from use. A public good is, for example, the results of basic research that are not generated to a sufficient extent by private-sector players. In such a case, funding and provision by the state can make sense.

Knowledge spillovers: In R&I activities, externalities occur in the form of knowledge outflows that the knowledge producer cannot prevent. For example, competitors can obtain knowledge by inspecting an innovative product without having to bear the full costs of knowledge production themselves. In this case, the private returns of the innovation diverge from the social returns and the innovator will, from a social perspective, invest too little in knowledge production.

Asymmetric information: Asymmetric information is when one side of the market is better informed than the other. This occurs, for example, in the financing of R&I activities by third parties. External investors can assess the chances of success of R&I projects less reliably than the companies engaging in R&I. This information asymmetry leads to a smaller number of R&I projects being financed than would make sense in macroeconomic terms.

Uncertainty: While the probabilities of occurrence of certain conditions are known for risky situations, no probabilities of occurrence are available for situations of uncertainty. Uncertainty can lead to innovation players refraining from R&I activities because they cannot assess the consequences of their actions.

System Failures

The term system failure summarizes functional deficiencies of the innovation system. These deficiencies lead to innovation activities being carried out to a lesser extent than would be desirable from an economic perspective:[89]

Network failure: Lack of interaction with other players inhibits the use of complementary knowledge sources and interactive learning processes. The close cooperation in established innovation networks can in turn lead to a lack of exchange with partners outside the network; thus, too few new stimuli and ideas are injected, and path dependencies are solidified.

Institutional failure: Institutional deficiencies exist when laws and regulations, e.g., intellectual property rights or liability rules for autonomous systems, inhibit innovation activities. Societal values and norms, such as the establishment of a start-up culture or attitudes towards new technologies, can also have an impact on innovation.

Infrastructural failure: Innovation-relevant infrastructure is provided by private investors to an insufficient extent due to the associated expense and long-term operation.

Capabilities failure: A lack of skills among innovation players means they do not absorb new knowledge, take up new technologies and adapt to new situations.

Transformation Failures

Innovations can fundamentally help to overcome societal challenges and thus enable and accelerate transformative change to achieve socially desired goals. Yet there are various forms of transformation failure that lead to corresponding innovations not being made or not being applied to a sufficient extent.[90]

Demand articulation failure: Transformative change can be slowed down or impeded by the fact that there is no demand for innovative products and services that support it and are desirable from the perspective of society as a whole. As there is no market yet, users do not have the opportunity to articulate their needs. Potential providers can therefore not develop offers that meet the needs. Another reason for a lack of demand-supply coordination may be the absence of complementary technological and social innovations.

Directionality failure: Due to network or lock-in effects, the players involved in the transformation process are unable to coordinate themselves towards the socially desired transformation objectives and to act collectively. In addition, regulation and standardization, traditional R&I funding and infrastructures may be insufficiently geared towards facilitating the coordination of private players towards transformative change.

Policy coordination failure: There are deficits in horizontal, vertical, and temporal policy coordination, which are essential for transformative change, as well as in the coordination of the public and private sectors.

Reflexivity failure: The required readjustment of measures and objectives for transformative change is insufficiently developed. This means that the achievement of transformation objectives is not continuously monitored, and appropriate adaptation strategies are not developed.

of R&I alone but require complementary impulses from other policy fields. These impulses are of fundamental importance, especially for adopting new solutions on a broad scale and the accompanying adaptation to societal demands.

Formulation of Missions as a Strategic Task

At the strategic level, there is the requirement to establish a suitable process for formulating the missions.[91] This process should be broadly conceived because transformative change affects many social groups. This means that acceptance, which is crucial for the success of the missions, can be built up from the very start.

Since transformative change requires both technological and social innovation, it is conducive to align missions in such a way that they trigger R&I activities among different groups of stakeholders. Measures in this regard must consider user needs and possible impairments of those affected.

