

Practicing Impactful Mission-Oriented Innovation Policy

Climate change poses a global challenge with dire economic, environmental and social consequences, requiring urgent policy action. This brief outlines the integration of mission-oriented innovation policy (MOIP), systems of use innovation, and policy platform architecture as an impactful way to drive green transition. Their joint performance stems from enhanced coordination, a nuanced understanding of situational contexts, and active harnessing of key stakeholders potential in driving the green transition. In the case of high CO2 emission steel industry policy has potential to make a disproportionate impact.

Mission-oriented innovation policy faces many challenges as both the problems and solutions can be unclear and contentious.

Policy platform brings together key actors, and resources that can drive green transition.

Mission-oriented innovation policy aiming at transition needs to tackle complex and multifaceted challenges, where both problems and solutions may lack clarity. The dilemma is, that only precise and actionable policy measures enable actors and innovators to achieve given transition targets. A policy platform architecture tailored to promote systems of use innovation is suggested as a solution to the contradictory situation. It entails development of MOIP with clear and well-defined mission for systemic innovation, multi-party coordination and concrete goals to guide their implementation. This brief underscores the importance of systems-level innovation in industry, potential of tailored policy platform designs, and dynamic evaluation to meet ambitious climate objectives effectively. To manage such complexity, platform organizations are suggested as the missing link in enhancing the coordination and delivery of mission-oriented innovation policy. In the private sector platforms have demonstrated superior effectiveness in coordination, resource allocation, information sharing, and scaling of operations (Parker et al. 2016). Platform organisation grounded on practitioners realities holds similar potential for policy delivery. The recommendations are derived from the work of the University of Vaasa MISS project funded by Business Finland.

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MISS - Practicing mission-oriented innovation policy is a research project funded by Business Finland at the University of Vaasa, Finland. The project employs two analytical lenses, inclusive policy approach and systems of use approach as way to analyze and advance mission-driven innovation policies. Linking of mission-oriented policy and systems of use activities can facilitate not only the systemic change, but also the societal acceptance of the speed and scale of changes. The project studies users capability to be key actors in systemic innovation rather than merely targets of the policy. The main research questions of the project are: How to successfully make large systemic changes and/or transformations happen? How mission-oriented policy can create added value for businesses and for the wider society?

Green transition relies on electrification. This calls for national roadmap for the infrastructure and investments

MOIP needs strategic orientation with clear, feasible objectives, coordination and tailored policy instruments.

Introduction

Climate change is one of the most pressing global challenges, with potential economic losses of USD 178 trillion over the next 50 years (Deloitte, 2022). Transitioning to a sustainable economy—including the move away from fossil fuels—is imperative to mitigate these risks. Addressing this challenge requires innovative policy approaches that integrate diverse actors, technologies, and strategies. This brief explores the synergy between mission-oriented innovation policy (MOIP), systems of use innovation, and platforms as tools to drive green transitions. Specifically, it highlights how these approaches can address the high CO₂ emissions from the steel and aluminum industries, which contribute approximately 10% of global emissions. To accelerate green transition in society, policymakers need to tackle policy coordination challenge. Platforms as policy delivery and coordination tools can emulate the transformative powers of platform organisations like Amazon, Uber, or PayPal. Policy platforms hold untapped potential for societal change especially when integrated with systems of use innovation. They are offering a structured and dynamic approach to tackle complex systemic challenges. Policy impact hinges on concrete goals, measures and alignment with mission objectives. Immediate actions, including infrastructure investment and fostering public-private partnerships, are critical to laying the foundation for a sustainable green transition.

Data Sources

The analysis is supported by research papers, interviews with policy and business practitioners, and policy and programme documents published by ministries, agencies, the OECD, the International Energy Agency (IEA), and the United Nations.

Mission-Oriented Innovation Policy (MOIP) - Concept and Approach

MOIP typically employs a top-down strategy to address societal challenges by fostering collaboration across government, industry, academia, and civil society (Mazzucato, 2018). Key features include setting ambitious goals for change, coordinating public and private sectors, and leveraging financial and regulatory tools to create enabling environments. MOIP initiatives range from **accelerator missions** (e.g., the US Cancer Moonshot, emphasizing technological advancements) to **transformative missions** (e.g., Japan's Hydrogen Society, targeting systemic societal changes). Success depends mainly on three pillars: a) strategic orientation with clear, feasible objectives, b) coordination to

ensure alignment across actors and policies and c) implementation using tailored policy instruments and adaptive strategies.

Systems of Use Innovation - Definition and Role

Systems of use innovations transform production and business processes under the leadership of a keystone company.

