

Making Innovation a Mission?

Overview of the Implementation of
Mission-Oriented Innovation Policies
in Denmark, Finland and Sweden

Alberto Giacometti & Sigrid Jessen



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Foreword

This report is intended as a policy overview that sheds light on the implementation and vertical co-ordination of mission-oriented innovation policies (MOIPs) in the Nordic context, with a particular focus on Sweden, Finland and Denmark. The study was carried out on behalf of the Nordic Thematic Group for Green, Innovative and Resilient Regions (2021–2024).

In Chapter I, Sigrid Jessen and Alberto Giacometti, researchers at Nordregio, introduce mission-oriented approaches and the emerging rationale for applying them in innovation policy. The subsequent chapters take a deep dive into the cases of Sweden, Finland and Denmark, focusing on how MOIPs are being implemented within the context of their distinct policy traditions and unique characteristics of their innovation systems. In Chapter II, Markus Grillitsch, Director of CIRCLE and Professor at Lund University, provides an overview of innovation policy developments in Sweden, including its pioneering attempts to implement mission-oriented research and innovation policies. In Chapter III, Professor Markku Sotarauta of Tampere University examines the evolution of Finnish innovation policy, outlining conceptual shifts and the more implicit ways in which the mission-oriented approach has added a new layer to the country's policy repertoire. In Chapter IV, Professor Teis Hansen of the University of Copenhagen describes how MOIPs represent a new phenomenon in Danish innovation policy. The report concludes with a discussion and cross-country comparison of the extent to which MOIPs have penetrated the countries' existing policy frameworks, governance and organisational approaches, as well as the implications in terms of further research and empirical studies aimed at evaluating the MOIPs' effects and legitimacy.



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I. AN INTRODUCTION TO MISSION-ORIENTED APPROACHES TO INNOVATION POLICY.

Sigrid Jessen & Alberto Giacometti, Nordregio

In the public sector, mission-oriented innovation policy (MOIP) is an increasingly popular approach to specifying **directions in innovation** work and **setting out timelines**. This introductory chapter briefly unwraps the mission-oriented approach in the current policy context and academic debate. It also mentions related approaches, e.g. transformative or challenge-based policies, and how 'challenge-based' missions represent (or can potentially represent) a paradigm shift for innovation policy. It explores more specific ways in which MOIPs are being utilised in European Union (EU) policy. The chapter then delves into the academic debate that has emerged regarding the practical implementation of missions in countries and regions with fundamentally different innovation systems and policy traditions. Finally, the chapter looks at the Nordic context, specifically the cases of Sweden, Finland and Denmark, which are the focus areas of this policy overview. The introductory chapter sets the scene for the subsequent chapters, which take a deeper dive into the innovation policy structure and traditions in Denmark, Finland and Sweden, and explore whether (and how) MOIPs are influencing national and sub-national policy frameworks.

1. The concepts: What is meant by a mission-oriented approach to innovation policies?

The mission-oriented innovation approach, originally conceptualised by Ergas (1986) as 'big science for big problems', aims to address specific challenges by providing innovative solutions (Edler & Fagerberg, 2017). In recent years, the mission-oriented approach has gained prominence in innovation policies at various spatial levels, from European to local, and has been employed as a response to evolving global challenges, and in recognition of the pivotal role of government-led missions in fostering innovation-driven economic growth (Uyarra et al., 2019; Schot & Steinmueller, 2018). In many ways, the MOIPs represent a paradigm shift towards addressing 'grand societal challenges', and a departure from previous innovation policies that focused primarily on economic growth, by emphasising the mobilisation of science, technology and innovation to meet societal needs (Grillitsch et al., 2019; Hekkert et al., 2020). MOIPs are characterised by a systemic approach and a reliance on frontier knowledge to achieve specific goals. They do so by operationalising an innovation agenda led by the public sector and aimed at addressing societal challenges (Mazzucato & Semieniuk, 2017).

The mission-oriented approach emerged alongside other concepts and policy approaches, including transformative and challenge-oriented policies. All of these are interrelated, but emphasise different issues (Hekkert et al., 2019). What all of these concepts have in common is the aim of tackling societal challenges. Transformative Innovation Policies (TIPs), MOIPs and challenge-oriented policies all provide 'directionality' to innovation efforts. Janssen et al (2023) note that, increasingly, this is a core principle for innovation policy frameworks focusing on government entities' active role in leading and shaping innovation activity.

The specific focus on addressing 'grand societal challenges' represents a new 'paradigm for innovation policy' (Grillitsch et al., 2019), for several reasons. One key peculiarity is the introduction of timeframes. The urgency of tackling the climate crisis has spurred concerted efforts to mitigate its impacts within a defined period of time, e.g. as outlined in the Sustainable Development Goals (SDGs) and the Paris Agreement. The pursuit of a 'green transition' underscores the alignment of innovation policies with sustainability objectives, by introducing scheduling (timeframe) and directionality to innovation endeavours.

While there is growing awareness of major environmental and societal challenges, it remains largely unclear how the state authorities, despite their prominent role in addressing these challenges, should act. Visible responses to this demand can be seen in the design of TIPs and MOIPs. Many studies have focused on the rationale for transformative innovation, e.g. fostering economic growth or solving societal challenges, but few have focused on what is required from public institutions and policy-makers to instigate systems transformation (Janssen et al., 2023). This process is expected to demand higher levels of knowledge and capacity on the part of the implementing organisation, compared to previous neoliberal policies (ibid., Ghosh et al., 2021). However, a growing body of literature is focusing on change agency, and on exploring the roles of different actors, including public institutions, in instigating systems transformation (e.g. Grillitsch & Sotarauta, 2020). Other focus areas include the capacities needed to govern transitions (e.g. Hölscher et al., 2019) or the public-sector capabilities needed to lead transformational change (e.g. Kattel & Mazzucato, 2018).

2. The organisation: The integration of MOIPs into EU policy frameworks

The European Commission stands out as a key driver of the transformative shift in innovation policies. Through initiatives like the Horizon 2020 research and innovation programme (2014–2020), the EU focused on addressing broad societal challenges while fostering economic growth and industrial leadership. Building on this foundation, the Horizon Europe programme, with its substantial budget of €100 billion, takes a more ambitious approach. Drawing inspiration from Mazzucato's work (2016), it introduces the concept of 'missions' aimed at tackling pressing societal issues. These missions – defined as urgent strategic goals that require transformative systems change to overcome complex societal problems – guide the Commission's efforts, with missions outlined in areas such as climate change adaptation, cancer research and ocean health.

Furthermore, the integration of MOIPs into broader EU policy frameworks is evident in initiatives such as the European Green Deal, which aligns with the SDGs and allocates substantial funding to missions aimed at addressing pressing societal challenges (McCann & Soete, 2020). In addition, Smart Specialisation Strategies (S3) serve as a vehicle for fostering place-based innovation, with emerging concepts such as Smart Specialisation Strategies for Sustainable and Inclusive Growth (S4+) that emphasise the alignment of regional policy priorities with societal challenges (Interreg Europe, 2020).

Cappellano et al. (2023) explore the links between the mission-oriented approach and Cohesion Policy, and advocate for mutual policy learning, which may enable both parts to solidify their positions in the EU policy landscape. They argue that Cohesion Policy risks losing further its identity, due to, e.g. increasingly broad priorities, pressures on the national budgets, varying policy results and differing national goals, while the mission-oriented approach lacks a territorial perspective (Cappellano et al. 2023). However, the two may benefit from policy cross-pollination: By adopting mission-oriented principles, Cohesion Policy can align priorities with societal challenges, thereby enhancing its rationale and political support. Mission-oriented principles, on the other hand, would be further integrated into the fabric of the EU's overall objectives, and as such would be directed towards territorial policy considerations. In addition, directionality concepts can bolster the result orientation of Cohesion Policy. However, Cappellano et al. (2023) acknowledge some uncertainty as to the possible impacts of increasing the directionality of Cohesion Policy. They suggest leveraging the mission-oriented combination of top-down and bottom-up approaches to streamline Cohesion Policy governance. The mission-oriented approach can benefit from both Cohesion Policy's adaptability to regional contexts, as well as an equity-focused, redistributive approach. Scholars arguing for more spatially targeted missions, among others, have expressed support for this idea.

2.1. The relationship between MOIPs from EU level to the national context

The shift towards MOIPs is also visible in national and sub-national policy. For instance, the Scottish National Investment Bank (SNIB) has adopted a mission-oriented approach (Brown et al., 2021), and the Netherlands has developed ambitious missions to guide national strategies and public-private R&D initiatives. One such Dutch mission aims to significantly reduce national greenhouse gas emissions by setting specific targets for the coming decades (Hekkert et al., 2020). In their investigation of the role of the regional level in promoting challenge-driven innovation, Hassink et al. (2022) focus on the recent renewable energy innovation policy in Schleswig-Holstein, Germany.

However, while MOIPs are gaining popularity, both at EU level and among member states, the diffusion of MOIPs at different territorial levels might be easier said than done (e.g. Nelson, 2011; Wanzenböck & Frenken, 2020). One recurring critique is that challenge-based missions are highly complex. As opposed to the classic example of putting a man on the Moon, which had a clearly defined and mostly technical objective and solution, most of the societal challenges that MOIPs aim to tackle are so-called 'wicked problems'. In other words, even if the objective is clear, these challenges are highly complex, difficult to solve, involve numerous stakeholders with varying and conflicting interests, require action at different institutional and territorial levels, and do not lend themselves to a single solution or approach (Foray et al., 2012; Boon & Edler, 2018; Elia & Margherita, 2018). In addition, several scholars have long argued that applying one-size-fits-all policies to innovation efforts is at best not feasible, and even risks damaging regions by disregarding existing regional specificities and capacities (Tödtling & Trippl, 2005). This argument has also been raised more specifically in relation to MOIPs. In particular, economic geographers have challenged the validity of MOIPs by questioning the extent to which this approach recognises geographical variation, and whether sufficient geographical knowledge is taken into account (e.g. Coenen et al., 2015).

2.2. Implementation: Challenges and proposed solutions for MOIPs in different regional contexts

The critique of MOIPs' spatial blindness has resulted in a scholarly debate on the possibilities and potential impacts of applying missions across different countries and regions. Some studies go so far as to argue that certain countries and regions are not suitable for MOIPs (Brown, 2021). Brown (2021) argues that countries with innovation systems that are more dependent on an incremental and largely Doing-Using-Interacting (DUI)-based innovation mode (Jensen et al., 2007), i.e. the Nordic countries, are not well-equipped to successfully deploy MOIPs. The argument is that some missions are more urgent and time-sensitive than others, and therefore require more traditional scientific and technological innovation (STI)-based solutions, e.g. developing Carbon-Capture-Utilisation-Storing (CCUS) technologies and finding cures for cancer. Brown (2021) emphasises the need for customised regional innovation policies that are aligned with local innovation ecosystems, and advocates for context-driven rather than mission-driven policies, specifically in low innovation-intensive contexts. At the same time, however, recent empirical studies from the Nordic Region indicate that this stance lacks subtlety and that the suitability of MOIPs is not as black-and-white as Brown (2021) suggests. For example, Bugge et al. (2022) and Craens et al. (2022) note that MOIPs are gaining popularity in the Nordic countries. Bugge et al. (2022) argues that, in Norway, the continued mobilisation of existing regional resources, actors and structures led to a successful reorientation of the innovation system towards mission-oriented approaches.

In general, an increasing volume of literature emphasises that both the design and the implementation of missions require careful consideration of regional complexities – in terms of both regional strengths and weaknesses, as well as the comparative advantages and institutional contexts – to ensure that they effectively meet regional needs and create positive outcomes in all regions. In recent years, there have been several attempts to develop frameworks that allow for a higher degree of geographical knowledge to be incorporated into the design and implementation of the MOIPs. Examples include the small wins strategy for underdeveloped regions (Morrison et al., 2023) and 'challenge-oriented RISs' (Tödtling et al., 2022). Together, these studies form a comprehensive body of literature that illuminates not only the ways in which a geographical perspective can be applied in the MOIPs, but also the need for a geographical perspective that can help develop and implement successful MOIPs across a broad range of spatial contexts.

Morisson et al. (2023) argue that the complex nature of the new generation of innovation policies aimed at solving societal challenges poses a potential risk for less-developed European regions. They argue that these regions face being marginalised due to their comparatively lower institutional and governance capacities. In response, Morisson et al. (2023) advocate for the adoption of a so-called 'small wins strategy', which serves to empower less-developed regions and involve them in mission-oriented efforts aimed at addressing location-specific societal challenges. The small wins strategy emphasises the implementation of small-scale, bottom-up initiatives driven by a shared mission to tackle complex and persistent problems.

Tödtling et al. (2022) emphasise that regions possess varying capacities for transformative change and challenge-oriented innovation. They contend that a comprehensive re-evaluation of the Regional Innovation System (RIS) approach is required to better inform the development of the next generation of regional innovation policies. They also advocate for an alternative perspective on innovation, inspired by recent advancements in mission-oriented and transformative innovation policies. This alternative perspective introduces the concept of 'challenge-oriented RISs' (CoRISs), which stands in contrast to traditional RIS interpretations (Tödtling et al. 2022). CoRISs embrace a more critical stance toward innovation, emphasise the direction of change, invite new innovation stakeholders at various territorial scales, and prioritise the practical application and scaling up of innovations within and beyond regional boundaries.

3. The scope: Nordic countries

The Nordic countries are interesting cases for further analysis. They are high-income countries, renowned for prioritising innovation, yet compared to other high-income countries, they are more reliant on DUI and incremental innovation strategies. However, within the Nordic Region, there are important differences between the countries in terms of industrial structures and policy traditions. Asheim et al. (2011) note that Nordic economies have achieved a high level of performance despite their strikingly different innovation policies and strategies. Focusing more specifically on Sweden, Finland and Denmark, the literature highlights that these three countries have adopted different pathways in innovation policy frameworks and strategies. Finland's science-driven approach focuses on radical product innovation, with a specific emphasis on the ICT sector. Sweden, on the other hand, emphasises technology-based strategies and process innovations. Denmark has adopted a market-based, largely user-driven strategy, in which incremental, non-R&D-driven innovation dominates the consumer goods sectors (Asheim et al., 2011). These variations are also evident when looking at the countries' expenditure on R&D – a core indicator of state-level engagement in innovation.

R&D expenditure in 2021 in Sweden, Finland and Denmark was among the highest in the 28 EU member states – at second, fifth and sixth place, respectively (Figure 1; OECD, 2024). Sweden was only surpassed by Belgium, which has experienced an exponential growth rate in the last ten years, while Germany and Austria ranked third and fourth, respectively. Of the three countries, Finland has experienced the largest drop in R&D expenditure, from a high of 3.73% of GDP in 2009 to a low of 2.72% in 2016. However, in January 2023 the Finnish government substantially increased the annual R&D expenditure for 2024–2030 (Finnish Prime Minister's Office, 2023). On the other hand, Sweden's level of expenditure has been consistently high over the last 20 years. Overall, Denmark's expenditure has been lower than the other two countries but has increased over time.

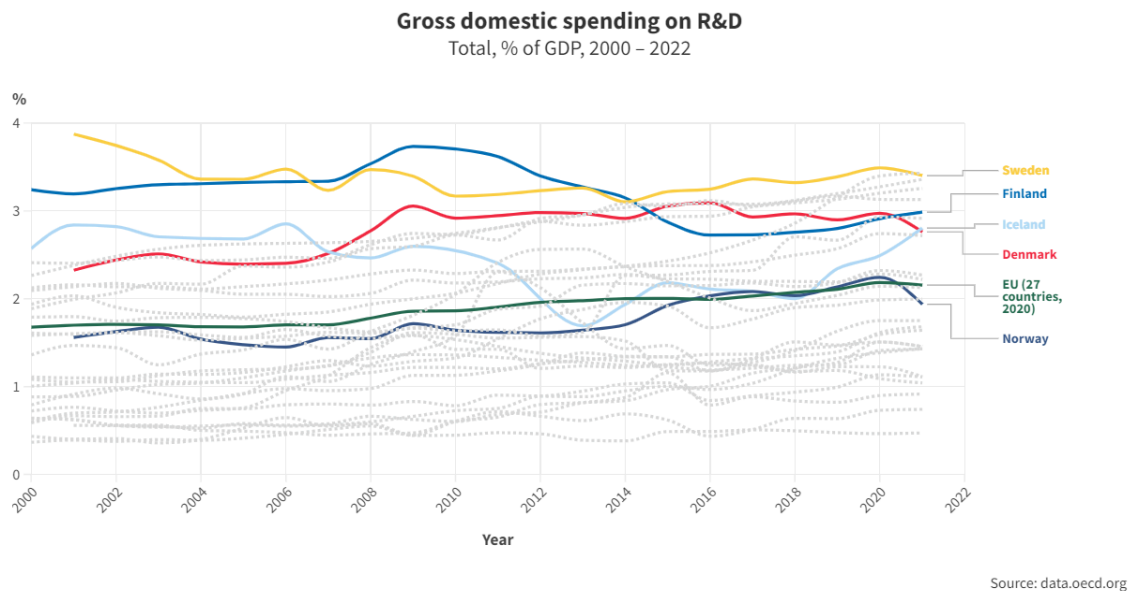


Figure 1: Gross domestic spending on R&D in EU countries as a total % of GDP, 2000–2022. Denmark, Finland and Sweden highlighted. Source: OECD (2024)

Furthermore, in the context of recovery from different crises, while also strengthening the political and societal focus on transformation towards green economies, the 2020 edition of the World Economic Forum's *Global Competitiveness Report* highlights the 'Nordic model' as 'the most promising in leading economic systems towards greater sustainability and shared prosperity' (Schwab & Zahidi, World Economic Forum, 2020). Specifically, the report highlights Finland, Denmark and Sweden, and declares these three countries as being 'among the best-prepared [...] for an economic transformation' (ibid.). The analysis is based on a combination of indicators that affect innovation ecosystems in different ways. However, as the following chapters will point out, the three countries have taken significantly different approaches to the state-level implementation of MOIPs. Denmark was the only country to select national missions focusing on the green transition, while Sweden and Finland have no nationally declared missions. However, as chapters II and III will show, this does not mean that these two countries lack transformative processes in their respective innovation systems. In fact, Sweden and Finland have long traditions of transformative innovation policy – and in Finland, this transformation is largely led by the private sector.

All of these different factors, particularly the move toward transformative and mission approaches, make the Nordic countries interesting case studies when investigating innovation. The following chapters aim to shed light at the characteristics of the three countries' innovation systems in relation to TIPs and MOIPs.

4. References

- Asheim, B., Isaksen, A., Moodysson, J., Sotarauta, M. (2011). Knowledge bases, modes of innovation and regional innovation policy: A theoretical re-examination with illustrations from the Nordic countries.
- Boon, W., and J. Edler. 2018. "Demand, Challenges, and Innovation. Making Sense of New Trends in Innovation Policy." *Science and Public Policy* 45 (4): 435–447. doi:10.1093/scipol/scy014
- Brown, R. (2021). Mission-oriented or mission adrift? A critical examination of mission-oriented innovation policies. *European Planning Studies*, 29(4), 739-761.
- Bugge, M. M., Andersen, A. D., & Steen, M. (2022). The role of regional innovation systems in mission-oriented innovation policy: exploring the problem-solution space in electrification of maritime transport. *European Planning Studies*, 30(11), 2312-2333.
- Cappellano, F., Molica, F., & Makkonen, T. (2023). Missions and Cohesion Policy: Living separate or dancing together? (No. 2023-02). JRC Working Papers on Territorial Modelling and Analysis, No 02/2023.
- Cappellano, F., Makkonen, T., Dotti, N. F., Morisson, A., & Rizzo, A. (2022). Where innovation meets directionality: An index to measure regional readiness to deal with societal challenges. *European planning studies*, 30(8), 1549-1576.
- Cappellano, F., & Kurowska-Pysz, J. (2020). The mission-oriented approach for (cross-border) regional development. *Sustainability*, 12(12), 5181.
- Coenen, L., Hansen, T., & Rekers, J. V. (2015). Innovation policy for grand challenges. an economic geography perspective. *Geography Compass*, 9(9), 483-496.
- Craens, J., Frenken, K., & Meelen, T. (2022). Mission-orientated innovation policy: The case of the Swedish "Vision Zero" approach to traffic safety. In: van Wee, B., Annema, J.A., & Köhler, J. (Eds.), *Innovations in Transport* (pp. 343-358). Cheltenham, Edward Elgar.
- Edler, J., & Fagerberg, J. (2017). Innovation policy: What, why, and how. *Oxford Review of Economic Policy*, 33(1), 2-23.
- Elia, G., and A. Margherita. 2018. "Can We Solve Wicked Problems? A Conceptual Framework and a Collective Intelligence System to Support Problem Analysis and Solution Design for Complex Social Issues." *Technological Forecasting and Social Change* 133: 279–286. doi:10.1016/j.techfore.2018.03.010.
- Ergas, H. (1987). Does technology policy matter. *Technology and global industry: Companies and nations in the world economy*, 191, 245.
- Finnish Prime Minister's Office (2023). New momentum for the Finnish RDI system – parliamentary working group sets objectives for the allocation of R&D funding. Retrieved 03-04-2024 at: <https://vnk.fi/en/-/new-momentum-for-the-finnish-rdi-system-parliamentary-working-group-sets-objectives-for-the-allocation-of-r-d-funding>
- Foray, D.; D.C. Mowery; and R.R. Nelson. 2012. Public R&D and social challenges: What lessons from mission R&D programs? *Research Policy* 41:1697-1702.
- Ghosh, B., Kivimaa, P., Ramirez, M., Schot, J., & Torrens, J. (2021). Transformative outcomes: assessing and reorienting experimentation with transformative innovation policy. *Science and*

Public Policy, 48(5), 739-756.