Policy Coordination as a Crucial Task in Mission Implementation

The implementation of missions requires not only coordinated R&I policy measures, but also a coherent policy mix across policy fields.[92] Consequently, the policy approach of New Mission Orientation results in a variety of requirements for policy coordination at the operational level.[93]

- To make missions a success, horizontal policy coordination is required, i.e., R&I policy and other policy fields are coordinated in terms of content and timing. For instance, missions that include climate targets may interface with environmental, fiscal, and social policies.
- Missions can affect several policy levels – from the municipal level to the Länder and Federal Government levels and to the EU level. Consequently, vertical policy coordination is of relevance here.
- Within the ministries involved in missions, different departments may be involved, which means that intra-ministerial coordination is required. Furthermore, there is a need for close coordination with the implementing agencies.

A policy geared towards transformative change requires continuous monitoring at the operational level, as well as evaluation of the measures taken and adjustments where necessary.[94]

- Due to the complexity of the policy approach, it is not only necessary to look at the impact of individual R&I policy instruments, but also to evaluate the interaction of the measures and initiatives in the policy mix. However, such an evaluation is very demanding and may stretch traditional methods to their limits.[95]
- Experimental R&I policies, such as those in the form of experimental spaces and demonstration projects, can provide insights into the possible adaptation of measures.

Missions as an Element of the High-Tech Strategy 2025

Missions were introduced as a new element of German R&I policy (cf. box B 1-3) in the context of the High-Tech Strategy (HTS) 2025. In its Annual Report 2019, the Commission of Experts acknowledged that with the formulation of missions a new approach was ventured.[96] However, this approach does not correspond to the New Mission Orientation concept in all the missions formulated there.

The Fraunhofer Institute for Systems and Innovation Research (ISI) will conduct accompanying research for the HTS 2025 missions, the results of which are expected to be published in spring 2021. The

Box B 1-3

Missions of the High-Tech Strategy 2025

According to the Federal Government, missions are intended to reinforce interdepartmental cooperation in R&I policy and bring research results into implementation in a targeted manner.[97] The HTS 2025 contains twelve missions that were formulated under the leadership of the BMBF in a top-down approach. These are: 'Combating cancer', 'Digitally networking research and healthcare – for intelligent medicine', 'Building up battery cell production in Germany', 'Putting artificial intelligence into practical application', 'Achieving substantial greenhouse gas neutrality in industry', 'Creating sustainable circular economies', 'Finding new sources for new knowledge', 'Substantially reducing plastic discharged into the environment', 'Preserving biological diversity', 'Developing safe, networked and clean mobility', 'Ensuring good living and working conditions throughout the country' and 'Shaping technology for the people'.

These twelve missions are very heterogeneous. They differ, among other things, in the breadth and measurability of objectives as well as in the anticipated time horizons. While, for example, the mission 'Ensuring good living and working conditions throughout the country' offers a lot of room for interpretation and action, the mission 'Building up battery cell production in Germany' is formulated much more narrowly.

The implementation of the HTS 2025 is accompanied by an advisory body, the High-Tech Forum (HTF). One of the purposes of the HTF is to provide the Federal Government with recommendations for action and implementation proposals regarding the twelve missions and thereby initiate policy learning. The HTF's thematically specific impulse papers pursue two objectives: on the one hand, they are made available to the public to advance the discourse from the various points of view; on the other hand, the recommendations are discussed across ministries in regular round table meetings of state secretaries.

In 2020, the HTF implemented a participatory approach with representatives from science and society through its monitoring of the participation process for the further development of the HTS 2025. Stakeholders were able to actively contribute to various thematic focal points in the context of online discussions and conferences. The insights gained from this were further discussed in results dialogues and finally presented in the round table meetings of state secretaries. According to the BMBF, the results will be incorporated into the follow-up strategy of the HTS 2025.

Commission of Experts welcomes the fact that accompanying research is being established and expects a final evaluation of the missions to be carried out within the framework of HTS 2025.