Grillitsch, M., & Hansen, T. (2019). Green industry development. *European Planning Studies*, 27:11, 2163-2183. doi:10.1080/09654313.2019.1648385

Grillitsch, M., & Sotarauta, M. (2020). Trinity of change agency, regional development paths and opportunity spaces. *Progress in Human Geography*, 44(4).

Grillitsch, M., Hansen, T., Coenen, L., Miörner, J., & Moodysson, J. (2019). Innovation policy for system-wide transformation: The case of strategic innovation programmes (SIPs) in Sweden. *Research Policy*, 48(4), 1048-1061. Retrieved from <https://doi.org/10.1016/j.respol.2018.10.004>

Hassink, R., Gong, H., Fröhlich, K., & Herr, A. (2022). Exploring the scope of regions in challenge-oriented innovation policy: The case of Schleswig-Holstein, Germany. *European Planning Studies*, 30 (11), 2293-2311.

Hekkert, M. P., Janssen, M. J., Wesseling, J. H., & Negro, S. O. (2020). Mission-oriented innovation systems. *Environmental innovation and societal transitions*, 34, 76-79.

Hölscher, K., Frantzeskaki, N., & Loorbach, D. (2019). Steering transformations under climate change: capacities for transformative climate governance and the case of Rotterdam, the Netherlands. *Regional Environmental Change*, 19(3), 791-805.

Janssen, M. Wanzenböck, I., Fünfschilling, L. & Pontinakis, D. (2023). "Governance arrangements for the implementation of transformative innovation policy: Insights from a comparative case study," *Papers in Innovation Studies 2023/13*, Lund University, CIRCLE - Centre for Innovation Research.

Janssen, M. J., Wesseling, J., Torrens, J., Weber, K. M., Penna, C., & Klerkx, L. (2023). Missions as boundary objects for transformative change: understanding coordination across policy, research, and stakeholder communities. *Science and Public Policy*, 50(3), 398-415.

Kattel, R. & Mazzucato, M. (2018). Mission-oriented innovation policy and dynamic capabilities in the public sector, *Industrial and Corporate Change*, Volume 27, Issue 5, Pages 787–801, <https://doi.org/10.1093/icc/dty032>

Larrue, P. (2021). The design and implementation of mission-oriented innovation policies: A new systemic policy approach to address societal challenges. OECD.

Mazzucato, M. (2018). Mission-oriented innovation policies: challenges and opportunities. *Industrial and corporate change*, 27(5), 803-815.

Mazzucato, M., & Semieniuk, G. (2017). Public financing of innovation: new questions. *Oxford Review of Economic Policy*, 33(1), 24-48.

Morisson, A., Liotard, I., & Revest, V. (2023). Small Wins through Inducement Prizes: Introducing Challenge-Oriented Regional Prizes (CORP). *Sustainability*, 15(4), 3240.

Nelson, R. (2011). The Moon and the Ghetto revisited. *Science and Public Policy*, 38(9), 681-690.

Schot, J., and W. Steinmueller. 2018. "Three Frames for Innovation Policy: R&D, Systems of Innovation and Transformative Change." *Research Policy* 47 (9): 1554–1567. doi:10.1016/j.respol.2018.08.011

Schwab K. & Zahidi S., World Economic Forum (2020). The Global Competitiveness Report Special Edition 2020: How Countries are Performing on the Road to Recovery'. Geneva, Switzerland. ISBN 978-2-940631-17-9

Tödtling, F., & Trippl, M. (2005). One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy*, 34(8), 1203-1219

Tödtling, F., Trippl, M., & Desch, V. (2022). New directions for RIS studies and policies in the face of grand societal challenges. *European Planning Studies*, 30 (11), 2139-2156.

Uyarra, E., Ribeiro, B., & Dale-Clough, L. (2019). Exploring the normative turn in regional innovation policy: Responsibility and the quest for public value. *European Planning Studies*, 27(12), 2359-2375.

Wanzenböck, I., & Frenken, K. (2020). The subsidiarity principle in innovation policy for societal challenges. *Global Transitions*, 2, 51-59.

Wittmann, F., Hufnagl, M., Lindner, R., Roth, F., & Edler, J. (2021). Governing varieties of mission-oriented innovation policies: A new typology. *Science and Public Policy*, 48(5), 727-738.

Wittmann, F., Hufnagl, M., Roth, F., Yorulmaz, M., & Lindner, R. (2021). From mission definition to implementation: Conceptualizing mission-oriented policies as a multi-stage translation process (No. 71). *Fraunhofer ISI Discussion Papers-Innovation Systems and Policy Analysis*.



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II. SWEDEN: JOURNEY TOWARDS A MISSION-ORIENTED APPROACH – 'MADE IN SWEDEN'. *Markus Grillitsch, Lund University*

1. Introduction

The aim of this chapter is to provide an overview of innovation policy developments in Sweden and vertical coordination. It also includes a discussion of the relevance of mission-oriented research and innovation policies. The chapter draws mainly on relevant documentation such as research bills, government decisions, strategic documents, funding agencies' websites, call documents for research and innovation instruments, and evaluation reports.

The chapter briefly introduces the innovation policy landscape in Sweden, then provides an overview of the main funding instruments, before discussing Sweden's journey to more challenge- and mission-oriented research and innovation policies. The discussion includes reflections on how challenges or missions are articulated and defined, the level of vertical coordination of research and innovation policy, and the main instruments.

2. Innovation policy landscape in Sweden

Sweden has been a frontrunner in identifying the need for and experimenting with research and innovation policies that address societal challenges and are aimed at system change. This stems from the 2009 Lund Declaration, adopted during the Swedish EU Presidency, which emphasised the role of research and innovation policy in efforts to address major societal challenges (Avdeitchikova and Schwaag Serger, 2024). Since then, Sweden has implemented a range of transformative, challenge- or mission-oriented research and innovation programmes.

In the Swedish context, a variety of government agencies are mandated with implementing these programmes (see Figure 2). These include Vinnova, the Swedish innovation agency, as well as research councils with a dedicated focus on societal challenges, i.e., Formas (the Swedish Research Council for Sustainable Development) and Forte (the Swedish Research Council for Health, Working Life and Welfare). Further, the Swedish Research Council, which in principle supports basic research, has responsibility for several national programmes with a societal orientation. In addition, the Swedish Energy Agency, as an emergency-preparedness authority and sectoral agency responsible for energy, is tasked with realising the sustainable energy transition, and considers research and innovation to be necessary parts of this process. Avdeitchikova and Schwaag Serger (2024) argue that, compared to other countries, government agencies in Sweden tend to have more autonomy in how to fulfil their mandate, which makes it possible to channel resources towards strategic transformative innovation programmes. These governance systems may come at a price, in the form of lower levels of ownership within the national government, as well as coordination challenges at the national level (Avdeitchikova & Schwaag Serger, 2024; Scordato et al., 2021). In addition to these central state agencies, there are a variety of other agencies, as well as foundations that fund research and innovation.

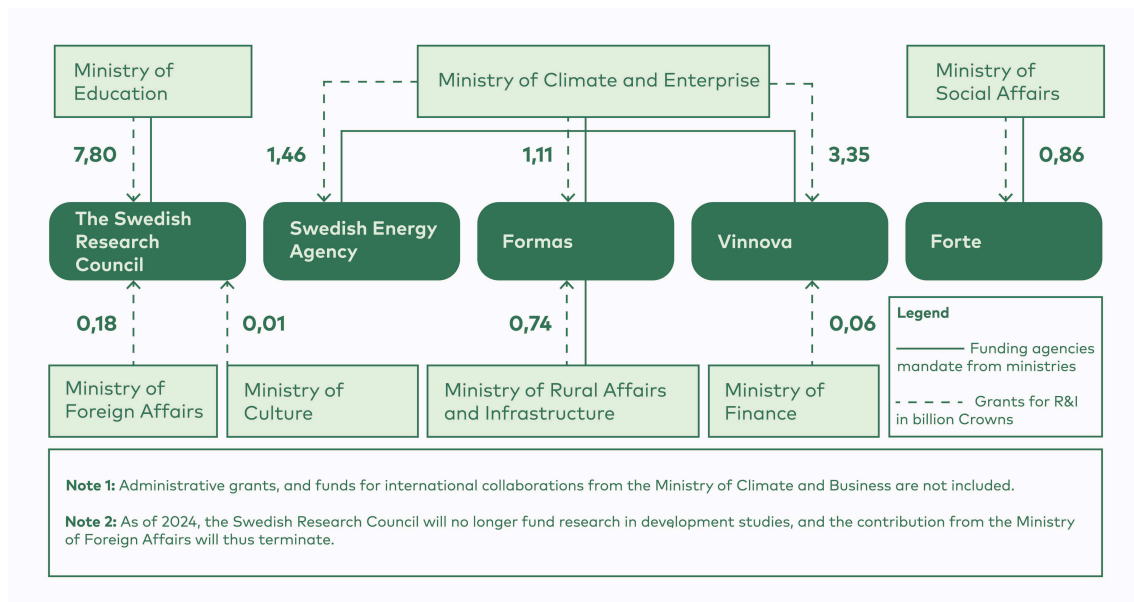


Figure 2: Organisation of government research and innovation funding in Sweden. Source: Adapted and translated from Swedish Government Official Reports (Statens offentliga utredningar (SOU) 2023:59)

The main policy programmes explicitly targeting societal challenges and tangible contributions to system change are Challenge-Driven Innovation (UDI), launched in 2011 by Vinnova; the Strategic Innovation Programmes (SIP), launched in 2012 as collaboration between Vinnova, the Energy Agency and Formas; and, with the same set of actors, Impact Innovation, which announced a call for proposals in 2023. Vinnova also implements mission thinking across their eight priority areas by funding, e.g. innovation platforms or demonstrators. The transformative or mission-oriented approach is therefore increasingly penetrating the various innovation programmes. In addition, the National Research Programmes (NRPs) were launched in 2017 with a view to generating knowledge with societal relevance. Formas has responsibility for four national programmes focusing on the climate, sustainable spatial planning, food, and oceans and water. Forte has responsibility for applied welfare research, working life research and mental health. The Swedish Research Council has responsibility for the national programmes on antimicrobial resistance, migration and integration, viruses and pandemics, crime, segregation, and the consequences of digitalisation.

This very short overview of the Swedish landscape for financing challenge- or mission-oriented research and innovation highlights the complexity of the system. The government inquiry into research and innovation financing (SOU 2023:59) stipulates that the current infrastructure primarily responds to the first and second generations of innovation policy. At the same time, the inquiry stated that changes were required to address the needs of the third generation of innovation policy. The first generation essentially focused on enhancing science and technology, based on the assumption that the knowledge generated will translate into innovation, and therefore societal benefits. The second generation takes a systemic perspective, and appreciates the need to facilitate interaction between knowledge-generation and -exploitation. As such, it is aimed at promoting innovation, but also assumes that innovation will translate into societal benefits. The third generation aims to help address societal challenges, and propel system change (Grillitsch et al., 2021; Laatsit et al., 2022; Schot & Steinmueller, 2018).

The government inquiry suggested a new agency structure informed by seven criteria (secure free research; stimulate international excellence and groundbreaking research; enhance knowledge, innovativeness and competitiveness; connect research and education; enhanced international co-operation; greater directionality; and more efficient administration). This structure should include only three agencies: one for research, one for strategic research and one for innovation. The agency for research should focus on excellence; the agency for strategic research should focus on the needs of Swedish society and industry; and the innovation agency should promote the transformation of society, helping address societal challenges and enhancing economic competitiveness. It is suggested that the lion's share of the funding should be allocated to the research agency (SEK 8.2 billion p.a.) and the strategic agency (SEK 7.8 billion p.a.) and that the innovation agency distribute SEK 1.7 billion p.a. While there is a perceived need for change, this proposal has attracted criticism. For example, the Energy Agency's response to the SOU suggests that separating research from its other areas would weaken the energy transition. Vinnova suggests two agencies instead of three, and is critical of the relatively smaller allocation suggested for the innovation agency. Also, it is noted that reorganisations consume resources, and as such have potential implications for existing capabilities related to the work on challenge- and/or mission-oriented policies.

3. Overview of main funding instruments

The 2009 Lund Declaration is often considered as the event that kicked off the shift towards increasingly challenge- and mission-oriented research and innovation policies (Avdeitchikova & Schwaag Serger, 2024). In 2011, Vinnova launched the development of the programme for

Challenge-Driven Innovation (CDI), although its budget was insufficient to make a major impact (OECD, 2016). This programme is currently processing its final calls for proposals, after which it will be discontinued. Subsequently, the Research Bills 2012/13:30, 2016/17:50 and 2020/21:60 introduced various instruments that, over time, substantially changed research and innovation policies in Sweden. Three major instruments with an explicit challenge- or mission-orientation have also been developed: Strategic Innovation Programmes (SIPs), Impact Innovation and the National Research Programmes (NRPs). In addition, the Research Bill 2016 also introduced the Collaboration Programme (samverkansprogram). However, it had fewer instruments than the three previously mentioned. This chapter focuses on the three major instruments, as they illustrate Sweden's journey towards more challenge- and mission-oriented research and innovation policies. It also provides a short summary of the CDI programme and the Collaboration Programme. However, it is important to note that there are other instruments within Vinnova's priority areas, such as the recent innovation platforms for sustainable food systems and vision-driven health, both of which have an explicit focus on missions.

3.1. Challenge Driven Innovation (CDI)

CDI was established in 2011 as a Vinnova programme dealing with sustainability challenges. In the first calls, Vinnova defined the challenges involved, and from 2018 onwards it referred to the Sustainable Development Goals (SDGs). The programme consisted of three stages. The first sought to develop an innovation-oriented idea of how to solve one or more societal challenges; the second was aimed at developing collaborations between partners and developing innovative solutions; and the third involved supporting the testing and implementation of the solution. CDI also included a facility that would carry out pilot studies. Calls for stage three are currently underway, after which the programme will be discontinued. A total of 783 projects were funded under the CDI programme, of which 51 reached stage three (Ramboll, 2022). In addition to the overall aim of addressing societal challenges, CDI experimented with engaging broader coalitions of actors, and thereby emphasised multi-disciplinary and boundary-spanning collaborations. The stage model was considered a success, and subsequently adapted for SIPs and Impact Innovation, as will be described later. One learning from CDI was that the impact of individual projects/innovations is often limited by conditions other than technology, e.g. business model innovation or supportive regulations (Ramboll, 2022).

3.2. Strategic Innovation Programmes (SIPs)

The SIPs were an important step towards challenge- or mission-oriented innovation programmes. These relate to the Research and Innovation Bill 2012 (2012/13:30) and the Research and Innovation Bill for a Sustainable Energy System (2012/13:21), which proposes that Vinnova, the Energy Agency and Formas should collaborate to strengthen strategic innovation areas. In a first step, a call was announced to formulate strategic innovation agendas via a bottom-up process. A total of 290 proposals were received, of which 136 applicants were granted funding to develop strategic innovation agendas. Then, four consecutive calls were issued to establish SIPs (which, in line with the Research Bill 2012, were initially defined as strategic innovation areas). This resulted in the establishment of 17 SIPs, each of which could be funded for a maximum of 12 years, subject to evaluation at three-year intervals. So far, all SIPs have been evaluated, and have been granted funding for the consecutive three-year period. Assuming that all SIPs will be funded for 12 years, the total funding for the 17 SIPs will amount to SEK 16 billion, of which SEK 7.2 billion will come from public funding (Åström & Arnold, 2023).

The overall objectives (expected programme impacts) were defined as:

- Increasing sustainable growth
- Creating conditions for sustainable solutions to global societal challenges
- Sustainable social development, to secure employment, welfare, environmental and energy policy objectives
- Improving competitiveness and increasing exports for Swedish industry
- Ensuring that Sweden is an attractive country in which to invest and do business.

The programme offices had overall responsibility to, e.g. update and renew the innovation agenda in dialogue with the stakeholders; develop networks and collaborations both in Sweden and internationally; generate and disseminate knowledge; and monitor the activities, thereby ensuring learning and reflexivity. By far the largest share of the funding was allocated to competitive bidding. Programme offices would play a role in defining the call text and nominating evaluators, but had no influence on the selection, and only limited influence in the implementation of individual projects (Fridholm & Hallström Hjorth, 2023; Åström & Arnold, 2023). However, the programme offices could also develop strategic projects in negotiation with the agencies, and target system-level interventions. In addition, they could initiate complementary activities, such as international outlooks, investigations, workshops, courses, graduate schools, networking events or conferences.

The SIPs asked for a broader engagement of societal stakeholders compared to previous initiatives, with the chair of each SIP's board representing the 'problem-owner' (*behovsägare*). In this context, this refers to a stakeholder who takes responsibility for the problem or societal need addressed, and also has agency in terms of implementing and disseminating the solutions developed in the SIP. In addition, it was requested that the demand side holds the majority on the SIP boards, in the form of private- or public-sector actors who could benefit from the results. The programme office was tasked with steering activities in ways that would benefit demand-side stakeholders.

It has been argued that one strength of the SIPs is the long-term perspective, which is a necessary condition for delivering system change. Some of the programmes that were criticised in the first three-year evaluation were subject to mitigation actions and adaptations, and are now considered successful (Fridholm & Hallström Hjorth, 2023). This implies that the long-term perspective, including regular formative evaluations, allowed for learning and reflexivity, and more generally facilitated the building of the capabilities necessary to run large-scale and complex programme initiatives. The long-term perspective enabled investment in collaborative structures that would yield benefits over time.

While the four rounds of calls for establishing SIPs were quite similar overall, there are also some subtle but important differences. The first call emphasised that the SIPs would create the preconditions for international competitiveness and the creation of sustainable solutions for global societal challenges. This was to be achieved through closer national and international collaboration, joint efforts and renewal, with a long-term perspective. In the third call, the order of priorities changed, with sustainable solutions in first place, and international competitiveness second.

Some small changes are also visible in the intervention logic for SIPs, as shown in Figure 3, from the third-round call text. Compared to the call text for the first and second rounds, there are two changes here: First, the introduction of Goal and Vision (Mål och Vision) as a vertical pillar, which indicates a move towards mission-orientation. Second, the order of the overall objectives (effektmål) or desired impacts has changed. In the first and second calls, increased sustainable

growth was in the first position, but in the third call, it moved to third place. In the first, second and third calls, it is stated that SIPs must contribute to at least two of the overall objectives, whereas in the fourth call, all proposals must target sustainable solutions.

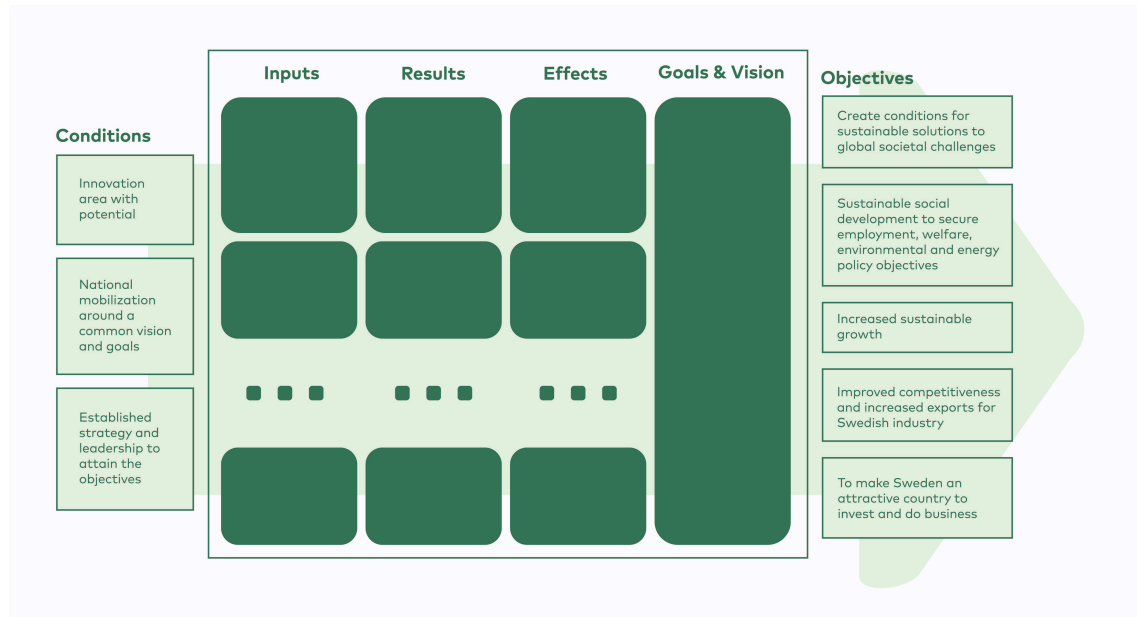


Figure 3: Intervention Logic for SIPs. Source: Adapted from Vinnova et al. (2014)

Overall, the evaluations showed that the SIPs had successfully strengthened international competitiveness in strategic areas, and also enhanced research and development in collaboration between industry and R&D actors (Fridholm & Hallström Hjorth, 2022, 2023; Åström & Arnold, 2023). While the programmes were dominated by industry leaders and key R&D actors, they were also open to newcomers, which led to enhanced networking and collaborations. The dominance of existing industry leaders is explained by the SIPs' objective of focusing on areas of national strength and importance, combined with competitive bidding. The companies involved reported good expectations for commercial impact, mainly through the development and improvement of products, services or processes. However, the financed projects' concrete outputs were often prototypes or demonstrations, which may in future lead to the introduction of new products. The companies also reported that the innovation processes were facilitated (sped up), and that the collaboration led to new follow-on/spin-off projects, which suggests that the activities related to SIPs were relevant to the companies concerned. Increasingly, the SIPs also adopted a value-chain perspective to developing solutions that include actors along the whole value chain. R&D actors reported that their international competitiveness has strengthened, and expect this trend to continue in the future. They also suggested that the SIPs have contributed to their ability to work with the industry or carry out industry-relevant R&D. Further, the SIPs have used strategic projects to address system-related weaknesses (Fridholm & Hallström Hjorth, 2022, 2023; Åström & Arnold 2023).

The SIPs' system effects include enhanced networks, collaboration and competence development between actor groups and sectors. Areas of competence development include PhD education, graduate education, training and life-long learning (Fridholm & Hallström Hjorth, 2022, 2023). The two main topics at EU level, green transition and digitalisation, play an important role in all programmes. Some programmes also worked with aspects such as standards or regulations.

However, in relation to the objective of contributing to system change, the evaluation of the SIPs is critical, and varies between them and, in particular, between the four application rounds

(Fridholm & Hallström, Hjorth, 2022; Grillitsch et al., 2019; Åström & Arnold, 2023). The SIPs have changed over time. Previously, the first round was primarily characterised by a continuation of traditional sectoral and collective research programmes. However, the programmes awarded in rounds two to four increasingly included programmes that were less consolidated and drew less on previous programmes, and as such show greater diversity (Fridholm & Hallström Hjorth, 2023; Åström, et al., 2021). In the fourth call, Viable Cities was selected, which has a relatively strong focus on system change using a mission-oriented approach. This means that while at the beginning there was a rather low degree of ambition in terms of addressing societal challenges, this ambition has increased over time, and system change has become more of a priority. In terms of actor mobilisation and coordination, the SIPs may have contributed to building the capacity needed to drive system change.

3.3. Impact Innovation

With the Impact Innovation programme, the Swedish Energy Agency, Formas and Vinnova aimed to implement the Government Decision (2021-04218), which in turn was based on the Research and Innovation Bill 2020 (2020/21:60). Impact Innovation is a 'new' strategic innovation programme for transformative change and sustainable development. These new programmes are aimed at accelerating development in areas of strategic importance for Sweden and broad societal relevance related to Agenda 2030. The programmes will lead to system change and an increased focus on societal effects such as zero-carbon emissions, a circular economy or digital transformation. The programmes will also promote international collaboration, both within the EU and globally. A call for preparatory projects was issued in September 2022. A total of 98 applications were received, of which 23 have been awarded funding to develop full proposals. These proposals were submitted in Autumn 2023, and five Impact Innovation programmes were awarded. A second call is expected in 2025.

The government's decision relates to previous SIPs, which will be adapted to reflect the transformative ambition. It also relates to the evaluation of the SIPs, which highlights positive outcomes in terms of forging new actor constellations and collaborations, as well as improved competitiveness and increased exports. While the evaluation of the SIPs identified some effects in terms of creating conditions for sustainable development, contributing to global societal challenges and innovations with lower environmental impact, the societal effects were assessed as rather incremental and minor (or at least, had not yet been realised when the evaluations were conducted). For this reason, the decision emphasises that the new programmes' contribution to system change and to addressing societal challenges must be strengthened, and that fewer but larger programmes will be developed to make a greater transformative impact. The design of Impact Innovation aims to deliver on these goals while also building on the lessons learned from the 17 SIPs. In addition, the programme draws on Vinnova's experiments with and learnings from mission-oriented programmes in the areas of healthy sustainable food and healthy sustainable mobility. The call text for the Programme Offices for Impact Innovation states:

"The Swedish Energy Agency, Formas, and Vinnova are jointly launching Impact Innovation, which is Sweden's largest innovation intervention of the 2030s. The objective of Impact Innovation is to accelerate the transition towards sustainability for global competitiveness and societal benefits, aligned with the sustainability goals outlined in Agenda 2030. Impact Innovation is a long-term collaborative effort that harnesses the driving forces from actors across different sectors, including business, academia, the public sector, and civil society."

(Energy Agency et al., 2023, 6)

Each of the five Impact Innovation programme offices needs to have a clear mission to contribute to one or more of the following three areas: attractive and well-functioning communities, good

and equal health, and production, consumption and value chains within the planet's boundaries. 'A Mission should be bold, ambitious, time-bound, and measurable. It must constitute the overall and long-term direction of the programme. When working towards a Mission, one may need to work with different areas within a programme. The engagement from the various actors participating in the program can vary between these areas' (Energy Agency et al., 2023, 7).

Figure 4 illustrates Impact Innovation's organisational structure. Each programme must define clear missions that contribute to system change and societal impact related to the three priority areas. The programme offices are responsible for operating and coordinating all activities and initiatives within each programme. They are also responsible for ensuring learning processes and the necessary reflexivity to engage effectively with the uncertainties and emergent nature of system change. Relatedly, the requirements for monitoring and evaluation systems are more pronounced than those of the SIPs. Each programme will combine constellations of actors from different sectors, including business, academia, the public sector and civil society. The programme offices will also have a clear idea of how to engage the various actor groups in long-term collaboration on the mission, thereby promoting transformative, systemic change aimed at sustainability.

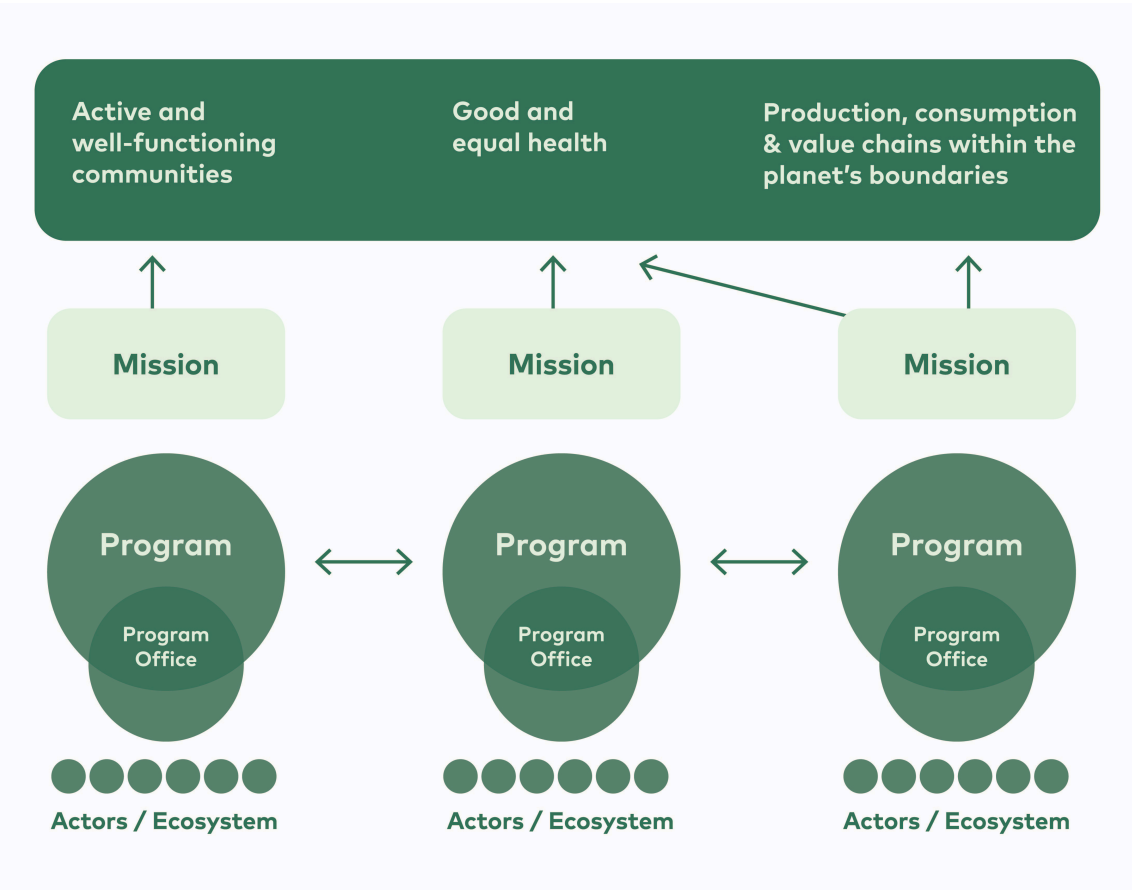


Figure 4: Organisation of the Impact Innovation Programme. Source: Vinnova 2023

3.4. National Research Programmes

The National Research Programmes (NRPs) were initiated with the Research Bill 2016/17:50 and extended through the Research Bill 2020/21:60. The overall aim is to steer research activities in such a way that they contribute to societal challenges, promote inter-disciplinary and cross-sectoral research, and establish links between research and education. The initiative refers to the strategic orientation of research and innovation programmes of the European Union (Horizon) and grand societal challenges (Agenda 2030 and Paris Agreement). The Research Bill 2020/21:60 explicitly refers to the possibility of seeking synergies with initiatives at the European level. In Sweden, the introduction of the NRPs meant that more weight was given to research that is challenge-driven or oriented towards defined societal challenges.

Each of the 13 programmes lasts ten years, which affords a long planning horizon for building research infrastructure. Each programme is coordinated strategically by one of the research councils (Fortes, Formas, Swedish Research Council). Each programme has a programme committee that includes relevant research funders, and facilitates coordination between them to avoid overlaps. The programme committees have their own advisory groups (including the problem-owners) with a broad range of competencies. The purpose of this broad stakeholder engagement is to ensure the challenge-driven nature of national research programmes. A recent evaluation positively assessed the NRPs' governance structure, but also noted that the programme committees' influence has rather diminished over time (Arnold et al., 2022). The programmes are primarily implemented through calls offering funding for research grants, innovation grants or collaboration funding.

Each NRP responds to societal challenges that are broadly defined in the Research Bills and then further specified through analysis and dialogue processes orchestrated by the programme committees. For instance, the NRP on climate, the largest of the 13 NRPs, defines six focus areas: sustainable innovation for climate efforts; system-integrated knowledge of climate change, ecosystems and society; production and consumption in line with climate goals; governance for meeting climate challenges; economic and financial drivers for climate action; and a democratic and just climate transformation (Formas, 2022).

Overall, the NRPs bring a more explicit and thematic directionality to the research activities. In consultation with the stakeholders, the programmes also aim to narrow down the themes to define the knowledge needed to address the societal challenges. However, in their implementation, the programmes tend to follow the logic of the research funders, i.e. researchers respond to calls and propose projects in a bottom-up manner, in which the actual research and societal relevance are defined in relation to a particular programme. As such, while they strengthen the innovation system's knowledge-generation function, the knowledge-exploitation function (and the integration with problem-owners) is less pronounced. This means that actors who could implement and exploit the generated knowledge in ways that promote system change were less present. Accordingly, a meta-evaluation of seven NRPs (Arnold et al., 2022) suggests a relatively strong performance in terms of scientific output and enhanced interdisciplinary collaboration. However, the evaluation also finds that the NRPs had less impact when it came to generating cross-sectoral collaboration (e.g. between research and industry), which diminished their contribution to system change. Arguably, an excessively broad formulation of objectives limited the opportunities to exert directionality, while the lack of system integration (e.g. with actors who could implement and exploit the knowledge generated) limited the potential system impact.

3.5. Collaboration Programmes (Samverkansprogram)

Research Bill 2016/17:50 initiated five strategic innovation areas (later revised to four) based on the work of the National Innovation Council. The National Innovation Council was led by the Prime Minister, five ministers, and ten external representatives from, among others, industry and research (Edquist, 2019). Collaboration Programmes (CPs) were established in the areas of mobility and transport, smart cities, circular and bio-based economy, life science, and advanced manufacturing and materials. Research Bill 2020/21:60 also refers to this programme. Vinnova was mandated (Regeringsbeslut 2019-05811) to support the implementation of the CPs by, among other things, mapping relevant stakeholders, conducting an analysis of the system and the requirements for system change in dialogue with stakeholders, and identifying synergies between programmes. SIPs appear to have been the main tool for CP implementation. As such, it is difficult to assess the real impact of the CPs.

4. Sweden's journey to a challenge- and mission-oriented research and innovation policy

Research Bills 2012, 2016 and 2020 changed the directionality of research and innovation policies. There is now a clear emphasis on more challenge-oriented research, as well as innovation that contributes not only to international competitiveness, but also to addressing societal challenges and propelling system change. The initial formulations and attempts via SIPs and NRPs have been relatively timid, and bear many traces of previous programmes. However, over time, the SIPs have increasingly emphasised societal relevance, system change and mission orientation. For example, the SIP Viable Cities, which received a grant in the fourth round, has a clear mission orientation and more place-based approach. While the NRPs have sought to direct research towards societal challenges, the link to knowledge exploitation has been rather weak. This reflects a common challenge facing innovation systems – namely that knowledge exploration and exploitation need to be closely connected for the systems to generate innovation and societal impact. Impact Innovation follows the main thrust of the evaluations for both SIPs and NRPs with regard to investment in larger programmes, which recommended that (public or private) problem-owners should be placed at the centre to develop an innovation system capable of tackling selected societal challenges and thereby generating a greater impact.

4.1. Choosing challenges and missions

Overall, the Swedish approach emphasises stakeholder participation, with rather limited directionality from the national government. The government has increasingly articulated that research and innovation policy should contribute to addressing societal challenges. Most importantly, it provided the preconditions for new initiatives such as SIPs, NRPs and Impact Innovation, with substantial funding and the aim of addressing societal challenges. The government also decided on the thematic areas of the NRPs and the collaboration programmes. However, it defined the objectives and themes in very broad terms. More detailed themes and objectives for the NRPs were developed in consultation with a coalition of actors, funders, the research community and society. The subsequent calls then followed the themes, and researchers proposed relevant projects.

The process that led to the formulation of SIPs was intended or articulated as a bottom-up initiative, as groups of actors were invited to develop strategic innovation agendas, some of which were then consolidated into SIPs. In practice, however, the SIPs are run by quite

well-established groups of actors who have the capacity necessary to run large-scale programmes and succeed in national competitions. This was especially true for the SIPs in the first round, all of which were related to previous innovation programmes. Hence, while bottom-up refers to limited directionality on the part of the government, the processes were also top-down in the sense that they were dominated by established and highly capable organisations and groups of actors. Further consolidation and concentration via Impact Innovation may further raise the hurdles for 'new entrants', and reinforce the need for established, resource-strong environments in running the programmes.

Impact Innovation is subject to a degree of directionality from the government similar to that of the SIPs, albeit with an expectation that its activities should be larger, more focused, and deliver more impact in terms of system change. However, the call text shows that Impact Innovation provides more directionality in terms of objectives. In addition, the applications are required to propose a clear mission statement, and must demonstrate strong ownership by the problem-owner. In that sense, it might be expected that Impact Innovation will exert stronger directionality, but this is very much dependent on the implementation mechanisms.

In terms of how funding agencies perceive missions, the articulation of the major instruments is not very detailed. However, a detailed elaboration of a Vinnova document on designing missions offers more insights, and reflects the overall picture presented in this report so far (Hill, 2022). As Figure 5 shows, the general perspective is rather bottom-up. It begins with identifying different angles for an intervention, based on meetings, interviews and workshops, coupled with sector analysis and relevant research. These angles are then developed into more specific missions, a step which also entails creating networks of relevant and willing actors. The next step in implementing the missions consists of developing and experimenting with prototypes. Successful experiments are then scaled up to system demonstrators.

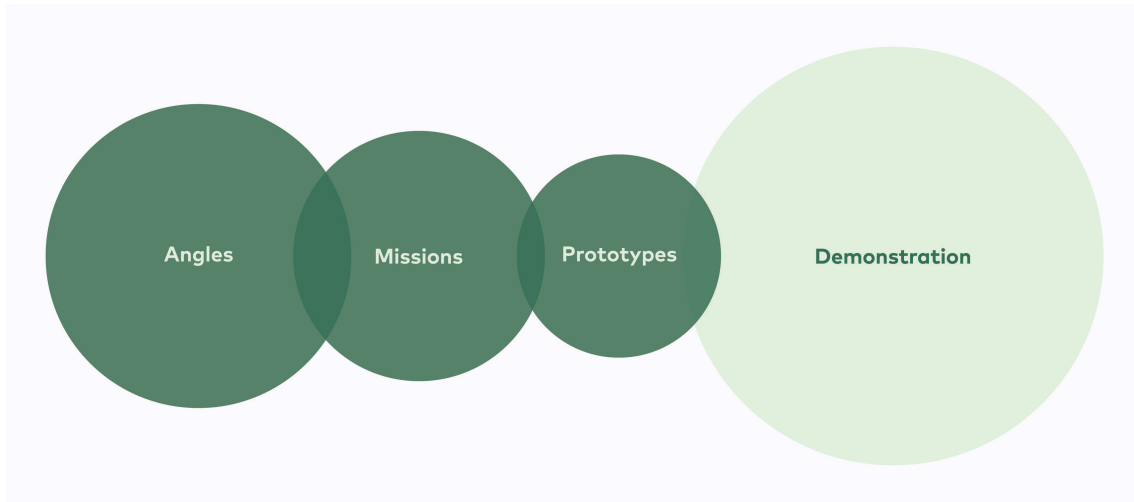


Figure 5: Vinnova model for designing missions. Source: (Hill, 2022, 140f)

4.2. Vertical coordination: Multi-level governance and place-based approaches

With regard to the linkages between the *national level* and the *European/global level*, the Research Bills 2012, 2016 and 2020, as well as the consequent implementation in SIPs, Impact Innovation and NRPs, are clearly influenced by the macro-level discourse on grand societal challenges, the climate crisis, the Paris Agreement and Agenda 2030. This influence primarily concerns the broad framing of the challenges, but also the allocation of substantial funding to

programmes that are challenge- or mission-oriented. The texts also refer to European initiatives, notably the Horizon programmes. However, this usually takes the form of describing the policy landscape and expressing a wish to create synergies.

The extent to which the SIPs and NRPs contribute to increasing participation in Horizon programmes is somewhat questionable. On the one hand, the SIP evaluations suggest several follow-up projects and propose increased internationalisation, which may include, e.g. Horizon projects. On the other hand, the meta-evaluation of the NRPs (Arnold et al., 2022) is more sceptical, suggesting that the actors pursuing European funding opportunities were already in a strong position to do so. As such, the link between the national and European programmes appears to be grounded mainly on an alignment of challenges, as expressed in the wider discourse and manifested in Agenda 2030.

The SIPs and NRPs are rather silent about their relationship to multi-level governance at local and regional levels. A first hint is provided by the spatial distribution of funds, which largely follows the spatial distribution of the main actors in the research and innovation landscape (Åström & Arnold, 2023). Neither the SIPs nor NRPs specified place-based approaches and context-sensitivity in their calls, nor do the programme evaluations cover these aspects. As a consequence, these programmes have primarily targeted the Swedish landscape while also being largely space-blind, i.e. ignoring the implementing organisations' locations and environments.

This is quite interesting in relation to the European Commission's place-based regional development interventions: smart specialisation. The original idea behind smart specialisation was to promote industrial transformation and competitiveness through innovation, while paying limited attention to societal challenges. Recently, various attempts have been made to reorient smart specialisation and European regional development policy approaches to societal challenges (Grillitsch et al., 2023). In addition, the National Strategy for Sustainable Regional Development for 2021–2030 makes a connection between smart specialisation and the overall objective of addressing societal challenges and promoting system innovation, and even mentions missions as one potential approach. As such, while a general direction is articulated, the link between the national challenge- or mission-oriented programmes (SIPs and Impact Innovation) and the regional development approaches is rather weak at the instrument level. This link could potentially be strengthened by building on previous experience with Vinnväxt, which was a place-based approach that supported longer-term collaborative innovation initiatives, with some evidence of system-level effects (Wise et al., 2022).