B 1-3 New Mission Orientation: The Role of the State

Scope of State Intervention in the Market Controversially Discussed

There are different views on what role the state should take in its transformative change-oriented policy. At the centre of the controversial discussion is the question of the limits of public sector action in the context of market versus state. Some[98] deem it sufficient that the state identifies market or system failures in the R&I system and remedies the resulting underinvestment in R&I by funding basic research and individual, incentive-compatible measures. This aims at intensifying innovation activities and developing these out of the market in the direction of the set objectives and mission.

Others[99] see the fact that the desired changes in direction cannot be achieved through market forces precisely as the central problem. Unarticulated demand and lock-in effects are reasons why it is not worthwhile for innovative actors to pursue new socially desired directions of innovation. That is why mere intensification of innovation activities in known fields of technology falls short, as this fails to steer these activities in the direction of set missions, or not sufficiently so. For this reason, policy interventions aimed at changing direction are considered necessary. In this context, individual voices propose an entrepreneurial state[100] that would directly take over all activities along the innovation process – or closely guide these – and consequently also generate the corresponding profits. Critics of this notion fear that the public sector acts in an industrial policy manner and uses measures in the implementation of missions that interfere with the creativity of the market and thus with an open problem-solving process.[101]

The redirection of innovation activities by the public sector in directions that the private sector players themselves do not take is associated with interventions in market economy dynamics. The Commission of Experts emphasizes that these interventions can be reduced by the way mission-oriented policies are designed. It proposes a market-oriented version of New Mission Orientation that relies not only but heavily on market forces to solve problems. This approach is guided by the following considerations:

- Compared to an a priori specification of a particular problem solution, such as 'battery-powered vehicles', an open description of missions, such as 'non-fossil propulsion technologies', relies more on the creative forces of market players, as they can take different paths to achieve the goal.
- Promoting problem-solving alternatives in the pre-market phase, i.e., up to the point of knowledge and technology transfer, does not represent a massive intervention in market dynamics. Private sector players decide for themselves whether and to what extent they want to use certain innovation opportunities.
- If direct market interventions are unavoidable, they should have a catalytic character, i.e., they should only provide an impulse and then be withdrawn again. This applies, for example, to the promotion of young technologies, to overcoming lock-in in old technologies and to the development of new infrastructures[102] such as refuelling systems for innovative forms of mobility.

Implementation of New Mission Orientation Requires Agility

New Mission Orientation is a policy approach that places special demands on politics and administration. These include a particularly high coordination effort as well as the need to constantly review, evaluate and adjust measures for the implementation of missions regarding their functioning. To successfully implement New Mission Orientation for R&I policy, policymakers and administrators must have capabilities that can be described by the term agility.

Agility is usually understood to be a form of 'ability, nimbleness and mobility of organizations and people or in structures and processes'[103].[104] It is primarily regarded as a reaction to change and emerging uncertainties. Like the OECD in its

concept of strategic agility,[105] the Commission of Experts emphasizes that it is not enough to react flexibly and quickly to changes. Rather, politics and administration must also proactively prepare long-term decisions, design them in a participatory manner and implement them reflexively. In doing so, a balance must be struck between long-term planning and short-term adaptation. This expands the concept of agility to include proactivity, participation, reflexivity, and ambidexterity in addition to speed and flexibility (cf. box B 1-4).

In the context of New Mission Orientation, superordinate strategic as well as implementation-related operational aspects must be considered in R&I policy. The strategic aspects are the processes for formulating new and reformulating existing missions, while the operational aspects are the processes and procedures for implementing missions.[106] The anticipatory planning of these processes requires a high degree of proactivity.

Participation of stakeholders and social groups is an essential element of the strategic level. Participation creates a broad information base and shared perception of problems that players in politics and administration need for strategic foresight and for an appropriate definition of objectives and priorities. These objectives and priorities subsequently also serve as shared orientation for collective action. Furthermore, broad participation can improve the acceptance of decisions taken.

The implementation of missions requires continuous adaptation processes. This requires reflexive action based on systematic feedback processes and expressed in accompanying experiments, subsequent evaluations and, where necessary, reformulation of the overarching objectives and measures. The acceptance of uncertainty and mistakes as well as the rejection of the idea of deterministic controllability of processes are important characteristics of the reflexive implementation of a mission-oriented R&I policy.[107] At the level of political-administrative decision-makers, reflexive action takes place by way of continuous adaptation of institutional and organizational structures to the changing tasks. This adjustment requires space for reflection and freedom where existing processes can be questioned and reorganized across hierarchies and with the help of external knowledge. In this way, policy learning is supported.

The main challenge of an agile R&I policy is to balance the stability and reliability of its objectives and measures on the one hand and a flexible response to changing requirements on the other. Facing this challenge and maintaining balance is called ambidexterity.

Sporadic Use of Elements of Agile Politics

The federal ministries are already using agile policy elements in isolated cases. At the strategic level, the BMBF's current foresight process VORAUS:schau! aims to proactively identify and discuss trends and future topics.[108] By means of various laboratories, for example, the BMWi's regulatory test beds[109] and the digital laboratories of the Federal Ministry of the Interior (Bundesministerium des Innern, für Bau und Heimat, BMI),[110] reflexive adjustments to the legal and regulatory framework for new technologies and business models are being tested and digitalization processes in the administration are being advanced. In addition, the BMBF has established various dialogue formats to promote participatory exchange and discussion regarding future topics and technologies.[111]

At the operational level, some ministries are experimenting with the use of modern collaboration methods and human resources tools, which also promotes agile working.[112] Under the aegis of the Federal Chancellery, the Work4Germany initiative supports federal ministry employees[113] in their acquisition of modern working methods and relevant future competences and their integration into everyday work.[114]

R&I Policies for Overcoming Transformation Failures B 1–4

A mission-oriented R&I policy must be aware of the facts that lead to transformation failures to counter these with targeted measures. Since the manifestations of transformation failures can differ greatly, the range of possible public sector action is

Box B 1-4

Characteristics of Agility

Speed, flexibility
Speed and flexibility are given when changes are reacted to at short notice and in a way that is appropriate to the problem.

Proactivity
Proactivity is characterized by forward-looking action that anticipates or predicts potential obstacles to the implementation of measures. Evaluation ensures that catalogues of measures and impact periods of possible instruments are in line with the timeliness of the requirements.

Participation
Participation means that all relevant players are involved to both ensure a broad information base and improve the acceptance of collective decisions and solutions.

Reflexivity
Reflexivity is given when there are effective feedback loops based on qualitative or quantitative evidence that are used by operational staff for readjustment and feed into the information situation of staff at the strategic level.

Ambidexterity
Ambidexterity refers to the balancing of stability on the one hand and change on the other.[115]

There are some tensions between the agility criteria. For instance, participatory processes come at the expense of speed and flexibility. It is therefore hardly possible in practice to establish a political-administrative process that equally satisfies all agility criteria.

also very wide (cf. box B 1-2). The measures outlined below show how public sector action to overcome transformation failures can be designed in practice.

Stimulating Demand for Innovation

The problem of demand articulation failure has as yet hardly been considered by R&I policy. Transformative change can be slowed down or impeded by the fact that there is no demand for innovative products and services that support it and are desirable from the perspective of society as a whole. On the one hand, demand articulation does not take place if potential customers are unable to assess the benefits of innovative products and services. On the other hand, the dissemination of innovative products and services on the market often requires the development of new infrastructures, rapid standardization processes and complementary technological or social innovations (cf. box B 1-2).[116]

One instrument to overcome the problem of a lack of demand articulation is innovation-oriented public procurement. Its potential derives from the considerable scale of public demand.[117] If it is aligned with socially agreed missions, it offers a multitude of opportunities to initiate transformation processes and influence the direction of their development.