However, there are signs that this trend is shifting. In *Viable Cities*, the last SIP, the cities are key actors, and this SIP therefore incorporates a multi-level governance dimension. In addition, Vinnova implemented mission-oriented pilots on sustainable and healthy food, and sustainable and healthy mobility, which adopted a more place-based approach. The experience with mission-oriented innovation programmes is reflected in *Designing Missions*, which outlines a 'Swedish' approach (Hill, 2022). This document foregrounds a place-based approach to missions, in which the situatedness of a challenge in a particular context plays an important role in both problem formulation and negotiating relevant solutions. Furthermore, the overall aim of impact innovation – i.e. contributing to attractive and well-functioning communities – opens up for more place-based approaches, as the relevant communities would often be anchored in place. This means that, even if not explicitly required, municipalities and regions can participate in national challenge- or mission-oriented programmes. Yet, as pointed out in 4.3, little is known about to what extent, how and with what outcomes municipalities and regions would combine policy instruments focused at that level (e.g. smart specialisation) with, e.g. SIPs or Impact Innovation. This means that it remains to be seen to what extent the recent 'rediscovery' of the importance of context and place in national approaches will lead to a strengthening of multi-level governance, and a greater emphasis on the place-based design and implementation of mission-oriented programmes.

4.3. Implementation of challenge- and mission-oriented policies

Several features characterise challenge- and mission-oriented policies in Sweden. First, the policies have a long time horizon (10+ years). They are also subject to regular evaluations that enable learning and flexibility. In relation to the SIPs, this has been noted as positive, as it has allowed deficiencies to be identified in several programmes. These were subsequently tackled, leading to an overall positive evaluation of the SIPs.

Second, the programmes' governance structures foresee broad stakeholder engagement. In the case of the SIPs and Impact Innovation, the programme office must demonstrate this both in the application and in the regular evaluations. In the case of the NRPs, this will be guaranteed by a programme committee, which includes different funders and a broad range of societal interests.

Third, within the SIPs, the possibility of strategic, negotiated projects opens up the possibility of stronger implementation of the missions, via the programme offices. Most of the funding was distributed through calls, and therefore the programme offices could formulate these calls in ways that exercised directionality. However, the funding decisions and the implementation of projects fell largely outside of the programme offices' sphere of influence. Similarly, the NRPs primarily used traditional calls for project funding to disburse most of the funds.

Hence, while the new governance structures of SIPs, Impact Innovation and NRPs have afforded some directionality in terms of defining the challenges to be addressed, and have also mobilised broader actor coalitions, there is a higher degree of fragmentation at the project level. This raises questions about the extent to which the project portfolios contribute to the transformative mission. At the same time, there is a lack of clarity about how, e.g. NRPs and SIPs and future Impact Innovation programmes are linked at the actor level. For instance, are the beneficiaries of NRPs also beneficiaries of SIPs and Impact Innovation? If so, do the links between actors across sectors exist at the micro-level? It is unclear how individual actors can use combinations of instruments to achieve transformative ambitions. In addition, the extent to which actions at the level of projects can and should be coordinated – and how – remains an open question (cf. Laatsit et al., 2022).

5. References

- Arnold, E.; G. Melin; and J. Olsson. 2022. A Formative Meta-Evaluation of Seven Swedish National Research Programmes 2017-2021. Stockholm: Formas.
- Avdeitchikova, S. and S. Schwaag Serger (2024), Innovation policy as an instrument for driving transformation – lessons from practice Papers in Innovation Studies.
- Edquist, C. (2019), Towards a holistic innovation policy: Can the Swedish National Innovation Council (NIC) be a role model?, *Research Policy*, 48, 869-879.
- Energy Agency; Formas; and Vinnova. 2023. Establishment of Impact Innovation programs: funding of Program Offices ed. Vinnova. Stockholm: Vinnova.
- Formas. 2022. Knowledge for a climate transformation: Strategic agenda for the National Research Programme on Climate. Stockholm: Formas.
- Fridholm, T. and M. Hallström Hjorth. 2022. Nioårsutvärdering av strategiska innovationsprogram: Slutsatser från fem utvärderingar 2022. Stockholm: Vinnova.

———. 2023. Nioårsutvärdering av strategiska innovationsprogram: Slutsatser från sex utvärderingar 2023. Stockholm: Vinnova.

Grillitsch, M.; T. Hansen; L. Coenen; J. Mörner; and J. Moodysson (2019), Innovation policy for system-wide transformation: The case of strategic innovation programmes (SIPs) in Sweden, *Research Policy*, 48, 1048-1061.

Grillitsch, M.; T. Hansen; and S. Madsen. 2021. Transformative innovation policy: a novel approach? In *Handbook on Alternative Theories of Innovation*, ed. B. Godin; G. Gaglio; and D. Vinck, 276–291. Cheltenham: Edward Elgar Publishing.

Hill, D. 2022. Designing missions: Mission-oriented innovation in Sweden - A practice guide by Vinnova. Stockholm: Vinnova.

Laatsit, M.; M. Grillitsch; and L. Fünfschilling (2022), Great expectations: the promises and limits of innovation policy in addressing societal challenges, *Papers in Innovation Studies*.

OECD. 2016. *OECD Reviews of Innovation Policy: Sweden 2016*, ed. O.R.o.I. Policy. Paris: OECD Publishing.

Ramboll. 2022. Analysis of the program Utmaningsdriven Innovation. Stockholm: Vinnova.

Schot, J. and W.E. Steinmueller (2018), Three frames for innovation policy: R&D, systems of innovation and transformative change, *Research Policy*, 47, 1554-1567.

Scordato, L.; M.M. Bugge; T. Hansen; A. Tanner; and O. Wicken (2021), Walking the talk? Innovation policy approaches to unleash the transformative potentials of the Nordic bioeconomy, *Science and Public Policy*, 49, 324-346.

Vinnova; Energy Agency; and Formas. 2014. Strategiska innovationsområden hösten 2014 - utlysning för att etablera och genomföra strategiska innovationsprogram ed. Vinnova. Stockholm: Vinnova.

Wise, E.; M. Eklund; M. Smith; and J. Wilson (2022), A participatory approach to tracking system transformation in clusters and innovation ecosystems—Evolving practice in Sweden's Vinnväxt programme, *Research Evaluation*, 31, 271-287.

Åström, T. and E. Arnold. 2023. Meta-evaluation of the Swedish Strategic Innovation Programmes: As policy instruments for industrial competitiveness and system innovation: Faugert & Co Utvärdering/Technopolis Sweden.

Åström, T.; E. Arnold; and J. Olsson. 2021. Meta-evaluation of the third round of strategic innovation programmes after six years. Faugert & Co Utvärdering/Technopolis Group Sweden.



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III. FINLAND: MISSION-ORIENTED INNOVATION POLICY?

Markku Sotarauta, Tampere University

1. Introduction

Finland is one of the first countries in the world to have embraced the idea of using a national innovation system to structure its science and technology policies (Lundvall, 2011). In doing so, it added an explicit innovation dimension to its policy mix. The drive to expand and institutionalise innovation policy instruments began in the mid-1990s, but slowed down following the financial crisis of 2008–2009 and the demise of Nokia’s mobile phone business, triggering an era of confusion in innovation policy (Laasonen et al., 2022). Despite all this, according to various indicators, Finland still ranks among the world’s top innovation economies (Dutta et al., 2022).

This century, Finnish innovation policy has broadened and deepened. It is now undergoing a process of self-reflection and searching for new initiatives and practices (Laasonen et al., 2022). The policy landscape has been in flux, and therefore this chapter is to some extent based on subjective judgements about the emerging forms of innovation policy. The main aim is to

highlight the most relevant conceptual shifts and how they have been translated into practice, from the perspective of mission-driven innovation policy. Overall, Finnish innovation policy has followed the trajectory outlined by Schot and Steinmueller (2018), from technological push to emphasising the innovation system, to adding mission-oriented or transformative innovation policy to the repertoire (Sotarauta et al., 2023).

Finland has not pursued a distinctive and well-structured mission-oriented innovation policy. Rather than forming a distinct policy entity, the 'missions' are embedded in the main policy programmes. This chapter does not assess the potential impact or functionality of the selected strategy, but presents an overview of Finnish innovation policy and the role of mission orientation.

2. Innovation policy landscape in Finland

2.1 Overview of Finnish innovation policy

As described by Laasonen et al. (2022), Finnish innovation policy has deepened and broadened over time. Innovation Policy 1.0 was characterised by a technology-driven approach, while Innovation Policy 2.0 emphasises enhancing innovation systems. More recently, the emerging ambition to catalyse transformative changes, constitutes a new era: Innovation Policy 3.0 (see Sotarauta et al. 2023).

Finland's science- and technology-based innovation (STI) policies have had a long history, dating back to World War II. From that time until the 1970s, when the foundations of the current framework were established, Finland – in a step-by-step manner, and not without difficulties – adopted a policy aimed at enhancing the technological capabilities of domestic industries, thereby reducing reliance on material-based production and exports (Alaja & Sorsa, 2021). The main objective was to build institutional capacity for science, technology and innovation. During this period, the foundational elements of what would later be termed an innovation system were established, including the National Technology Agency (Tekes) in 1983, the Science Council in 1963 (renamed the Science and Technology Policy Council in 1987 and the Research and Innovation Council in 2009), and the Academy of Finland in 1948 (modernised in 1969 and renamed the Research Council of Finland in 2023). Since the 1980s, city councils have established local technology-transfer mechanisms aimed at commercialising science and boosting collaboration between universities and companies (Häyrinen-Alestalo et al., 2006; Kostainen & Sotarauta, 2003). The first local technology centre was established in Oulu in 1982 (Männistö, 2002), after which the initiative spread to many other cities around the country.

The recession of the early 1990s marked a pivotal moment for Finland. It wreaked economic havoc and signalled a shift from a linear science and technology policy to an innovation-driven approach, which necessitated a broader systemic approach to boosting innovation. Throughout the 1990s, Finland incorporated into its policy framework concepts such as the innovation system and clusters, thereby emphasising indirect methods over direct intervention in product markets (Hernesniemi et al., 1996; Lemola, 2020; Schienstock & Härmäläinen, 2001). Over nearly three decades, National Innovation Systems (NIS)-oriented Innovation Policy 2.0 remained central to Finland's strategy, as highlighted by initiatives such as the Strategic Centres for Science, Technology and Innovation (SHOK, 2007–2016) and the Centres of Excellence (CoE, 1994–2013), which promote collaboration at the national and regional levels to enhance specialisation. The

NIS concept was also utilised rhetorically, to foster national agreement and consensus on the importance of knowledge and expertise (Miettinen, 2002) and the need to revitalise Finnish industrial policy (Ylä-Anttila & Palmberg, 2007). The mid-1990s onwards also witnessed the rapid growth of the Nokia-led ICT cluster, which increased confidence in the selected high-road strategy and added resources to the system.

The heightened focus on innovation policy and R&D efforts in the private sector led to a significant increase in Finnish R&D spending. Given that Finland's R&D expenditure had been among the lowest among OECD countries during the 1970s (Alaja & Sorsa, 2021), this surge marked a notable shift. By 2010, Finnish R&D expenditure had risen to be among the highest globally, but then experienced a steep decline. Indeed, Finland's innovation policy arrived at two critical junctures – one in the early 1990s, and the other around 2008–2010. The latter coincided with both the global financial crisis, which impacted economies worldwide, and Nokia facing fierce competition in the mobile phone market.

The many challenges resulted in a prolonged period of sluggish economic growth, spanning more than a decade (2010 onwards). This led to industrial restructuring, slow export growth, reduced industrial investment, declining employment levels, and decreased investment in research, development and innovation (RDI). This has been described as Finland's 'lost decade' (OECD, 2017). In real terms, the Finnish GDP fell to the 2008 level in 2017 (Deschryvere et al., 2021). The various actions taken during the last decade paint a general picture of 'innovation policy confusion'. An increasingly complex economic and political landscape led to hurried attempts to spur economic development, which revealed confusion and misunderstandings about the purpose of innovation policy and its expected outcomes (Laasonen et al., 2022). Moreover, in the 2010s, Finnish policy discourse around economic competitiveness began to emphasise fiscal sustainability and relative labour costs rather than innovation (Kaitila, 2019). Consequently, former flagship programmes were closed, and the once-successful innovation policy trajectory, which had attracted significant international attention, gradually faded away. The idea of national innovation systems, which had permeated Finnish innovation policy programmes from the 1990s to the 2000s, lost its programmatic status. Confusion reigned as to the purpose and instruments of innovation policy (Alaja & Sorsa, 2020).

The 2020s have seen the beginnings of Innovation Policy 3.0, which draws on the internationally recognised need to tackle grand challenges, based on emerging ideas around mission- or challenge-driven or transformative innovation policy. The need to transition from an institutional innovation system to a more entrepreneurially driven one is a common theme in innovation policy discourse (see Section 3).

2.2. The main innovation policy actors

The main innovation policy actors are categorised into four tiers (see Figure 6). The first-tier actors direct innovation policies at the highest national level, while the second-tier actors represent the ministries responsible for innovation policy within their mandate. For their part, the third-tier actors include agencies that specify policies and make funding decisions, while the fourth-tier actors represent the core of innovation, research, development and business-related organisations and groups.

Historically, the Research Innovation Council (RIC) and its predecessors have been regarded as a crucial, high-level coordinating mechanism within the national innovation system (Pelkonen, 2006; OECD, 2017). The Prime Minister chairs the RIC, and key ministers participate (five in 2024). In addition to the ministers, the RIC consists of seven members selected for their ability to comprehensively represent the research and innovation system. The attendees also include government-appointed permanent experts (six), including the leaders of central agencies, e.g.

Business Finland and the Research Council of Finland, and three permanent secretaries from ministries, who serve as resident experts (Research and Innovation Council, 2024). RIC's efficacy is not solely reliant on its structural elements, but also on significant cultural aspects in modern Finland. One such aspect is the consensus-seeking corporatist tradition, in which representative councils such as the RIC are regarded as customary channels for influencing policy decisions (OECD, 2017). Moreover, the Council functions within a primarily centralised administrative environment characterised by extensive networking among its members, which promotes a degree of coordination that frequently extends beyond formal protocols (Arnold & Boekholt, 2003; Pelkonen, 2006). Notably, the experience of collectively navigating the crisis of the early 1990s seems to have facilitated the Council's transition from acting as a mediator to assuming a strategic leadership role (Pelkonen et al., 2008).

Given the emphasis on the relative importance of labour costs over innovation, the Prime Minister's Office (PMO) has taken on a more active role in coordinating economic policies. This includes limited funding for commissioning targeted studies. The PMO has earmarked approx. €8 million specifically to support short-term applied research that is aligned with the government's policy priorities. The rationale behind the PMO using research funds is that it helps to ensure that government-funded research addresses societal needs, rather than solely reflecting the objectives of individual ministries, and in doing so contributes to a unified research agenda. For example, the PMO has commissioned studies on mission-oriented innovation policy (Gronchi, et al. 2023). However, in 2023, Petteri Orpo's government opted to terminate the PMO's research funding (Valtioneuvoston..., 2023).

Finland's second tier is described as a 'two-pillar' system, in that both the Ministry of Education and Culture and the Ministry of Economic Affairs and Employment (MEAE) take the lead in shaping public research and innovation policies and overseeing key research and funding agencies (OECD, 2017). The Ministry of Education and Culture is responsible for developing education, science, culture, sport and youth policies, as well as international cooperation in these fields (Ministry of Education and Culture, 2024). The MEAE is tasked with overseeing the regulation of the labour, goods and services markets, and supervising industry, energy, employment policy and regional development. It formulates policies across various areas, including industry, energy and climate, innovation and technology, internationalisation, health and safety at work, employment practices, regional development, competition, consumer policy and the integration of migrants. This wide-ranging mandate consolidates research areas that are often handled by separate ministries.

The third tier includes the various funding agencies that operate under the jurisdiction of their respective ministries. Notable among these are Business Finland (a merger between Tekes and Finpro in 2018), which is affiliated with the MEAE; and the Research Council of Finland, which operates under the Ministry of Education and Culture. For its part, Finnish Industry Investment, Ltd (FII) is 'a state-owned, market-driven investment company that invests in venture capital and private equity funds and directly in Finnish start-ups and growth companies'. 'FII has an industry-focused mission to promote economic growth, innovation and investments' (Finnish Industry Investment Ltd, 2024).

In the Finnish system, as in Sweden, the agencies operate with significant autonomy from their parent ministries. Funding and other resources are typically managed at the agency level. According to the OECD (2017), this setup offers a notable advantage compared to more centralised ministry-agency relationships, as it anticipates future needs for decentralised, system-changing policies. The involvement of other ministries is increasingly crucial, mainly due to the emergence of cross-ministry strategies in fields such as the bioeconomy and healthcare. This trend is expected to continue as the societal challenges addressed by research and innovation agendas evolve, thereby necessitating greater involvement from a broader range of ministries.

The fourth tier comprises universities, state research institutes and university hospitals involved in R&D activities. While higher education institutions function independently, they are primarily overseen by the administrative arm of the Ministry of Education and Culture, which directs their activities and distributes government funding. Furthermore, other ministries provide funding for research and innovation endeavours, with some ministries directing affiliated sectoral research centres (e.g. the Finnish Institute for Health and Welfare and the Finnish Environment Institute). In addition, the Finnish Innovation Fund (Sitra) functions as an independent think-tank and funding body, focusing on future-oriented activities in the Finnish innovation system. It facilitates experimentation and acts as a catalyst for collaboration. Sitra is responsible to the Parliament of Finland. It is funded via investments stemming from endowment capital (approx. €950 million) initially granted by Parliament, with an annual operational budget of €30 million (Finnish Innovation Fund, 2022).

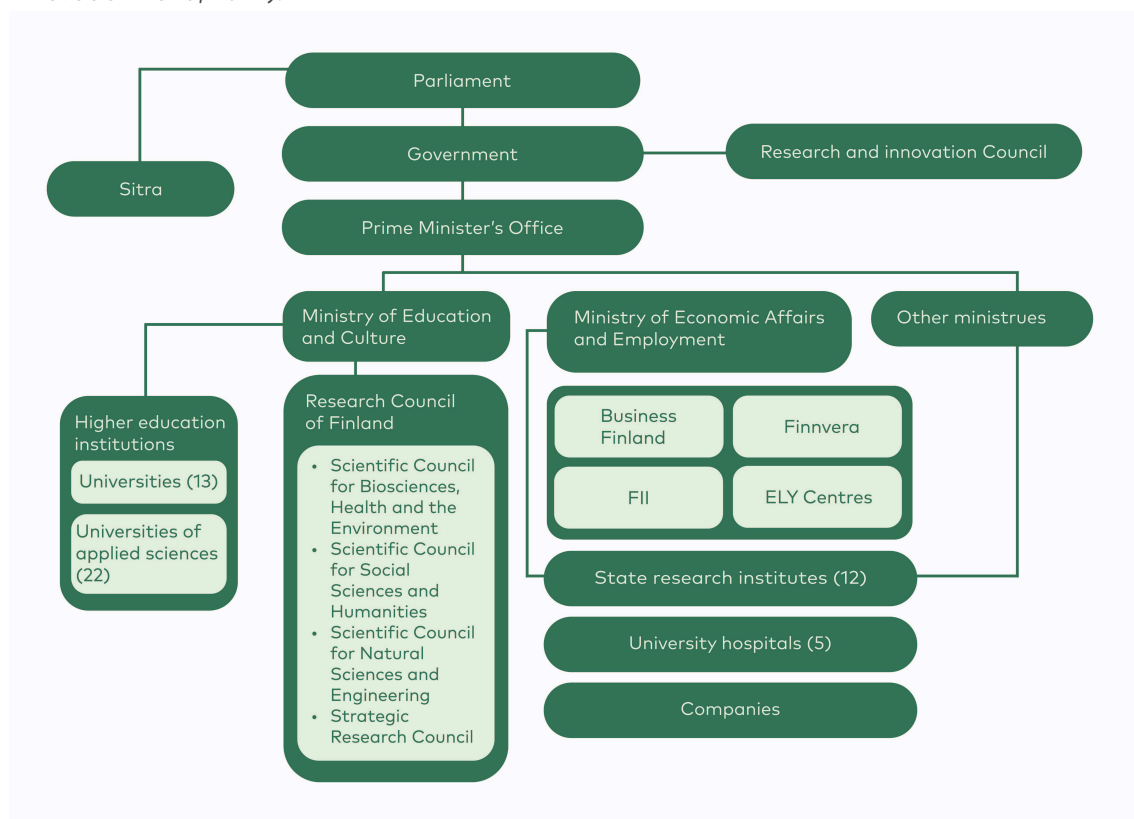


Figure 6. A simplified illustration of the main public innovation policy set-up in Finland (note that the figure is structural and does not inform funding streams). Source: Author's own, based on OECD, 2017.