- Public innovation-oriented procurement can contribute on the demand side to directing private R&D and innovation spending in the desired direction. Public demand for certain new goods and services can lead to an R&D-promoting effect for technologies that would otherwise tend not to be approached by private players. An example of this funding format is the Dutch Small Business Innovation Research programme (SBIR programme) (cf. box B 1-5).[118]
- Innovation-oriented procurement enables the gathering of information about new technologies and their use and making this available to other players. The application experiences of government agencies can thus make it easier for private users to evaluate and use the innovations. In this way, new consumption patterns and new consumer groups, e.g., for non-fossil fuel vehicles, can be opened.

– Innovation-oriented procurement is an instrument that can at least partially remedy undesirable developments resulting from lock-in effects and network externalities. Public procurement of new technical products can achieve a demand volume for a new technology that is sufficient to overcome a lock-in and thus initiate the replacement of an obsolete technology by a new technology. This is particularly important when a specific infrastructure, such as charging stations for electric vehicles, is needed to enable the spread of a new technology.

Box B 1-5

Stimulating Demand for Innovation Using the Practical Example of the Small Business Innovation Research Programme in the Netherlands

In 2005, the Dutch government launched the Small Business Innovation Research programme (SBIR programme), which was inspired by a programme of the same name in the USA. The SBIR programme aims to use public procurement to mobilize the innovative capacity of Dutch companies to solve grand societal challenges. At the same time, innovation activities are to be promoted, especially in small and medium-sized enterprises, and competitiveness reinforced.[119] At the beginning of a funding line within the SBIR programme, ministries and other public authorities identify a societal problem for which innovative solutions are required and provide a budget. In a first step, companies are invited in an open competition to submit a feasibility study for the solution of the problem described.[120] After selection of the best feasibility studies, R&D activities are further promoted in a second step up to the creation of prototypes and initial test series. In a third step, the companies prepare the market launch of the new product or service. This last step does not involve direct funding; however, the public sector can provide indirect support by acting as the first buyer of the new products. In this way, it acts as a lead user, generates demand for innovative products and itself benefits from the possibilities offered by the innovative solutions developed under the SBIR programme.[121]

Strengthen Directionality

One form of transformation failure is the lack of directionality of innovation activities towards missions (cf. box B 1-2). To strengthen directionality, an agile policy is helpful in the sense that social forces are proactively involved in the formulation of missions. One instrument for this are participatory foresight processes.[122] Within the framework of foresight processes, decision-makers can develop a common orientation regarding complex issues and clarify normative questions of principle in the context of potentially highly controversial issues in cooperation with stakeholders and experts across sectors or ministries. This can facilitate consensus building in subsequent policy decisions and enable directionality.[123] Government Foresight in Finland is such an example (cf. box B 1-6).

Improve Coordination

A mission-oriented R&I policy is associated with high coordination requirements. Coordination should be proactive and include both the strategic and operational levels. The instrument of Mission Boards, as used by the EU to prepare Horizon Europe, is an example of this format (cf. box B 1-7). At the strategic level, mission objectives need to be coordinated between several ministries and subordinate authorities. At the operational level, there is also a need, beyond inter-ministerial coordination, for coordination between the various specialist departments within the ministries involved.[124]

The organizational structure of the institutions in charge of implementing missions, usually ministries, stands in the way of the coordination requirements mentioned above. Ministries are characterized by

their own functional structures and logics, which usually exist in isolation from each other. The development of an aligned understanding of mission objectives and the measures needed to achieve them requires coordination structures and mechanisms between ministries. In Germany, a State Secretaries' Round Table was established for this purpose as a standing body for the strategic orientation and implementation of the HTS 2025.

Box B 1-6

Strengthening Directionality Using the Practical Example of Government Foresight in Finland

Strategies for the future of the country have been developed in Finland at the beginning of each legislative period since 1993, serving as a strategic framework for the current legislative period, but also beyond it. Strategy development is led by a cross-party working group based at the Prime Minister's Office,[125] a so-called Government Foresight Task Force. The reports it submits are discussed within the government and presented to the Finnish Parliament, in particular its Committee on Future Affairs. One aim of the working group is to bundle a wide range of foresight activities and related information and to support decision-making processes. The preparation of the foresight reports does not follow a strictly defined methodological approach. Depending on the topic, different organizational and procedural paths are taken, and national and international institutions are involved. The institutionalized nature of foresight reporting, the link to the highest levels of government and parliament, and the involvement of stakeholder groups from science, business and civil society help to strengthen the influence of foresight reports on the political agenda. In addition, the results are also heard outside of government, for example, by national science institutions. Foresight reporting thus facilitates an active approach to future societal challenges.[126]

Box B 1-7

Improving Coordination Using the European Union Mission Boards as a Practical Example

Missions are an integral part of the Horizon Europe research framework programme. For the concretization of the missions, corresponding Mission Boards were set up for the five themes defined in consultation with the Member States, the so-called Mission Areas, which submit their proposals directly to the commissioners responsible for the respective themes. These Mission Boards are characterized by a high degree of autonomy in defining missions and developing an associated R&I agenda. In addition, the missions are each staffed with around 15 leaders from different areas of politics, business, research, and societal stakeholder groups and are accompanied not only by the Directorate General for Research and Innovation, but also by up to ten Directorate Generals that pursue both R&I-related and sectoral policy agendas. The Mission Boards chairs report directly to the commissioners, who also take the final decision on the missions and agendas.[127] A new Mission Board is appointed for the implementation phase of each mission.[128]

Increase Reflexivity

A mission-oriented R&I policy faces the challenge of actively managing transformative change and constantly adjusting measures as it progresses. This adjustment requires a high degree of reflexivity (cf. box B 1-4). Instruments for this can be, for example, stage-gate models (cf. box B 1-8). They are based on continuous monitoring and accompanying evaluation processes that provide those responsible with the necessary information to adapt ongoing measures to current developments, to develop them further or to discontinue them. An example of how reflexive elements can be systematically built into mission implementation is the Swedish programme Challenge Driven Innovation by VINNOVA (cf. box B 1-8).[132]

Box B 1-8

Increasing Reflexivity Using the Practical Example of Challenge Driven Innovation in Sweden

Challenge Driven Innovation (CDI) is a programme of the Swedish innovation agency VINNOVA, which was implemented in 2011. CDI aligns with four overarching, broadly defined challenges (future healthcare, sustainable and attractive cities, information society 3.0 and competitive manufacturing) and relies on cross-sectoral collaboration between a range of public and private players.[129]

CDI uses a stage-gate model to align projects against the four challenges and other overarching objectives (e.g., transdisciplinarity, end-user involvement, diversity, etc.). This allows regular adjustments to be made to the project portfolio. To move from one stage to the next, projects are evaluated and assessed on this basis (gate). Project partners have the option of dropping out after one phase or joining in at a later phase. This means that the project and the consortium must adapt continuously. In addition, the involvement of private sector partners increases with each phase, as commercialization and implementation issues come to the fore in later phases.[130] During evaluations, content-related project adjustments are made on an ongoing basis; projects can also be terminated if they do not develop in the desired direction.[131]

Recommendations for Action B 1–5

Use New Mission Orientation to Address Grand Societal Challenges

R&I policy has the responsibility to contribute to addressing the grand societal challenges and to initiate transformative change. As the policy approach of New Mission Orientation supports this, the Commission of Experts advocates that the Federal Government should give greater attention to this policy approach in a market-oriented version. It recommends pursuing missions that initiate transformative change also in the new legislative period and beyond.