According to Statistics Finland, R&D expenditure in 2022 totalled €7.9 billion, of which the private sector's share was 68.0%, the HEI sector 24% and the public sector 8%. In Finland's 2024 state budget, the total allocation for R&D activities amounts to €2,511.3 million. The share of state research funding as a percentage of GDP is estimated at approximately 0.87% (Statistics Finland, 2024). The budgeted funding for R&D at universities amounts to €799.4 million (excluding external funding and basic funding of €1.9 billion, which is competitively allocated on computational criteria). For universities of applied sciences, this is €117.9 million (excluding basic and external funding). Moreover, the research appropriations of the Research Council of Finland amount to €553.5 million, of which the share for strategic research is €57.3 million. R&D funding for university hospitals is €29 million. The R&D funding for state research institutes totals €232.4 million, of which the biggest share (€96.6 million) is allocated to the Technical Research Centre

(VTT). The funding for VTT's R&D was increased by appropriations for a quantum computer and a pilot environment for microelectronics and quantum technology (Statistics Finland, 2024; Valtion talousarvioesitys, 2024).

3. Overview of the main funding instruments related to mission orientation or transformative innovation policy in Finland

3.1. Emerging mission-oriented innovation policy

The evolution of innovation policy has created a more intricate landscape for implementation, in which additional policy objectives and instruments are introduced alongside existing ones, rather than forming a distinct policy mix with clearly defined responsibilities. New goals and terminology replace old ones, without a clear understanding of how the new approach should impact specific measures.

The MOIP's emphasis on strategic orientation, policy coordination, systemic approaches and collaborative policy formulation or implementation has been an elemental part of Finnish innovation policy since the 1990s, if not longer (see Schwaag Serger & Palmberg, 2022; Lemola, 2020). For example, the former regional CoE and the SHOK programmes were based on the principle that there needed to be clear objectives, broad coordination of policy actors across administrative boundaries, better integration of different policy instruments and broad consultation in the formulation and implementation of policies across different stages of the innovation chain and different types of instruments (Halme et al., 2023). These guiding principles were followed and implemented with varying degrees of success.

In a way, directionality has long been part of innovation policies, but the directions are being reoriented. For a prolonged period, Finland's science, technology, and innovation (STI) policy directed resources predominantly towards sectors or clusters that were considered vital for the Finnish economy, including the forestry, metal and machinery, ICT and shipbuilding industries. RDI programmes were used to customise innovation policy for specific clusters. In recent years, however, the focus on individual industries and technologies has lessened, in favour of making room for broader economic sectors and megatrends (Laasonen et al., 2022). This emphasis on ecological and societal issues is new development in Finnish innovation policy, inspired by international policy formulations and debates. Health and well-being, the bioeconomy (including the circular economy) and digitalisation, as well as associated enabling technologies, are now spearheading the expanded scope of innovation policy. Recent discussions on innovation policy have portrayed missions as a way of addressing many pressing societal issues. What is particularly noteworthy in the present conversation is that the potential missions are believed to help mobilise various stakeholders towards a shared objective (Gronchi, et al. 2023).

Although Finland does not have an explicit MOIP, Finnish policy and academic communities are discussing and seeking ways to better integrate new ideas into the innovation policy mix. Indeed, various policy documents have included the concepts of transformative, challenge-based or mission-oriented approaches. In addition, several commissioned studies have clarified the concepts and introduced international experiences (Halme & Niinikoski, 2019; Gronchi et al. 2023; Halme et al., 2023). As such, they have sought ways to adopt a more mission-oriented or transformative approach to innovation policy. Consequently, missions may not serve as a starting point for innovation policy, but Finnish innovation policies are increasingly acknowledging, in both

their goals and content, the importance of addressing complex societal problems. Missions are therefore increasingly embedded in existing or new programmes.

Interestingly, the core concepts are used in overlapping and somewhat circular ways. For example, MEAE's report on innovation policy aimed at reforming the economy and society maintains that transformative innovation policy can be viewed as mission-oriented policy, in the sense that it focuses on addressing problem-, issue- or phenomenon-specific societal challenges, rather than supporting economic growth or renewal (Halme & Niinikoski, 2019). Similarly, it has been argued that innovation policy approaches focusing on systemic changes include both renewability (transformation) and mission-driven approaches (Halme et al., 2023). According to these reports, societal challenges constitute a new, broader, sustainable and longer-term goal. As such, they represent a clear transition from technology-centric approaches to systemic-level changes at the societal and behavioural levels. At the same time, however, the reports argue that while mission-driven approaches address societal problems through innovation, transformative innovation policy focuses on instigating significant socio-technical changes. They acknowledge that renewability and the mission-driven orientation often intersect, e.g. in societal missions (Halme et al., 2023). The reports therefore use the core concepts in a circular and overlapping manner. They conflate, on the one hand, the change-related concepts of 'renewability', 'transformation' and 'transition'; and on the other hand, the innovation policy-related concepts of 'mission', 'transformative' and 'challenge'. In doing so, these terms lose their distinctive meanings.

The core policy concepts, and the instruments based on them, form an embryonic 'policy cloud' that encompasses an explicit desire to move from pure economic growth and technology orientation to addressing grand challenges, without losing sight of the importance of economic issues.

3.2. Overall policy strategies of the 2020s

As outlined in the previous government's sustainability roadmap (Hallituksen kestävyystiekartta, 2021), Finland is striving to attain carbon neutrality by 2035, halt biodiversity decline, advance the bioeconomy and circular economy, promote sustainable food systems, and enhance animal welfare. There is also a focus on using fewer non-renewable natural resources and transitioning to a sustainable utilisation of renewable ones. Further, efforts are being directed towards reducing reliance on fossil fuels, promoting renewable energy sources, and facilitating sustainable industrial renewal. In addition, the government aims to achieve ecological sustainability, both domestically and globally (Hallituksen kestävyystiekartta, 2021).

The sustainability roadmap envisions Finland maintaining its position as one of the most innovative nations in the world by the 2030s, with sustainable economic growth grounded in the prudent utilisation of natural resources and intangible value creation. Moreover, Finland aims to develop sustainable export solutions, including clean energy, low-carbon technologies, renewable materials, circular economy practices, clean food production, enhancements in quality of life and well-being, and associated technologies. Finland seeks to become a global leader in the circular economy, high-value bio-based products, low-emission energy systems, and climate and environmental solutions (Hallituksen kestävyystiekartta, 2021).

These high-level ambitions are translated into upper-level strategies and roadmaps for providing innovation-policy actors with a shared direction and common guidelines, including:

A roadmap for implementing Agenda 2030 (Valtioneuvosto 2022)

- In 2021, the Finnish National Commission on Sustainable Development formulated a national roadmap for the 2030 agenda. This medium-term plan outlines the necessary steps Finland must take to attain the objectives outlined in the global 2030 Agenda for Sustainable Development, as endorsed by the UN in 2015.
- The roadmap strives to advance the fulfilment of the Sustainable Development Goals through six systemic packages or areas of change. Each area of change within the roadmap encompasses a vision for 2030, a series of objectives aimed at translating these visions into tangible outcomes, and a depiction of key measures relevant to various sectors of society that are pivotal for effecting change. Alongside the six areas of change, the roadmap also delves into Finland's efforts to aid in the execution of the 2030 agenda at the global level.
- The roadmap also includes five overarching principles that are of paramount importance in its implementation. These principles include ensuring fairness, equity and gender equality, promoting inclusion and engagement in all areas of society, prioritising the needs of the most vulnerable to ensure that no one is left behind, committing to long-term sustainability and policy coherence, and shouldering global responsibility.

National Roadmap for Research, Development and Innovation (Valtioneuvosto, 2020; Kansallinen tutkimuksen..., 2021)

- The Roadmap for RDI (2020) encompasses a series of strategies aimed at enhancing RDI. It offers directives for fostering sustainable growth and well-being, and for elevating the scale and aspirations of R&D endeavours. The aim is to increase **R&D** spending to 4% of GDP by 2030 (Parliamentary Working Group).
- The strategic development targets include improved competencies, a new partnership model and a more innovative public sector.
- The updated National Roadmap for RDI (2021) encompasses 36 initiatives, one of which acknowledges the significance of missions. As per the roadmap, the ministries will develop a novel challenge- and mission-oriented strategy for executing and financing research and innovation endeavours. The objective of these missions is to tackle significant global challenges and transitions that necessitate comprehensive solutions, by incorporating multiple policy measures (e.g. research, development and innovation, regulation, procurement, and information management) and fostering cross-sectoral collaboration. The planning process will leverage insights and assessments from current policies and funding mechanisms.

R&D funding law 2023 and the multi-annual plan for funding (Valtioneuvosto, 2023)

- The Parliamentary Working Group on Research, Development and Innovation outlined key areas for advancing the Finnish RDI system, and evaluated the status and allocation focus of R&D funding.
- The 2023 law on R&D funding establishes the yearly allocation of central government funds for R&D, and aims to increase public-sector R&D expenditure to 1.33% of GDP by 2030. The goal is to increase public and private investment to 4% of GDP by the end of the 2020s.
- The group underscored the significance of enhancing top-level leadership and coordination in research and innovation policy in Finland, to facilitate the holistic advancement of the RDI system.
- The working group was tasked with drafting an eight-year plan in accordance with the state law regarding R&D funding and other aspects related to R&D policy.

Circular economy programme (Ministry of Employment and the Economy, 2021)

- The programme advances the circular economy by outlining goals for the utilisation of natural resources. It sets targets and metrics, outlines the necessary actions to be implemented, and allocates resources aimed at fostering the circular economy and facilitating fundamental systemic change.

In their own ways, the RDI policies highlight the need to tackle societal and environmental issues alongside economic growth. Finland has subscribed to the 'green growth' concept (OECD, 2009), which highlights the importance of transitioning to more sustainable economic development models, through systemic economic change, as well as novel production methods and consumption patterns.

3.3. Research Council of Finland funding

In addition to emphasising research excellence, the Research Council of Finland addresses the interaction between research and societal actors, thereby stressing the importance of potential societal impact as a criterion in funding decisions (Arnold et al., 2022).

In 2024, the Research Council of Finland's funding mandate is €553.5 million (Statistics Finland, 2024). It primarily functions through three scientific councils, encompassing biosciences, health and the environment; social sciences and the humanities; and natural sciences and engineering. It also includes several subcommittees, which make decisions regarding calls that cut across several scientific councils and the Finnish Research Infrastructure Committee. Notably, from the perspective of this report, the Research Council of Finland also hosts the Strategic Research Council (SRC). It was established in 2015 to 'fund high-quality research with great societal relevance and impact. SRC-funded research seeks concrete solutions to grand challenges that require multidisciplinary approaches' (Strategic Research Council, 2024). In addition to SRC funding, the Flagship Programme of the Research Council of Finland is another of the most relevant directed funding schemes with regard to both mission-oriented and transformative perspectives (Gronchi et al., 2023).

3.3.1. Strategic Research Council funding

The SRC's programmes aim to support strategic, problem-focused research that supports the identification of solutions to societal issues, with a specific emphasis on policy-making. In addition, the SRC supports the revitalisation and competitiveness of businesses and industries, fosters advancements in working environments and the Finnish public sector, and can also substantiate policy-making processes and distribute research findings. The SRC allocates funding amounting to approximately €57.3 million annually. Both universities and public/private research institutes are eligible for this funding. The projects' beneficiaries may include any relevant stakeholders.

The point of departure for SRC funding is to identify themes that represent crucial challenges for Finland's future, which are sufficiently horizontal, broad and diverse, and which require a multidisciplinary approach. Every year, the SRC, following a consultation process, develops recommendations regarding strategic research themes. The themes of its projects are prepared in an interactive process including open online surveys, thematic workshops and open hearings for the scientific community and research users. At the end of this process, the SRC submits to the government a proposal for thematic areas and priorities for the following year (see Figure 7).

The SRC's procedure combines top-down directionality with bottom-up proposal ideation and implementation. Ultimately, the government decides the themes upon which the SRC formulates research programmes and releases funding solicitations. Although these themes are directional,

they are sufficiently broad in terms of implementation, and ensure both the autonomy of scientific and scholarly enquiry, and the collaboration between knowledge-producers and -users.

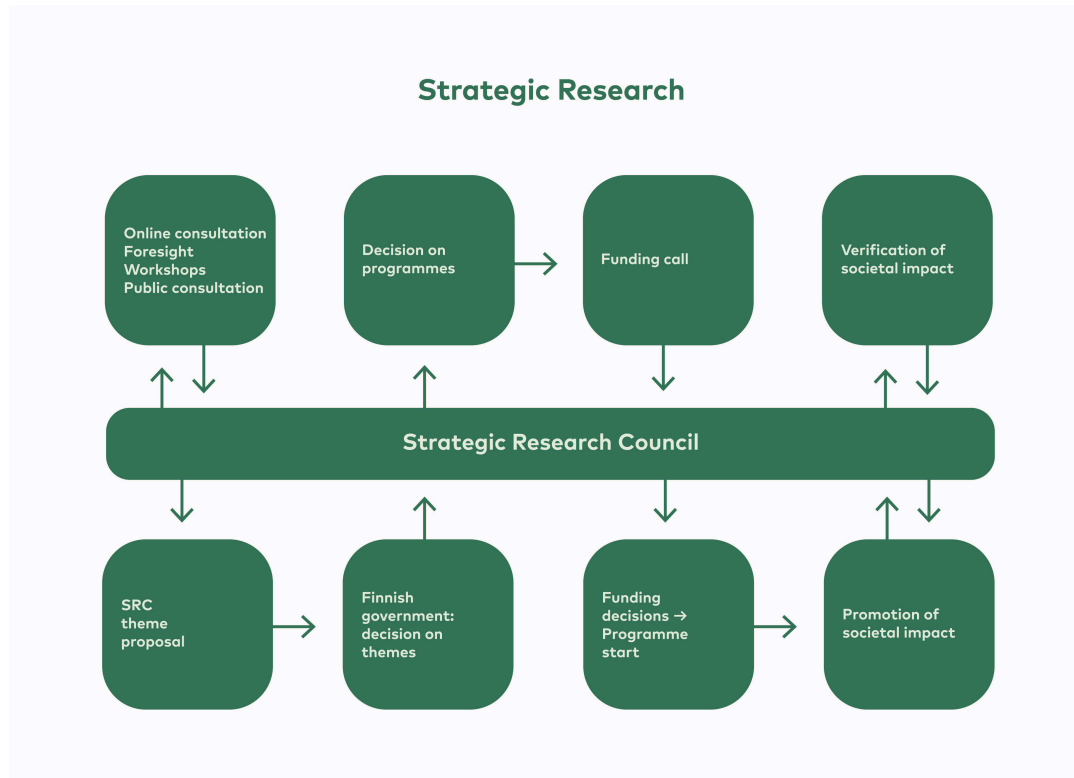


Figure 7. The Strategic Research Council's process. Source: Adapted from the Research Council of Finland's website: aka.fi

In 2024, there are 15 ongoing programmes, comprising 64 projects (see Strategic Research Council, 2024). Concluded projects include the following, which exemplify Finnish thinking on green growth.

Keys to Sustainable Growth (2018–2023)

- The programme's objective was to generate strategies for how society, communities and individuals can employ innovative and sustainable methods to effectively utilise, cultivate and consolidate their resources and assets.
- It included six projects, all with extra-academic beneficiaries:
 1. Educational Transformations for Facilitating Sustainable Personal, Social and Institutional Renewal in the Digital Age (Growing Mind) (the University of Helsinki and the University of Turku)
 2. All Youth Want to Rule their World (ALL-YOUTH) (Tampere University, the University of Helsinki and the University of Eastern Finland)
 3. Sustainable Drug Discovery and Development with End-of-Life Yield (SUDDEN) (the University of Helsinki, the Finnish Environment Institute, the Demos Research Institute Oy, Aalto University, the University of Eastern Finland and LUT University)
 4. Circular Economy Catalysts: From Innovation to Business Ecosystems (CICAT2025) (Tampere University, Turku University of Applied Sciences, the University of Eastern Finland, the University of Jyväskylä, Tampere University of Applied Sciences and the University of Turku)

5. New Packaging Solutions for People, Planet and Business (Package-Heroes) (VTT Technical Research Centre of Finland, Ltd; the Finnish Environment Institute; LUT University; the Natural Resources Institute Finland; and the Åbo Akademi University)
6. Healthy Lifestyles to Boost Sustainable Growth (STYLE) (the University of Jyväskylä; the Finnish Environment Institute; the University of Turku; the VTT Technical Research Centre of Finland, Ltd; and the UKK Institute)

3.3.2. The Flagship Programme

The Research Council of Finland's Flagship Programme is 'an instrument that supports high-quality research and increases the economic and societal impact emerging from the research' (Finnish Flagship Programme, 2024). Crucially, besides contributing to finding sustainable solutions to societal challenges, the flagships are expected to promote economic growth by developing new business opportunities. The programme emphasises intensive collaboration between knowledge producers, industry and other societal actors, and also considers the demand for international collaboration. Funding directed towards these programmes is both comprehensive and long-term. In 2024, the Finnish Flagship Programme encompasses 14 flagships. The host organisations include nine universities, six research institutes, Helsinki University Hospital, the Finnish Red Cross Blood Service and CSC - IT Center for Science, Ltd.

Of the 14 flagships, the following four, selected in the fourth call, exemplify the nature of the programmes:

Digital Waters Flagship (DWA)

- The project aims to facilitate a transition to the digital representation of real-world water systems (digital twins), to reproduce hydrological storage systems and their usage, with novel options for improved scenario analysis, planning and governance.
- It is directed by the University Oulu and partnered by the Finnish Geospatial Research Institute, the Finnish Meteorological Institute, Aalto University, the Finnish Environment Institute and the University of Turku.
- The project aims to generate new knowledge and understanding about declining learning achievement, increasing dropout rates, and the use of digital technology in education.
- It also aims to create a unique data infrastructure that integrates existing data from educational science, psychology, learning analytics, sociology and economics. The data infrastructure will serve as a platform for the utilisation of large longitudinal and register data.
- It is directed by the University of Jyväskylä and partnered by the University of Helsinki, Aalto University and the University of Turku.

Flagship of Advanced Mathematics for Sensing, Imaging and Modelling (FAME)

- This project aims to develop applied mathematics and physics methods to meet societal needs, such as medical imaging, industrial process monitoring, interpreting satellite data and testing structures for defects without breaking them.
- It is directed by the University of Eastern Finland and partnered by the University of Helsinki, LUT University, the University of Jyväskylä, Aalto University, the University of Oulu, Tampere University and the Finnish Meteorological Institute.

Finnish Quantum Flagship

- This project aims to bring together leading quantum experts in physics, computational science, mathematics, nanoscience and nanotechnology, as well as economics, to consolidate and expand Finland's national ecosystem for quantum technology.
- It also aims to boost the emergence of new businesses and secure Finland's position as a leading quantum-enabled society.
- It is directed by Aalto University and partnered by the University of Helsinki, CSC, the University of Jyväskylä, Tampere University, the University of Oulu and the VTT Technical Research Centre of Finland, Ltd.

3.4. Business Finland funding

Sustainable development, especially in support of climate and environmental goals, has long been a key priority for Business Finland and its predecessors' (i.e. Tekes and Finpro) programmes. However, a significant change occurred in 2020, when Business Finland updated its strategy and selected sustainable development as one of its three main strategic objectives. Business Finland plays a central role in the Finnish innovation system. Its versatile funding repertoire covers almost all of the main innovation-related initiatives, from the commercialisation of science to boosting innovation and business ecosystems at national level. Two flagship programmes worth mentioning in the context of mission orientation are Business Finland's missions and Growth Engines.

3.4.1. Business Finland's missions

In early 2022, Business Finland initiated a new mission-oriented approach, and both of its first two missions were related to advancing the green transition. According to Business Finland, the green transition and, more broadly, sustainable development not only have significant business potential, but also offer promising opportunities to renew the Finnish economy. Business Finland's missions represent its new approach to enhancing direct innovation funding aimed at addressing major global challenges and generating broad societal value. Each mission consists of a variety of programmes and campaigns that promote the missions' objectives. In 2024, BF's missions and their objectives are as follows:

- **Diginative Finland (2023):** Accelerating digital transformation and creating a global competitive advantage for Finnish companies.
- **Carbon-Neutral Future (2023):** Significantly increasing Finland's global carbon handprint.
- **Circular Transition for Zero Waste (2023):** Supporting Finnish companies in their transition to the circular economy and zero waste, in a way that increases competitiveness and sustainable growth.
- **Healthcare Reimagined 2035 (2023):** Addressing global health challenges.
- **Immersive Digital Life (2023):** Enabling people and businesses to better collaborate, communicate and solve problems in open virtual environments.