With the New Mission Orientation policy approach, the public sector has a changed role in R&I policy. It must steer innovation activities in socially agreed directions that the private sector players themselves, due to transformation failures, do not take. However, the Commission of Experts is of the opinion that, despite all state guidance, the market as a discovery process must not be undermined but should be explicitly used as a source of new technologies and creative solutions. A correspondingly market-oriented version of New Mission Orientation must take the following principles into account:

- No specific solutions are defined in advance in favour of an open approach that allows for different solutions. This allows for utilization of the creative forces of market players.
- The promotion of alternative problem solutions focuses primarily on the pre-competitive area from basic research to knowledge and technology transfer.
- If direct interventions in the market are necessary, these will be temporary in the sense of a catalytic R&I policy.

The successful implementation of the New Mission Orientation requires agile political action. The Commission of Experts welcomes the fact that R&I policy has already become more agile in recent years. Yet it calls on the Federal Government to enshrine agility even more systematically in political action.

Establish Participatory Processes for Formulating Missions

The implementation of missions requires complementary innovations from different stakeholder groups and, where appropriate, changes in societal behaviour. Missions can only be successfully implemented if they are supported by those with political responsibility and broad sections of the population.

- The Commission of Experts advocates ensuring close cooperation between the various ministries as well as the active involvement of stakeholder groups, expert panels, citizens as well as the Länder and municipalities in the formulation of the missions.
- Concrete objectives must be derived from the missions. These must have a time frame and their fulfilment must be measurable. The time frame should be based on the objective of the missions and not on the duration of legislative periods. However, the Commission of Experts considers it sensible to formulate legislature-specific milestones to make use of the existing political incentive structures. When the objective of a mission is achieved or a mission falls significantly and persistently short of the objectives set, the funding associated with the mission should be terminated.

Expand Policy Coordination for Implementation of Missions

Superordinate coordination structures are needed for the efficient implementation of missions. In addition to coordination with other policy fields in terms of content and timing, the funded R&I projects usually must be accompanied by appropriate adjustments in the legal framework and by triggering standardization processes.

- The Commission of Experts considers it necessary to strengthen the horizontal coordination of ministries in the implementation of missions. This can be done through inter-ministerial task forces led by the state secretary level and involving the working level. The Commission of Experts recommends setting up a separate inter-ministerial task force for each mission and providing it with decision-making powers and its own budget.
- In the case of particularly complex missions, it should also be examined whether it makes sense to adjust the structure of the ministries involved or even to set up a separate ministry for this purpose.
- The Commission of Experts recommends reinforcing horizontal coordination not only between the ministries, but also within the ministries. Depending on the nature of the mission, it is advisable to set up cross-departmental project teams or to create separate mission-related units within the organizational structure. These project teams or units are each to be equipped with their own discretionary competences and budgets.

Intensify Innovation-oriented Public Procurement

- The Commission of Experts repeats its recommendation to further expand innovation-oriented public procurement.[133] In order to support transformative change, procurement should also increasingly align itself with socially agreed missions.

Create Conditions for More Policy Learning

When implementing the policy approach of New Mission Orientation, policy learning must be integrated into the processes more strongly than before. The Commission of Experts advocates taking the following aspects into account:

- Against the background of existing uncertainty, mission-oriented R&I policy is also a policy of experimentation. Experiments include the possibility of learning from

failure. In terms of a positive error culture, policy learning should be implemented more strongly to ensure that goal adjustments, readjustments of the organization and measures and even complete discontinuation are possible and accepted when implementing missions.

– Missions must be continuously subjected to a monitoring process as well as to accompanying and final evaluations. Due to the complexity of missions, further research on evaluation methodology is needed and should be encouraged.
– For policy learning, it makes sense to create more scope for reflection and freedom[134] and to free up staff capacities in ministries and project management organizations to this end. In this context, it is important to increasingly involve external experts from business and science, e.g., through temporary fellowships, in addition to employees from different hierarchical levels.