3.4.2. The Growth Engine programme

The National RDI Roadmap (2020, 2021) outlines the necessity of consolidating business and research networks into larger ecosystems that can enhance the strength, breadth and impact of innovation policy. Autio and Thomas, for their part, laid the foundation for innovation policy by defining a platform as a 'network of interconnected organisations, connected to a focal firm or a

platform, that incorporates both production and use-side participants and creates as appropriate new value through innovation' (Autio & Thomas, 2014). Based on this perspective, innovation ecosystems are therefore constructed on platforms. The platform strategy revolves around bringing together various interconnected actors and their expertise (Asheim et al., 2011), thereby creating and amplifying novel network effects. Indeed, in the 2020s, Finnish innovation policy explicitly prioritises building and orchestrating ecosystems that transcend spatial and industrial boundaries. The most prominent initiative in this context is the Growth Engine, which operates on a platform/ecosystem model. Instead of bolstering specific clusters, Growth Engines aim to cultivate ecosystems.

The Growth Engine programme offers financial support to platform companies rather than clusters (as was the case with the SHOK programme), with a view to achieving predetermined business objectives. The main objective is to generate billion-euro export businesses in Finland by launching new operators (known as platform companies) that will assume leadership roles in ecosystem-building. This not only enables companies to achieve their own business goals, but also generates broader effects across the ecosystem. The assumption is that boosting a platform company's business can generate extensive networking effects and benefits for ecosystem members. Grant-winning platform companies are expected to build robust global ecosystems around them by mobilising a diverse network of companies of varying sizes, including research organisations and public actors, who can work together to achieve shared concrete business objectives.

Business Finland classifies potential platform companies into two categories: *leading* and *challenger*. Leading platform companies, known in Finnish as '*veturi*' (locomotives), are well-established global entities with the capacity and willingness to significantly boost their R&D investments in Finland and take on leadership roles within relevant ecosystems. Business Finland provides funding of up to €20 million for a platform company, and €50 million for ecosystem partners. Challenger companies are those aiming to expand into global markets, address minor or more specific challenges, or develop entirely new business operations. Alternatively, they may be multinational corporations strengthening their global presence in Finland. While challenger companies also commit to new RDI investments, their commitments are smaller than those of leading companies. Funding for challenger companies is capped at €10 million, while ecosystem partners can receive up to €20 million (Business Finland, 2023).

From 2020 to 2023, Business Finland provided capital loans or grants (orchestration funding) to the following ecosystems, each of which is connected to green transition or digitalisation. The planned increase in cumulative RDI commitments amounts to €1,486 million (Business Finland, 2023).

Leading companies

- **NESTE:** Sustainable and globally scalable solutions for the R&D of raw materials that reduce the use of crude oil.

https://www.businessfinland.fi/4a9cd1/globalassets/finnish-customers/01-funding/06-ecosystems/neste_veturi_tiekartta.pdf

- **ABB:** Platforms for the optimal generation and consumption of electricity in a carbon-neutral society.

<https://www.businessfinland.fi/492bb4/globalassets/finnish-customers/01-funding/06-ecosystems/abb-green-electrification-2035-veturi-roadmap.pdf>

- **FORTUM & METSÄ GROUP:** New fibre-based products for consumer markets to reduce the carbon footprint.

https://www.businessfinland.fi/49a764/globalassets/finnish-customers/01-funding/06-ecosystems/expandfibre_ecosystem-roadmap_may-2023.pdf

- **KONE:** Mobility solutions for urban environments, in line with sustainable development principles.

<https://www.businessfinland.fi/49073c/globalassets/finnish-customers/01-funding/06-ecosystems/kone-the-flow-of-urban-life-veturi-roadmap.pdf>

- **NOKIA 5G:** Making Finland a pioneer in 5G networks and industrial 5G (ended).

<https://www.businessfinland.fi/suomalaisille-asiakkaille/palvelut/rahoitus/veturiyrittysten-ja-ekosysteemien-rahoitus>

- **SANDVIK:** Globally competitive electric and digital solutions for heavy machinery.

<https://www.businessfinland.fi/492bb4/globalassets/finnish-customers/01-funding/06-ecosystems/sandvik-veturi-roadmap.pdf>

- **TIETOEVRY:** Trust-based digital services.

https://www.businessfinland.fi/494766/globalassets/finnish-customers/01-funding/06-ecosystems/20220221_tietoevry_veturi_public_roadmap.pdf

- **KONECRANES:** Zero4 material flow.

<https://www.businessfinland.fi/499c0b/globalassets/finnish-customers/01-funding/06-ecosystems/konecranes-zero4.pdf>

- **WÄRTSILÄ:** WISE – Wide & Intelligent Sustainable Energy.

<https://www.wartsila.com/media/news/16-02-2024-wartsila-led-eur-200-million-collaboration-ecosystem-to-PAY-autonomous-zero-emission-balancing-solutions-for-the-energy-transition-3404703>

- **PATRIA:** eALLANCE programme

<https://www.patriagroup.com/newsroom/news/2024/patria-led-ealliance-programme-will-amplify-collaboration-with-civilian-and-defence-sector-companies>

Challenger companies

- **BITTIUM:** Seamless and secure connectivity.

https://www.businessfinland.fi/4904f7/globalassets/finnish-customers/01-funding/06-ecosystems/bittium_seamless-and-secure-connectivity-2024.pdf

- **PONSSE & EPEC:** Unlocking sustainability in off-road and commercial vehicles.

https://www.businessfinland.fi/49bbc4/globalassets/finnish-customers/01-funding/06-ecosystems/ponsse_epec_forward27_roadmap.pdf

- **DANFOSS:** Fossil-free future.

https://www.businessfinland.fi/49c1e1/globalassets/finnish-customers/01-funding/06-ecosystems/danfoss_fossil-free-future_roadmap_2023.pdf

- **MIRKA:** Shaping the green transition.

https://www.businessfinland.fi/494803/globalassets/finnish-customers/01-funding/06-ecosystems/mirka_shape-02-2024.pdf

- **KEMPOWER:** Heavy electric traffic ecosystem.

<https://kempower.com/news/heavy-electric-traffic-ecosystem-program-boosted-by-10-million-euros/>

- **VALIO:** Food 2.0

<https://www.businessfinland.fi/491a86/globalassets/finnish-customers/01-funding/06-ecosystems/food-2.0-roadmap.pdf>

Connected to EU RRF

- **BOREALIS POLYMERS:** Sustainable plastic industry.

<https://www.businessfinland.fi/49542b/globalassets/finnish-customers/01-funding/06-ecosystems/borealis-spirit-veturi-roadmap-20220318.pdf>

- **MEYER TURKU:** Climate-neutral cruise ship and shipyard.

<https://www.businessfinland.fi/494cb5/globalassets/finnish-customers/01-funding/06-ecosystems/meyer-turku-2022-03-18-necoleap-veturi-roadmap.pdf>

- **VALMET:** Circular economy technology.

<https://www.businessfinland.fi/4a5208/globalassets/finnish-customers/01-funding/06-ecosystems/beyond-circularity-roadmap-valmet-september-2023.pdf>

- **NOKIA EDGE:** Energy-efficient edge-computing.

https://www.businessfinland.fi/494a77/globalassets/finnish-customers/01-funding/06-ecosystems/nokia-veturi_competitive-edge_roadmap_2601_2022.pdf

- **WÄRTSILÄ:** Zero-emission marine.

<https://www.businessfinland.fi/494cf9/globalassets/finnish-customers/01-funding/06-ecosystems/wartsila-zem-leading-company-ecosystem-roadmap.pdf>

3.5. Place-based efforts

The overall innovation policy approach in Finland is top-down, with agencies playing a central role in the implementation and framing of the actual contents. According to Schwaag Serger and Palmberg (2022), this has led to a focused implementation of generic ambitions, as formulated in various upper-level documents. In addition, the OECD (2017) found Finland to be comparatively centralised, with regions not having an established role in the formulation and execution of innovation policies. Indeed, as Suorsa (2007) observed, despite the acknowledged importance of cities and regions in innovation activities, Finnish national innovation policies did not consider the regional perspective in the 1990s or early 2000s. However, Jauhiainen and Suorsa (2008) note that the interconnection between innovation and regional development has since been formally recognised, and there have been efforts to integrate regionality into nationally designed innovation and regional policies – the CoEs (1994–2013) being the prime example (Häyrynen-Alestalo et al., 2006). However, the CoE programme and other efforts to localise innovation were more about integrating regional policy into innovation policies, rather than localising or regionalising top-down innovation policies.

The national innovation policies and innovation-oriented local/regional development strategies have served the primary cities well, as their development capacity allows them to integrate cities (as local clusters) into the national innovation framework. This not only fosters collaboration on innovation activities within local communities, but also facilitates participation in global markets (Jauhiainen & Suorsa, 2008). It should be noted that the active influence of actors in the main university cities has also allowed national policies to be formulated in a co-evolutionary process between various stakeholders at national and regional/local levels (Sotarauta & Kautonen, 2007). Overall, since the 1990s, innovation policy has, both directly and indirectly, pushed cities, regions and higher education institutions to specialise and strengthen their profiling areas.

Indeed, even though Finland appears to have a centralised and top-down innovation policy, its municipalities – most notably, the major cities – have since the 1980s and 1990s invested time and money in locally derived efforts (e.g. Männistö, 2002; Tervo, 2002; Kostainen & Sotarauta, 2003). In addition, some explicit national policy programmes have attempted to implement integrative bottom-up and top-down programmes (e.g. Innovative Cities), with an emphasis on a customised approach that supports networking across scale and place. These policy initiatives have incentivised cities and regions to explore, identify their strengths, cultivate their distinctive knowledge bases and improve capacities through collaboration between public-sector entities, higher education institutions and industries.

The transition to ecosystem-oriented principles advocates locally and regionally rooted but globally interconnected and dynamic ecosystems. The aim of the ecosystem concept is to reduce the excessive emphasis on sectoral dimensions, without losing business and local/regional specificities. The newly adopted ecosystem approach prioritises facilitative policy interventions, such as adopting co-creation models to orchestrate engagement among diverse stakeholders, nurturing public-private partnerships and steering collaborative strategic initiatives (including foresight, visioning, cumulative knowledge generation and analysis, sense-making and collective

learning). In addition, the ecosystem approach entails utilising public procurement to drive innovation and initiating a range of experimentation and innovation challenges (see Laasonen et al., 2022). The different approaches to local-level ecosystems strive to generate innovation platforms for experimentation (Anttiroiko, 2016; Sotarauta & Suvinen, 2019). Examples of ecosystem-oriented and facilitative approaches include ecosystem agreements and the Six City Strategy (2014–2022) the six cities being Helsinki, Espoo, Tampere, Vantaa, Oulu and Turku. The Six City Strategy is mentioned here as a case that highlights the innovation-related activities of individual city councils and their joint efforts. The main goal was to build collaboration between cities, inhabitants and various partners on key themes relevant to cities. These included, among others, climate change, the circular economy, mobility, well-being, education and employment. The collaboration also enabled cities to experiment in areas such as smart mobility and cleantech. As a result, cities are generally highlighted as actors and testing grounds for innovation, as well as open platforms and physical spaces for evolving and growing ecosystems.

Another significant shift in locally oriented innovation policies is the transition from programme-based operations to a contractual model. The 'ecosystem agreement procedure', as facilitated by the MEAE in collaboration with city councils, exemplifies the operationalisation of the ecosystem approach. Ecosystem agreements aim to enhance cities' innovation activities and foster collaboration relevant to particular urban areas. The ecosystem agreements are tailored to local requirements, and it is assumed that they can be effectively implemented at the local level. Agreements are formulated with cities to strategically allocate public and private research, development and innovation funding, with a view to enhancing (potentially) globally competitive ecosystems. The main aim of the agreements is to foster innovation ecosystems, essentially enhancing collaboration within networks, reinforcing key competencies, and boosting effectiveness. It is expected that these agreements will amalgamate research projects and networks into larger ecosystems, and as such support the attainment of objectives delineated in other national initiatives, such as the National Roadmap for Research and Innovation and the Export and International Growth Programme.

The implementation of the agreements aligns with the allocation of resources for sustainable urban development during the EU programming period 2021–2027. In 2021, the government earmarked €5 million for urban areas to initiate ecosystem agreements. Subsequently, following the initial phase, the agreements will be financed through EU funding designated for sustainable urban development. The participating cities and their respective thematic areas are as follows:

- **Lappeenranta, including Imatra:** Green electrification.
- **Kuopio:** Health and well-being technology and water expertise.
- **Turku:** Renewing industry and life sciences.
- **Helsinki, Espoo and Vantaa:** Smart and sustainable urban solutions; well-being and health technology; new learning environments and digital solutions for skills development.
- **Oulu:** Digitalisation in the changing urban environment; OuluHealth – digital well-being and health solutions; and sustainable circular economy and clean solutions.
- **Joensuu:** New business in the bioeconomy, circular economy and photonics.
- **Lahti:** Carbon-neutral circular economy and sports business.
- **Jyväskylä:** Physical activity, health promotion and well-being and industry renewal.
- **Vaasa:** Smart, sustainable energy systems.
- **Tampere:** Sustainable Industry X (SIX), buildings, energy and infrastructure, as well as digital health solutions.
- **Seinäjoki:** Sustainable regeneration of the food ecosystem and intelligent regeneration of industry.

- **Mikkeli:** The circular economy of the municipal water system.
- **Pori:** Technology metals and circular economy, as well as automation and robotics.
- **Kokkola:** Battery chemistry, circular economy and intelligent solutions that support industry.
- **Kajaani, including Sotkamo:** Measurement technology, high-performance computing, artificial intelligence and data centres.
- **Rovaniemi:** Arctic tourism, future well-being services and management of distances.
 - (Agreements between the state and cities to speed up innovations in carbon reduction, digitalisation and well-being <https://tem.fi/en/-/agreements-between-state-and-cities-to-speed-up-innovations-in-carbon-reduction-digitalisation-and-wellbeing>)

4. Conclusion

The mission-driven approach to innovation has been welcomed in Finland as necessary, but thus far only small steps have been taken. Still, the clear consensus among ministries, agencies and the scholarly community is that innovation policy must address the grand challenges (Gronchi et al., 2023; Hämäläinen, 2022). Naturally, numerous challenges arise in terms of adoption and implementation, including the need to learn new capabilities and overcome the impact of short-term funding and coordination across sectors and organisations. In addition, siloed approaches and the lack of a long-term perspective have been seen as factors that impede transformative innovation policy. It has also been argued that Finland's innovation policy lacks a shared vision, which, combined with siloing, hinders transformation (Gronchi et al., 2023; Hämäläinen, 2022).

The facilitative ecosystem approach aligns with policy discourse, and emphasises business ecosystems and the need to respect their dynamic, market-driven nature (Rinkinen, 2016). Indeed, the latest trends in Finnish innovation policy are based on the conviction that the country must move from institutional to entrepreneurial innovation systems (see for iRIS and ERIS, Ylinenpää, 2009). All of this implies that the public sector remains in the background, instigating various developmental processes and providing ecosystems with resources. It remains to be seen to what extent the need to increase the public sector's role in directing mission-oriented efforts will be aligned with dynamic bottom-up ecosystems.

Interestingly, the mission-oriented or transformative innovation policy calls for the state to adopt a more strategic role, while the ecosystem approach advocates a more organic, self-organising approach. However, the somewhat contradictory nature of these two key trends does not appear to be fully recognised or discussed. This may be because the Finnish approach is pragmatic, and focuses on embedding sustainability-related missions and issues into innovation policy programmes and instruments, rather than launching separate mission-oriented or transformative innovation policies. In addition, virtually all policy programmes stress that solving grand societal and ecological challenges also creates business opportunities and offers ways to renew the Finnish economy.

Finland is not shy about directing innovation policies. Since the 1980s, it has had a relatively straightforward thematic and challenge-driven orientation, as well as a long tradition of formulating policies in broad consultation with a range of stakeholders and companies. Overall, demand was previously most visibly articulated in relation to business needs and technology orientations. However, in the 2020s, societal and ecological issues have become pervasive in all innovation policy-related documents, alongside business needs and technology development.

Nevertheless, as Laasonen et al. (2022) observe, numerous approaches and ideas are still evolving, and have yet to form a coherent set of policy rationales, operational practices and instruments. The Finnish innovation policy of the 2020s is characterised by policy exploration and experimentation, but an integrated policy strategy has not been implemented in practice.

Similarly, while Finland is active in governance innovation (Kuivalainen et al., 2022), its adoption of the mission-oriented approach has been piecemeal, with some elements being incorporated into various projects, programmes and national funding mechanisms. The many transformative ambitions are not always clear, as the ecosystem approach necessitates letting concrete forms emerge from the bottom up, enabled by public actors and public funding, but also orchestrated by companies or universities. It remains to be seen whether the implicit world-saving ambitions will gradually become more explicit as the actors in orchestrated ecosystems adopt new operational forms and content, thereby embedding new ambitions in these ecosystems. Alternatively, the ecosystems will dissipate and turn into piecemeal activities.

In sum, Finland follows an overarching and embedded mission-oriented strategic framework consisting of multiple missions or mission areas across many programmes. Crucially, the ecosystem approach implicitly questions the long-standing appreciation of the importance of a grand shared vision, and instead (implicitly) emphasises the usefulness of relatively fuzzy but visionary concepts. As a consequence, actors are forced to reconsider their visions, their positions in the ecosystems, and their ways of acting. The emergent nature of ecosystems allows a variety of actors to collectively search for direction. A well-run ecosystem approach, with its loose conceptual tools, may empower multi-faceted and boundary-spanning endeavours that have the potential to orchestrate ecosystems.

5. References

- Alaja, A., & Sorsa, V.-P. (2021). The evolution of the national innovation system as programmatic policy idea in Finland. *Science and Public Policy*, 47(6), 834–843.
- Ali-Yrkkö, J., & Hermans, R. (2002). *Nokia in the Finnish Innovation System. Discussion Paper 811*. The Research Institute of the Finnish Economy. Helsinki.
- Anttiroiko, A.-V. (2016) City-as-a-platform: The rise of participatory innovation platforms in Finnish cities. *Sustainability*, 8(9)
- Arnold, E. & Boekholt, P. (2003) *Research and Innovation Governance in Eight Countries A Meta-Analysis of Work Funded by EZ (Netherlands) and RCN (Norway)*. Technopolis
https://www.researchgate.net/profile/Erik-Arnold/publication/309617082_Research_and_Innovation_Governance_in_Eight_Countries_A_Meta-Analysis_of_Work_Funded_by_EZ_Netherlands_and_RCN_Norway/links/5819fe0a08ae3c82664c0fc6/Research-and-Innovation-Governance-in-Eight-Countries-A-Meta-Analysis-of-Work-Funded-by-EZ-Netherlands-and-RCN-Norway.pdf Accessed, February 13, 2024.
- Arnold, E., Warta, K., Halme, K., Evers, G., van der Graaf, A., Haila, K., Järvelin, A.-M., Kettinen, J., Kolarz, P., Krismer, R., Piirainen, K. & Sutinen, L. (2022) *Evaluation of the Academy of Finland*. Publications of the Ministry of Education and Culture, Finland 2022:7; Helsinki.
- Asheim, B. T., Boschma, R., & Cooke, P. (2011). Constructing regional advantage: Platform policies based on related variety and differentiated knowledge bases. *Regional Studies*, 45(7), 893–904.
- Autio, E., & Thomas, L. (2014). Innovation ecosystems: Implications for innovation management.

In M. Dodgson, N. Phillips, & D. M. Gann (Eds.), *The Oxford handbook of innovation management*, 204–228. Oxford University Press.

Business Finland. (2023). *Challenge competition 2023 for leading companies & challengers* [Webinar]. <https://www.businessfinland.fi/48f080/globalassets/finnish-customers/01-funding/06-ecosystems/webinar-29.5.23-veturiyrittajien-info-challenge-competition-for-leading-companies-2023.pdf> Accessed March 29, 2024

Deschryvere, M., Husso, K., Suominen, A. (2021) *Targeting R&D intensity in Finnish innovation policy*. OECD Science, Technology and Industry Working Papers 2021/08. OECD; Paris.

Dutta, S., Lanvin, B., Wunsch-Vincent, S., Rivera León, L., & Wunsch-Vincent, S. (2022). Global innovation index 2022: What is the future of innovation-driven growth? World Intellectual Property Organization. <https://doi.org/10.34667/TIND.46596> Accessed, March 15, 2024

Finnish Flagship Programme. (2024). Research Council of Finland. <https://www.aka.fi/en/research-funding/programmes-and-other-funding-schemes/flagship-programme/> Accessed, March 15, 2024

Finnish Industry Investment Ltd. (2024). Creating new, global Finnish success stories – Market change we are striving for. <https://tesi.fi/en/about-tesi/> Accessed, March 15, 2024

Gronchi, I., Leppänen, J., Sarkia, K., Ahokas, J., Järvensivu, P., Salminen, V. & Uitto, H. (2023) *Missiovetoisuus uudistavan tutkimus- ja innovaatiopolitiikan aikakaudella: Strategisen toimeenpanon malli*. Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 2023:33. Helsinki.

Hallituksen kestävyystiekartta (2021) Valtioneuvoston julkaisuja 2021:43. Helsinki.

Halme, K., Järvelin, A.-M., Haila, K., Reid, A. & Barberis, M. (2023) *Vihreää siirtymää tukeva innovaatiopolitiikka: Toimintamallit ja käytännöt*. Työ- ja elinkeinoministeriön julkaisuja 2023:20. Helsinki.

Halme, K. & Niinikoski, M.-L. (2019) *Taloutta ja yhteiskuntaa uudistava innovaatiopolitiikka*. TEM-raportteja 2019:7. Helsinki.

Hämäläinen, H. (2022) Yhteiskunnalliset ongelmat osana Suomen innovaatiopolitiikkaa : uuden sukupolven missiolähtöisyys tiedontuotannon regiimin neuvottelussa. Master's Thesis. University of Helsinki. <https://helda.helsinki.fi/server/api/core/bitstreams/965d0e09-d62a-4550-8a39-25c01df57873/content> Accessed February 12, 2024

Häyrynen-Alesta, M., Pelkonen, A., Teräväinen, T., & Waltari, S.-T. (2006). Integrating regional policy with technology policy – The experience of Finland. *Fennia – International Journal of Geography*, 184(1), 3-17.

Jauhiainen, J. S., & Suorsa, K. (2008). Triple helix in the periphery: The case of Multipolis in Northern Finland. *Cambridge Journal of Regions, Economy and Society*, 1(2), 285–301.

Kaitila, J. (2019). From innovation to labour costs: Change of emphasis in Finnish competitiveness policy ideas after the Eurocrisis. *Competition and Change*, 23(1), 47–70.

Kansallinen tutkimuksen, kehittämisen ja innovaatioiden päivitetty tiekartta (2021) <https://okm.fi/documents/1410845/22508665/Kansallinen+tutkimuksen,+kehittämisen+ja+innovaatioiden+päivitetty+tiekartta.pdf/b47931b4-3490-01a4-b2e2-83193329c5ef/Kansallinen+tutkimuksen,+kehittämisen+ja+innovaatioiden+päivitetty+tiekartta.pdf?t=1639483581267> Accessed February 12, 2024

Kostiainen, J., & Sotarauta, M. (2003). Great leap or long march to knowledge economy:

- Institutions, actors and resources in the development of Tampere, Finland. *European Planning Studies*, 11(4), 415–438.
- Kuivalainen, M., Hauhtonen, R., Alanko, I., Sanz, A. & Pussinen, P. (2022). Public sector innovation barometer: Central government results. Publications of the Ministry of Finance 2022:78. Helsinki.
- Laasonen, V., Kolehmainen, J., & Sotarauta, M. (2022). The complexity of contemporary innovation policy and its governance in Finland. *Innovation: The European Journal of Social Science Research*, 547-568.
- Larrue, P. (2021). *The design and implementation of mission-oriented innovation policies: A new systemic policy approach to address societal challenges*. In OECD Science, Technology and Industry Policy Papers (No. 100). OECD Publishing. <https://doi.org/10.1787/3f6c76a4-en> Accessed March 15, 2024
- Lundvall, B.-Å. (2011). Notes on innovation systems and economic development. *Innovation and Development*, 1(1), 25–38.
- Miettinen, R. (2002) *National innovation system: scientific concept or political rhetoric*. Edita; Helsinki.
- Ministry of Education and Culture (2023) Duties and objectives of the Ministry of Education and Culture (2024) <https://okm.fi/en/duties-and-objectives> Accessed March 15, 2024
- Ministry of Employment and the Economy (2021) Government resolution on the strategic programme for circular economy. 8 April 2021. <https://ym.fi/documents/1410903/42733297/Government+resolution+on+the+Strategic+Programme+for+Circular+Economy+8.4.2021.pdf/309aa929-a36f-d565-99f8-fa565050e22e/Government+resolution+on+the+Strategic+Programme+for+Circular+Economy+8.4.2021.pdf?t=1619432219261> Accessed February 12, 2024
- Männistö J. (2002). *Voluntaristinen alueellinen innovaatiojärjestelmä: Tapaustutkimus Oulun alueen ICT-klusterista*. Rovaniemi, Acta Universitatis Lapponiensis. Rovaniemi.
- OECD. (2017). OECD reviews of innovation policy: Finland 2017. <https://doi.org/10.1787/9789264276369-en> Accessed February 1s, 2024
- Pelkonen, A. (2006). The problem of integrated innovation policy: Analyzing the governing role of the Science and Technology Policy Council of Finland. *Science & Public Policy*, 33, 659–680.
- Pelkonen, A., Teräväinen, T. & Waltari, S.-T. (2008) Assessing policy coordination capacity: higher education, science, and technology policies in Finland. *Science and Public Policy*, 35(4), 242-252.
- Research Council of Finland. (2024). What we are. <https://www.aka.fi/en/about-us/what-we-do/what-we-are/>
- Research and Innovation Council (2024) <https://valtioneuvosto.fi/en/research-and-innovation-council> Accessed March 28, 2024
- Rinkinen, S. (2016) *Clusters, innovation systems and ecosystems. Studies on innovation policy's concept evolution and approaches for regional renewal*. Acta Universitatis Lappeenrantaensis 728. Lappeenranta.
- Schienstock, G., & Hämäläinen, T. (2001). *Transformation of the Finnish innovation system*. Sitra Report Series 7. Helsinki; Hakapaino Oy.
- Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of

innovation and transformative change. *Research Policy*, 47(9), 1554–1567.

Sitra's Strategy 2022. (2022) Finnish Innovation Fund.

https://media.sitra.fi/app/uploads/2021/06/sitra_strategy_2022.pdf Accessed, February 12, 2024

Sotarauta, M., & Kautonen, M. (2007). Co-evolution of the Finnish national and local innovation and science arena: Towards a dynamic understanding of multi-level governance. *Regional Studies*, 41(8), 1085–1098.

Sotarauta, M., & Suvinen, N. (2019). Place leadership and the challenge of transformation: Policy platforms and innovation ecosystems in promotion of green growth. *European Planning Studies*, 27(9), 1748–1767.

Sotarauta, M., Kolehmainen, J., & Laasonen, V. (2023). Evolving innovation policy rationales in Finland. In E. Pekkola, J.-E. Johanson, & M. Mykkänen (Eds.), *Finnish public administration*, 197–214. Springer International Publishing.

Statistics Finland. (2024). Valtion tutkimus- ja kehittämisrahoitus kasvaa 6,6 % vuoden 2024 talousarviossa. <https://www.stat.fi/julkaisu/cln1dOy49udv8Ocut3f6uw2af#> Accessed March 15, 2024

Strategic Research Council. (2024). Programmes and projects. <https://www.aka.fi/en/strategic-research/strategic-research/strategic-research-in-a-nutshell/programmes-and-projects/> Accessed March 15, 2024

Suorsa, K. (2009). *Innovation systems and innovation policy in a periphery: The case of northern Finland*. 183. Nordia Geographical Publications 38:4. Oulu.

Tervo, H. (2004). *Rakkaudesta teknologiaan: Toimijaverkostonäkökulma Oulun IT-keskittymän rakentumiseen ja toimintaan*. Acta Universitatis Lapponiensis. Rovaniemi.

Valtioneuvosto (2020) *Kestävän ja kehittyvän yhteiskunnan ratkaisuja tuottava Suomi*. <https://okm.fi/documents/1410845/4449678/Tutkimus-,+kehittamis-+ja+innovaatiotoiminnan+tielkartta/259864dc-a31c-cbcf-30ad-e2222724ccfa/Tutkimus-,+kehittamis-+ja+innovaatiotoiminnan+tielkartta.pdf?t=1590137297000> Accessed February 12, 2024

Valtioneuvosto (2022) *The 2030 Agenda Roadmap of the Finnish National Commission on Sustainable Development Finnish National Commission on Sustainable Development*. Publications of the Prime Minister's office 2022:17. Helsinki. https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/164200/VNK_2022_17.pdf?sequence=4&isAllowed=y Accessed March 15, 2024

Valtioneuvosto (2023). *Multi-annual plan for the use of research and development funding*. Final report of the Parliamentary RDI Working Group 2022. Publications of the Finnish Government 2023:56. https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/165008/VN_2023_56.pdf?sequence=4&isAllowed=y Accessed February 12, 2024

Valtioneuvoston selvitys- ja tutkimustoiminta lakkautetaan (2023) <https://vnk.fi/-/valtioneuvoston-selvitys-ja-tutkimustoiminta-lakkautetaan> Accessed March 15, 2024

Valtion talousarvioesitys. (2024). <https://budjetti.vm.fi/indox/sisalto.jsp?year=2024&lang=fi&maindoc=/2024/tae/valtiovarainministerionKanta/valtiovarainministerionKanta.xml&opennode=0:1:251:697:767> Accessed March 15, 2024

Veugelers, R., Aiginger, K., Edquist, C., Breznitz, D., Murray, G., Ottaviano, G., Hyttinen, A.,

Kangasharju, A., Ketokivi, M., Luukkonen, T., Maliranta, M., Maula, M., Okko, P., Rouvinen, P., Sotarauta, M., Tanayama, T., Toivanen, O. & Ylä-Anttila, P. (2009). *Evaluation of the Finnish National Innovation System – Full Report*. Taloustieto Oy. Helsinki University Print; Helsinki.

Ylä-Anttila, P., & Palmberg, C. (2007). Economic and industrial policy transformations in Finland. *Journal of Industry, Competition and Trade*, 7(3–4), 169–187.

Ylinenpää, H. (2009). Entrepreneurship and innovation systems: Towards a development of the ERIS/IRIS Concept. *European Planning Studies*, 17(8), 1153–1170.



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IV. DENMARK: ON A MISSION TOWARDS MISSION-ORIENTED INNOVATION POLICY.

*Teis Hansen, University of
Copenhagen & SINTEF*

1. The Danish research and innovation system

Similarly to Finland and Sweden, Denmark is performing well in international rankings of science and innovation capacity. Denmark performs very highly on measures relating to its skill base, digitalisation and use of ICT, as well as collaborations across sectors and geographies (European Commission, 2023). In a European context, Denmark also has a relatively high level of investment in R&D, albeit not quite on par with the EU leaders Belgium and Sweden (Eurostat 2024). Also, while SMEs make up a very significant share of the Danish economy, Denmark is not matching the EU's strongest performers in terms of SME innovativeness (European Commission 2023).

Danish research and innovation policy has been through a number of iterations in recent decades. In the 1980s, a number of technology-development programmes were introduced to steer research towards specific fields (IT, material technologies, and environment and food) that were deemed of significant societal relevance (Mejlgaard, Aagaard and Siune 2002). The importance

of the societal relevance of research was accentuated throughout the 1990s. It was central to the 2003 strategy 'From thought to invoice'^[1] (Regeringen 2003), which very clearly expressed a prioritisation of business-relevant research, thereby illustrating the increasingly close relation between science policy and innovation policy (Bloch and Aagaard 2012). At the same time, excellence and international leadership in research remained key policy priorities. This dual emphasis recurred in the Danish Government's 2012 innovation strategy 'Denmark – country of solutions' (Ministeriet for Forskning Innovation og Videregående Uddannelser 2012), which underlined the importance of stimulating both technology push and demand pull.

The Ministry of Higher Education and Science is the central ministry responsible for Danish research and knowledge-based innovation policy. However, other ministries are also engaged in innovation policy. The Ministry of Industry, Business and Financial Affairs is responsible for business support, including intellectual property rights and (via the Danish Board of Business Development, and jointly with the Ministry of Higher Education and Science) the national cluster programme. Through the Danish Board of Business Development, the Ministry of Industry, Business and Financial Affairs is also responsible for eight so-called regional 'Business Beacons', which are aimed at stimulating growth and competitiveness with a place-based approach in selected areas, many of which have a green focus, e.g. BioSolutions in Region Zealand, life sciences in the capital region, CCUS and PtX in North Jutland. In addition, other ministries, e.g. the Ministry of Climate, Energy and Utilities, administer research and innovation programmes pertaining to their specific empirical domains. Finally, a unique feature of the Danish research and innovation support system is the very large role played by private foundations such as Novo Nordisk Foundation, Carlsberg Foundation, Lundbeck Foundation and Villum Foundation in financing research at universities and research institutes. Other foundations, such as the Danish Industry Foundation, primarily support innovation and efforts to improve competitiveness. Figure 8 illustrates the structure of the Danish R&I system.

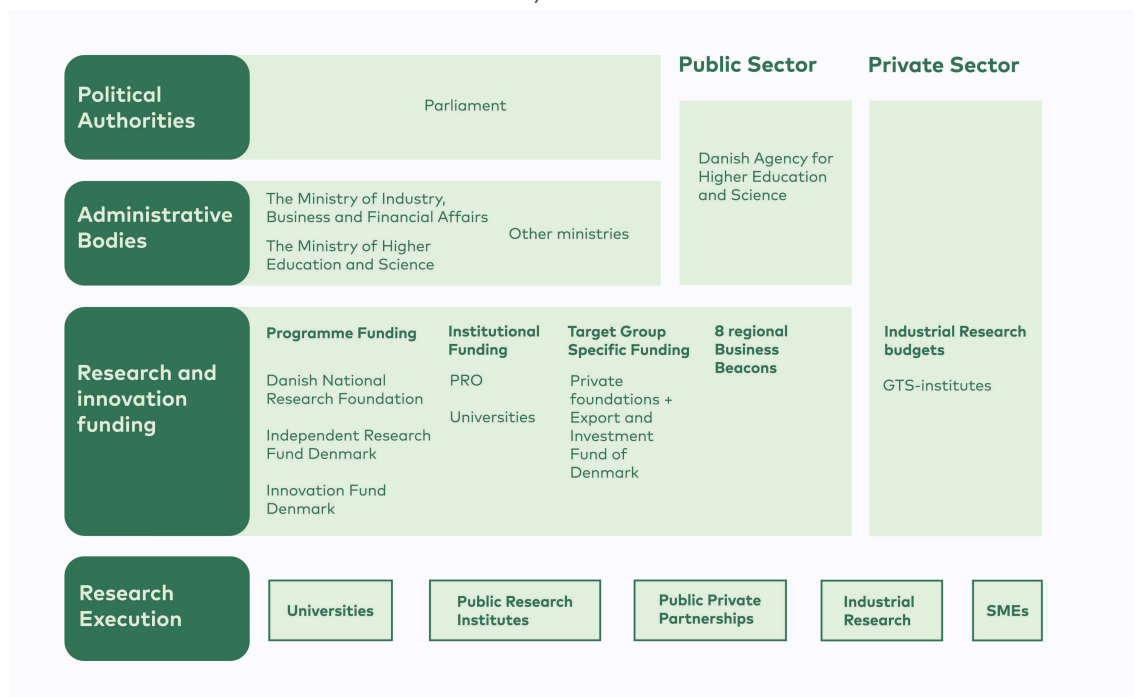


Figure 8: Structure of Danish Research and Innovation System. Source: Updated and adapted from Meissner, European Commission

1. In Danish, '*Fra tanke til faktura*'. In the broader public debate, this was more frequently expressed as 'From research to invoice' (in Danish, '*Fra forskning til faktura*').

In summary, the policy landscape prior to the introduction of the missions approach could be described as somewhat fragmented (Ketels et al. 2019, see also below). The Ministry of Higher Education and Science's research and innovation policy instruments were characterised by a hands-off approach, under which excellence in research and commercial potential of innovations steered the allocation of funds. However, this coexisted with quite specific funding tools for more narrowly defined research and innovation activities controlled by other ministries.

2. The position of MOIP in the national innovation policy landscape

In September 2020, the Danish Government launched a green research and innovation strategy that explicitly integrated a mission-oriented approach into national-level policymaking (Ministry of Higher Education and Science 2020). Previous policy successes – in particular, in the field of wind energy – may be said to have provided important lessons relevant to implementing MOIPs (Wohlert et al. 2022). However, the 2020 strategy represented a break with the previously dominant policy approach of the Ministry of Higher Education and Science, which attached little directionality to its funding allocation.

The green research and innovation strategy outlined four missions:

1. Carbon capture and storage or utilisation
2. Green fuels for transportation and industry (power-to-X, etc.)
3. Climate- and environment-friendly agriculture and food production
4. Recycling and reduction of plastic waste (later expanded to 'plastic and textiles').

Importantly, the directionality provided by these four missions does not permeate Danish research and innovation policy efforts as a whole. Firstly, existing non-mission-oriented policies under the Ministry of Higher Education and Science continue to operate. Crucially, these include base funding for universities; funding for basic research (in particular, Centres of Excellence) allocated by the Danish National Research Foundation; funding for excellent, original and internationally competitive research through the Independent Research Fund Denmark; and funding for applied and solution-oriented research and innovation activities (many with clear commercial potential) via Innovation Fund Denmark. Secondly, there was an ambition that the missions would not only pertain to research and innovation funds distributed by the Ministry of Higher Education and Science, but also help to coordinate efforts across ministries. However, this has not yet fully materialised. In summary, the green research and innovation strategy marked a significant change in Danish research and innovation policy, but has not yet fully revolutionised it.

3. Why a MOIP approach?

An important precursor to the missions approach in Denmark was the publication in 2019 of the Ketels committee's 'Peer Review of the Danish R&I System' (Ketels et al. 2019), under the European Commission's Horizon 2020 Policy Support Facility. One of the report's key conclusions was that '[t]here is no sufficiently clear, deliberate, overarching strategic direction of the Danish innovation system' (p. 12). Consequently, it calls for 'outlining an overarching innovation strategy [...] around a widely shared value proposition' (p. 15). The report explicitly mentions the mission-oriented approach as a framework for developing this strategy, as it would help address issues associated with fragmentation in publicly funded research and innovation activities.

In addition, following the 2019 election, the governing Social Democrats and its three supporting parties in parliament – the Social Liberal Party, the Green Left and the Red-Green Alliance – drafted an agreement of 'common understanding' (in Danish: '*forståelsespapir*'). The 2019 election is known as the 'climate election', due to the topic's importance in the preceding debates. Consequently, the first topic in the 'common understanding' agreement was 'a green and sustainable future', with a strong emphasis on climate change mitigation, including the role of research (Socialdemokratiet et al. 2019).

In this context, the MOIP approach was considered favourably, as it would answer the recommendations in Ketels' report and was in alignment with the programme of the incoming government. Additional supporting, albeit secondary, factors informed missions beyond the Ministry of Higher Education and Science, in particular the Ministry of Climate, Energy and Utilities, and the adoption of the European Commission's missions-oriented approach.

4. Who chooses the missions?

A relatively top-down approach was taken in the selection of missions (Normann et al., 2022). The Ministry of Higher Education and Science mapped research needs and potential, as well as research and industry strengths and potential. The mapping process was conducted following consultation with a group of stakeholders (e.g. universities and the so-called Climate Partnerships, consisting of key private-sector actors), primarily representing traditional key actors in the research and innovation system (Wohlert et al., 2021). These consultations pointed to some clear priority areas, e.g. power-to-X and CCS, although it proved more difficult to achieve consensus around promising technologies with respect to agriculture. Ultimately, the four missions were selected by the Ministry of Higher Education and Science, and subsequently approved by the government. According to the Ministry of Higher Education and Science (2020), the decision was based on four criteria:

- Green potential
- Business strength and potential
- Research strength
- Partnership potential, i.e. missions should be suitable for collaboration in partnerships between universities, industry, public sector, etc.

While these criteria are broad and not clearly quantified in the strategy, green potential – more specifically, the potential contribution to reducing domestic greenhouse gas emissions – was a central criterion when selecting potential missions. In this way, the Danish government's ambitious emissions targets (70% reduction by 2030 relative to 1990; net zero target for 2050; and the proposed ambition of the government appointed in December 2022 of reaching net zero by 2045) provide an overarching rationale for the missions: to ensure that public research and innovation funds contribute to achieving Danish climate policy targets.

5. How specific are the missions?

As evident from the titles, the four missions vary considerably in terms of their degree of specificity. Contrary to Mazzucato's approach to thinking about missions in policy-making (e.g. Mazzucato 2018), not all missions are problem- or challenge-driven. In particular, 'carbon capture and storage or utilisation' can be characterised as a potential solution to the decarbonisation challenge faced by the energy-intensive processing industry (e.g. cement, steel and

chemicals),^[2] but can also encompass alternative solutions such as electrification, hydrogen and demand reduction (Hansen et al. 2024).^[3] As such, an alternative formulation of this mission, with lower technology-specificity, might have been 'decarbonisation of energy-intensive industry'.^[4] At the other end of the spectrum, 'climate- and environment-friendly agriculture and food production' is very broad, not only in terms of potentially relevant solutions, but also in terms of the environmental dimensions that fall within the scope of the mission. Overall, the level of specificity of the missions varies considerably.

The strategy does not provide any specificity in terms of time-frames or place-sensitivity. While the strategy outlines that the government will continuously evaluate the need to add or modify missions, it does not provide a timeline or stipulate success criteria for the missions (cf. the way missions are applied by the EU, Mazzucato 2018). Rather, these matters are to be decided at the implementation stage.

6. Mission implementation

Following the green research and innovation strategy, the government initiated a number of initiatives related to green research and innovation in general. These include internal capacity-building for green transition policy, and continuing the allocation of a significant share of public research and innovation funds to green research and innovation activities (Ministry of Higher Education and Science, 2020; Ekspertgruppen om forskningens betydning for den grønne omstilling, 2023). Regarding the latter, parts of this funding are distributed through thematic calls by Independent Research Fund Denmark, as well as through broader thematic funding instruments by Innovation Fund Denmark. However, these funds do not necessarily contribute to the four specific missions. In fact, as highlighted by Aagaard, Norn and Stage (2022, p. 13), representatives from the Independent Research Fund Denmark and Innovation Fund Denmark deliberately seek to 'influence the political formulation of call texts to make sure that they are formulated as broadly as possible, but also subsequently seek to interpret them as broadly as possible' in the name of scientific quality. As such, there is no clear alignment between the directionality provided by the missions and the distribution of funds earmarked for green research and innovation activities. Consequently, the central policy instrument deployed in response to the missions has consisted of four so-called Innomission partnerships, funded through Innovation Fund Denmark. In 2021, a total of DKK 700 million was reserved for financing the partnerships in the period 2022–2026, with an additional DKK 300 million allocated in 2022 and again in 2023.

The Innomission partnerships emerged out of a two-stage development process. In phase 1, Innovation Fund Denmark launched a call for the development of mission roadmaps towards 2030 and 2050. Essentially, these roadmaps were to include a review of the global state-of-the-art in relation to the given mission. This involved identifying key barriers, Danish specialisations of relevance, a strategy for addressing the mission including proposed workstreams and activities in the first phase of the partnership, and the envisioned impact and milestones for successful completion (Innovation Fund Denmark 2021b, 2021a). The time frame for developing the roadmaps was very short (less than two months). This resulted in a hectic process in which

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2. Previously, carbon capture and storage was considered a promising solution to emission reductions from fossil-based electricity production, but it has been abandoned in the Danish context.
 3. Not all decarbonisation options are equally feasible across these industries, e.g. the importance of process emissions in cement production implies that not all emissions can be abated through, e.g. electrification.
 4. The mission is also concerned with emissions from bioenergy production and direct air capture. As such, this formulation could be extended to also cover negative emissions.

heterogeneous consortia, spanning universities, research institutes, cluster organisations and beyond, attempted to reach a consensus regarding the Danish research and innovation priorities in relation to the missions. Importantly, during this first step, no funding was allocated. Rather, it was seen as a bottom-up approach to defining the missions' directionality in more detail. However, among the actors involved, it was clearly seen as important to position research and innovation activities within the roadmaps, as a step towards future funding opportunities. The interests of core actors in the consortia therefore had a significant influence on the content of the roadmaps, partly due to the short time frame for their development, which allowed for only limited deliberation. A total of 12 roadmaps were submitted for the four missions. Following a review process, six of the roadmaps were selected, and formed the basis for calls for partnerships.

Subsequently, Innovation Fund Denmark launched a call for partnerships – again, with a short deadline of approximately two months. Applicants responding to this phase 2 call were to detail an organisational structure for the partnerships and propose activities leading to the implementation of the roadmaps. Funds of DKK 195 million were reserved for each of the missions 1, 2 and 3, and DKK 100 million for the mission on a circular plastics and textile economy,^[5] covering also expenses relating to establishment of partnership secretariats. Parts of these funds were allocated to specific projects described in phase 2 applications, but some were set aside for later calls managed by the partnerships. For calls from 2024 and onwards, decisions regarding project funding are the responsibility of the boards of the different partnerships, while Innovation Fund Denmark is only responsible for approving the selection process (see, e.g. INNO-CCUS 2023). As of March 2024, the partnerships had yet to finalise the processes for selecting projects for funding.

Place sensitivity was largely absent in the implementation of the missions. In the calls for both phases 1 and 2, little consideration was given to sub-national differences, requirements for geographically balanced participation, etc. Consequently, the partnerships did not emphasise these aspects in their applications. For instance, the successful application for the plastics and textiles circular economy partnership simply mentions the importance of involving regional and local authorities as part of the partnership's stakeholder engagement activities, and acknowledges the importance of establishing links to innovation projects initiated by, e.g. municipalities, regarding issues such as the collection of household textiles (CE-PT-Partnership 2021). Naturally, some specific projects will be strongly embedded in a local context. However, the overall implementation of the missions has a very strong national focus, and the missions are much more oriented towards global developments and the position of Danish actors in relation to international competition, rather than regional and local characteristics and opportunities. To some extent, this is a consequence of Denmark's relatively small geographical size.

The missions-oriented approach is still relatively new in Denmark, and as such there appears to be additional potential for strengthening its directionality. In particular, this is about ensuring coordination between the decisions taken by the partnerships and other relevant actors to avoid the partnerships becoming additional grant-awarding islands in a much larger research- and innovation-funding ocean (see also Normann et al., 2022). Strong dialogue between partnerships and relevant ministries is central to minimising this risk, especially as other research- and innovation-funding bodies of clear relevance to the missions are established and operated in parallel, e.g. the Plant-Based Food Grant initiated in 2021 to increase Danish production and consumption of plant-based food; or the Energy Technology Development and Demonstration

5. These figures account for the size of public funding to the partnerships. In addition, substantial co-funding (in terms of both time and money) from participating organisations should be included.

(EUDP) programme, which also funds power-to-X and CCUS activities at similar levels of technology-readiness as the missions. Similarly, as the focus of several regional business beacons clearly overlaps with the missions (e.g. CCUS and power-to-X in North Jutland or biosolutions on Zealand), they may be seen as more geographically sensitive manifestations of the missions, with a greater focus on upscaling and commercialisation. Organisationally speaking, however, the regional business beacons are separate from the missions. Generally speaking, therefore, the current degree of coordination appears to be insufficient and highlights the need to strengthen the governance structure around the partnerships. One alternative to strong coordination between such initiatives would be to concentrate resources. This would provide the missions with greater critical mass, and necessitate a stronger governance structure for the partnerships.

7. Summary

Insights from policy studies literature can be used to summarise the location of the decision-making power of MOIPs in Denmark (and potentially facilitate comparison between countries) – in particular, literature relating to policy design elements and policy abstraction (Cashore and Howlett 2007; see also Gong and Hansen 2023; Haelg, Sewerin and Schmidt 2020). Cashore and Howlett (2007) distinguish between policy aims (i.e. the goals that policies pursue) and policy means (i.e. the actions implemented in light of these aims). A distinction is also made between high-, mid- and low-level abstraction, which points to differences between ‘fundamental aims of policy and core assumptions about how policies (should) work’ (high-level) (Gong and Hansen 2023, p. 3), choices of policy objectives and types of instruments (mid-level), and ‘specific policy settings and instrument calibrations’ (low-level) (Haelg, Sewerin and Schmidt 2020, p. 313).

In relation to the Danish MOIPs, at the high level of abstraction, the policy aim (climate change mitigation) and overall policy approach (missions) were established top-down by the government, including the Ministry of Higher Education and Science. Similarly, the Ministry of Higher Education and Science and the Innovation Fund Denmark selected the specific missions and took the decision to organise mission implementation through partnerships, which points to a predominantly top-down approach at the mid-level of abstraction. However, at the low level of abstraction, a more bottom-up approach is taken, as stakeholders involved in the missions formulate goals and milestones for the missions, and make funding decisions for projects (Table 1).

	Aims	Means
High-level abstraction	<i>Policy aim: climate change mitigation</i> The government sets cross-cutting aims across policy fields (top-down)	<i>Policy approach: MOIP</i> The Ministry of Higher Education and Science initiates an MOIP approach (top-down)
Mid-level abstraction	<i>Policy objectives: four missions</i> The Ministry of Higher Education and Science establishes missions with inputs from stakeholders (top-down)	<i>Policy instruments: partnership structure</i> Innovation Fund Denmark selects the partnerships (and the framework for their organisation) to be used as a vehicle for implementing missions (top-down)
Low-level abstraction	<i>Policy targets: goals and milestones in mission roadmaps</i> Stakeholders set targets based on self-organised deliberations (bottom-up)	<i>Project funding selection criteria and decisions</i> Decisions regarding the selection of specific projects for funding are made via partnerships located at the partnership boards (bottom-up)

Table 1. Policy design elements for the Danish mission-oriented research and innovation policy

By examining the differences between more top-down and more bottom-up approaches to policy design at this granular level, it becomes possible to overcome the quite simplistic distinctions between them that are rarely seen in reality. At least, it is probably unusual to see high-level abstraction decisions determined in a bottom-up manner, whereas some policy fields may traditionally be characterised by a top-down approach to policy design at all levels of abstraction. At the same time, looking at the top-down versus bottom-up focus for the six policy design elements, it becomes apparent that there are indeed choices to be made regarding the design of MOIPs, and that countries may take decisions about them in different ways, which favour top-down and bottom-up decision-making to varying extents.

8. References

- Bloch, C. and K. Aagaard. 2012. Fra tanke til faktura. In Dansk forskningspolitik efter artusindskiftet, ed. K. Aagaard and N. Mejlgaard, 95-132: Aarhus University Press.
- Cashore, B. and M. Howlett. 2007. Punctuating Which Equilibrium? Understanding Thermostatic Policy Dynamics in Pacific Northwest Forestry. *American Journal of Political Science* 51:532-551.
- CE-PT-Partnership. 2021. Circular Economy for Plastics and Textiles - Developing solutions for 2030 and 2050: CE-PT-Partnership.
- Ekspertgruppen om forskningens betydning for den grønne omstilling. 2023. Rapport 1. Baggrunden for ekspertgruppen om forskningens betydning for den grønne omstilling.
- European Commission. 2023. European Innovation Scoreboard 2023. Brussels: Directorate-General for Research Innovation, Publications Office of the European Union.
- Eurostat. 2024. R&D expenditure.
- Gong, H. and T. Hansen. 2023. The rise of China's new energy vehicle lithium-ion battery industry: The coevolution of battery technological innovation systems and policies. *Environmental Innovation and Societal Transitions* 46:100689.
- Haelg, L.; S. Sewerin; and T.S. Schmidt. 2020. The role of actors in the policy design process: introducing design coalitions to explain policy output. *Policy sciences* 53:309-347.
- Hansen, T.; Andersson, J.; Finstad, J.; Hanson, J.; Hellsmark, H.; Mäkitie, T.; Nordholm, A. & Steen, M. (2024): How aligned are industry strategy and government policy for the decarbonisation of energy-intensive process industries? *Climate Policy*, in press
- INNO-CCUS. 2023. Process for investment in Pool 2: INNO-CCUS.
- Innovation Fund Denmark. 2021a. Call for: Roadmaps for mission-driven green research and innovation partnerships (Innomission-roadmaps). Aarhus: Innovation Fund Denmark.
- . 2021b. Structure for Innomission-roadmap content. Aarhus: Innovation Fund Denmark.
- Ketels, C.; M.D. Hanouz; J. Hunter; S. Kuhlmann; T. Raven; P. Heringa; U. Gabai; G. Marklund; and C. Palmberg. 2019. Peer Review of the Danish R&I System: Ten steps, and a leap forward: Taking Danish innovation to the next level. Brussels: European Commission.
- Mazzucato, M. 2018. Mission-oriented research & innovation in the European Union. Brussels: European Commission.
- Mejlgaard, N.; K. Aagaard; and K. Siune. 2002. Politik og forskning. *Forskningspolitik mellem autonomi og heteronomi*. Aarhus: Analyseinstitut for Forskning.
- Ministeriet for Forskning Innovation og Videregående Uddannelser. 2012. Danmark - Løsningernes Land. København: Ministeriet for Forskning Innovation og Videregående Uddannelser.
- Ministry of Higher Education and Science. 2020. Fremtidens grønne løsninger – Strategi for investeringer i grøn forskning, teknologi og innovation. Copenhagen: Ministry of Higher Education and Science.
- Normann, H.E.; L. Scordato; E. Solberg; T. Thune; and P.M. Koch. 2022. Måltrettede samfunnsoppdrag i Norge. Oslo: NIFU.

Regeringen. 2003. Nye veje mellem forskning og erhverv fra tanke til faktura. København.

Socialdemokratiet; Radikale Venstre; SF; and Enhedslisten. 2019. Politisk forståelse mellem Socialdemokratiet, Radikale Venstre, SF og Enhedslisten: Retfærdig retning for Danmark.

Wohlert, J.; K.T. Jakobsen; J. Westergaard; S. Ramsing; and O. Stavnem. 2022. Arven fra vindmøllerne. København: Tænk tanken DEA.

Wohlert, J.; J.K. Lind; M.T. Norn; S. Bigandt; and O. Stavnem. 2021. Forskning og innovation målrettet et klimaneutralt Danmark. Copenhagen: DEA.

Aagaard, K.; M.T. Norn; and A.K. Stage. 2022. How mission-driven policies challenge traditional research funding systems [version 1; peer review: 2 approved with reservations, 1 not approved]. F1000Research 11.



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V. DISCUSSION AND CONCLUSIONS

This report set out to identify both the general and more specific characteristics of the Nordic innovation systems, and how the Nordic countries are implementing MOIPs to varying extents, and in more explicit and implicit ways. The report focuses on Sweden, Finland and Denmark – three countries with strong innovation systems and traditions. The following cross-country comparison and discussion is based on the three country chapters and discussions with the authors.

1. Similarities and differences in the Nordic approaches to missions

The first – and most important – takeaway from this policy overview is that Sweden, Finland and Denmark each exhibit distinctive features in their approach to MOIPs. However, there are also notable similarities, especially between Sweden and Finland, both of which have a longer history than Denmark of linking innovation policies with sustainable development. This historical context influences their current policy frameworks. Sweden, for example, has adopted various transformative innovation policy frameworks, which integrate mission-oriented approaches into a consensus-driven policy-making environment. This evolution is partly a response to the Lund Declaration and subsequent policy actions that positioned Sweden as a frontrunner in innovation policy.

Finland, on the other hand, distinguishes itself through an embedded approach that invites companies to lead innovation ecosystems. This approach places significant emphasis on the role

of private enterprises in directing innovation policy. Denmark also places sustainable development high on the agenda, but adopts a clearly distinct, more centralised approach, marking a clear break from the otherwise hands-off, fragmented policy landscape. The Danish government takes a prominent role in formulating missions, and therefore aligns closely with Mazzucato's (2018) framework, even if not all Danish missions are challenge-based. Some focus on specific, mostly technical solutions, which reflects a more classical approach to missions than the one outlined in Mazzucato's (2018) MOIP principles.

1.1. Nordic integration and governance of MOIPs

The extent to which missions are integrated into national innovation systems varies across the three countries. In Denmark, missions add a new layer to existing research, development and innovation (RDI) instruments, and there is only limited coordination with parallel instruments. The government does not always clearly define the missions' goals; instead, stakeholders develop roadmaps through bottom-up processes. Sweden has rather explicitly used different 'transformative' innovation policy frames – from challenge-oriented, to transformative, to missions. The mission-oriented approach is central to Sweden's Impact Innovation framework, but appears to be less diffused across the entire governance system. While agencies have proactively adopted transformative innovation policies, clear, high-level missions (e.g. reducing emissions to zero) have not penetrated all levels of governance. Sweden has clearly drawn inspiration from Mazzucato's approach, but in practice the application of missions is closely integrated with the more consensus-oriented approach to policy-making, and as such functions primarily as a tool for stakeholder mobilisation, rather than dictating specific actions. In Finland, 'missions' are not explicitly applied, but research-related innovation is challenge-oriented, and MOIP approaches are embedded in many, if not all, innovation policy programmes. While steps towards MOIPs have fallen short, the overlapping and often interchangeable use of concepts such as 'mission', 'transformative' and 'challenge', as a fuzzy policy cloud, shows a clear desire to focus innovation efforts to address societal challenges. The embedded nature of innovation policy therefore facilitates continuous, bottom-up content evolution, in which themes are developed through open consultation among academia, businesses and the public sector.

Furthermore, this policy overview clearly shows that the role of state and non-state actors in defining and implementing RDI goals varies both across the three countries and within the national contexts, reflecting a mix of top-down and bottom-up processes. Denmark employs a combination of approaches – the selection of broad priorities, aims and missions is predominantly a top-down exercise; whereas the more specific selection of goals, targets and actions results from a more bottom-up process of deliberation involving stakeholders. In Sweden, missions are predominantly stakeholder-driven, with broad governmental goals that facilitate system changes, rather than dictating specific directions. National research programmes, however, exhibit more top-down characteristics, as they are defined by topics and challenges outlined in research bills. Nevertheless, the way in which these challenges and topics are defined, and incorporated into research bills, often follows an intense stakeholder-driven consultation process, thus challenging the top-down/bottom-up dichotomy. Finland mirrors Sweden in its stakeholder-centric approach, with agencies like Vinnova and Business Finland learning from each other and promoting collaboration. The formal structure suggests a top-down system, but in practice regional and local actors significantly reinterpret and localise the innovation policies.

Innovation policies in the Nordic countries are generally place-less, yet have clear spatial impacts, as they favour actors or industries based in specific locations. In Denmark, missions are selected without specific geographic considerations, although their implementation may benefit certain areas due to existing capabilities. The eight Regional Business Beacons, however, do have an explicit place- and challenge-based focus, although they are primarily concerned with stimulating

growth and competitiveness. Sweden's move towards transformative innovation policies has been relatively aspatial, favouring actors with stronger capabilities in competitive calls. However, mission-oriented pilots have started to reintroduce considerations of place, particularly through territorially anchored community engagement. In Finland, the innovation policy itself is place-less, but its implementation favours regions with robust universities and strong companies. Local actors often adapt and influence overall policies through reinterpretation and localised funding. One key reflection among the authors is that there tend to be considerable differences between the system as it appears in its formal structures (top-down), and the reality of how it works, and how actors at multiple levels are involved in designing innovation activities. This is also the case for regional and local authorities that are not formally part of the innovation policy structure, yet have a degree of formal responsibility for innovation work. This leads to a process of re-interpretation and localisation of innovation policy efforts.

2. Implications and further research

This report posed two simple questions: Are MOIPs currently being implemented in three Nordic countries (Denmark, Finland and Sweden)? And if so, what characterises the process of adopting MOIPs in these countries? These questions turned out to be not as simple as they first seemed. While missions and the mission-oriented approach have found their way into the national innovation systems toolbox, it is important to highlight that they have not replaced pre-existing structures. For the most part, missions add an extra layer to the already complex and fragmented policy frameworks and funding mechanisms. There is also a degree of fragmentation in the application of MOIPs themselves – depending on the programme, there are multiple ways to implement and coordinate mission-oriented efforts. For instance, the Swedish policy experimentation journey shows that the mission approach to innovation programmes can enhance interdisciplinary collaboration and scientific performance. However, the different programmes yielded mixed results, which exhibit a high degree of fragmentation at project level. In-depth evaluations of different programmes could therefore support policy-makers' ability to design and adapt TIPs and MOIPs.

Moreover, the country reviews reveal that the implementation of MOIPs cannot be simply characterised as either top-down or a bottom-up processes. Instead, the implementation of MOIPs seems to be ingrained into well-established national innovation systems, and long traditions of policy- and decision-making are characterised by more circular, consensus-based processes. Despite this commonality, the Nordic countries' unique national innovation systems, institutional set-ups, industrial bases, actors, capabilities and traditions result in different interpretations of the missions-oriented approach, and different processes for defining and selecting priorities and goals. However, little is known about how the Nordic countries' MOIPs are interpreted and applied at the subnational level.

Given that MOIPs are attracting more attention and are likely to remain an integral part of the innovation policy toolbox in the years ahead, future research should focus on empirical analyses of their outcomes and how they are impacted by different organisational approaches. It is crucial to understand how the sub-national levels and vertical policy coordination affect MOIP implementation. Investigating how local actors combine national and European innovation policies to pursue their goals can provide deeper insights into the operationalisation and impact of mission-oriented approaches. More empirical evidence will ultimately be critical to legitimise not only MOIP approaches, but also the processes used to formulate problems, solutions and goals.

Finally, further empirical research should help to identify how MOIPs, or specific interpretations of

transformative policies, are suited to the peculiarities of each Nordic country's innovation systems and innovation modes. Trust is often identified as a key Nordic asset that enables collaboration and consensus-building. However, it remains unclear to what extent this impacts innovation efforts, particularly in comparison to societies with lower levels of trust. For instance, the Swedish system has a strong capacity for coordinating action, which clearly facilitates the application of missions. However, the choice of missions and directionality remains open and subject to further debate. Furthermore, the fragmentation in the three countries' innovation policy efforts, ranging from a 'hands-off approach' in Denmark to a state of 'policy confusion' in Finland (as described in chapters III and IV in this report), calls for more reflection and research into the overall effectiveness of both the institutional arrangements and the individual programmes. Whether MOIPs can be integrated in the Nordic countries across ministries, agencies and sub-national authorities, as well as private research foundations, is an interesting question that warrants further empirical study.

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Alberto Giacometti & Sigrid Jessen, Nordregio

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Nordregio

Holmamiralens Väg 10

Skeppsholmen

Stockholm, Sweden

www.nordregio.org