Systems of use innovation focuses on the way users are integrating tools, behaviors, and components to achieve comprehensive solutions (von Hippel, 2021). Unlike isolated innovations, system-level approaches address interconnected challenges. New CO2 emission-free production processes and value networks emerge from systems of use innovation. The steel production process and aluminium processing exemplify systems of use where the manufacturer oversees a complex process aimed at competitively producing steel or aluminium structures in terms of price, quality, service, and sustainability. The strength and innovativeness of such complex systems rely on numerous suppliers capable of providing innovative components and process improvements. System of use companies coordinate suppliers' contributions to a multi-component innovation, which is crucial for the success of the innovation. Iansiti and Levien, 2004 refer these as Keystone companies that are achieving long-term success by fostering the health of their business ecosystems.

The green transition requires addressing interconnected challenges at the system level. Systems of use innovations play a key role in this process.

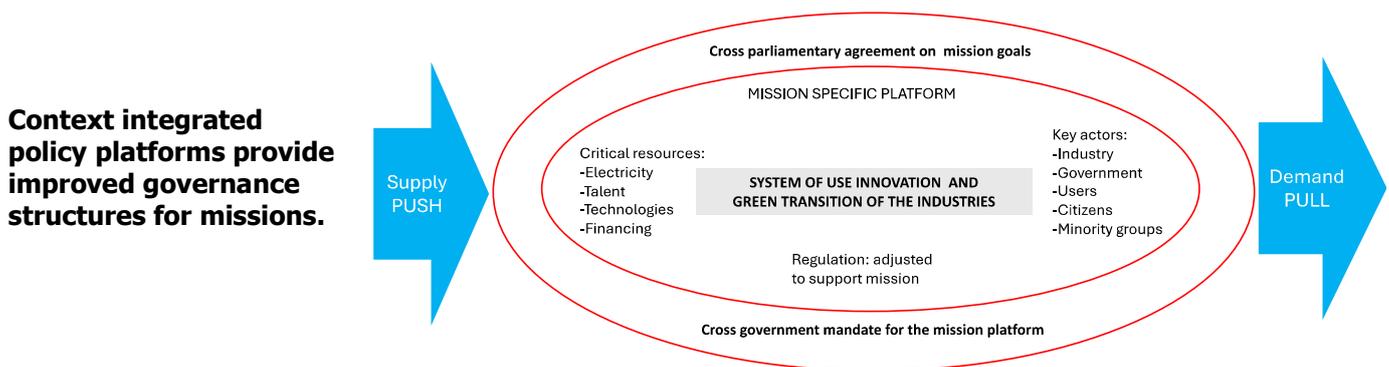
HYBRIT initiative case study demonstrates the potential of systems of use innovation in steel production. Here the producer develops hydrogen-powered alternative production method and replaces its coal-based processes. However, significant challenges remain. First, steel mills face electricity demands 4–6 times higher than traditional methods. Second is infrastructure, including electricity grid, that requires long planning cycles and regulatory clarity. Third, supplier coordination across the value chain is critical for incentivizing innovation. Finally, Industrial labor shortages, regulation need to be addressed to meet evolving technological demands. Effective support for systems of use Innovation calls for policy portfolios that address infrastructure development, material efficiency, and technology demonstration (IEA, 2020). Policy incentives can encourage supplier participation and ensure policies align with the demands of multi-component innovation. Regular monitoring and feedback loops can track progress to identify and address systemic bottlenecks.

Platforms as Policy Delivery Mechanisms

Platform organisations have emerged as a dominant force in the modern economy, reshaping industries and creating new avenues for value creation and capture. These models leverage digital technologies to connect multiple user groups, facilitating interactions and transactions

that were previously impossible (Yang et al., 2020). The key question is how platform architecture can serve mission-oriented policy making characterised by complexity and coordination issues (Baldwin, C. Y., and Woodard, 2010). Platforms are dynamic organizational models that facilitate resource sharing and collaboration among stakeholders. They create value through network effects, can adapt to shifting policy needs, and leverage data for real-time policy adjustments. Platforms can integrate mission-oriented innovation policy with systems of use innovation by fostering collaboration among governments, industries, and civil society. They can also align systemic innovations with green transition goals and accelerate progress through ecosystems of complementary innovations.

Figure 1: Policy platform outline



Described platform for zero-emission steel production would address energy demand and supply chain challenges, ensure stakeholder alignment, expedite regulatory processes, and support systemic goals. Integrated policy platform designs should be established to align closely with systems of use innovation. Increased infrastructure investments, especially in advanced technology electricity grids, are essential to meet the systemic needs (Deese, et al. 2024).

Concluding comments

The systemic nature of the green transition calls for national level road map for industry de-carbonising (see e.g., US Department of Energy, 2023). The aim should be on production of high value added sustainable products and services. Investments in essential infrastructure are essential part of the national level roadmap. In particularly societally sustainable green electricity production. Adoption of advanced grid technology should be prioritised as a fast and cost effective way to solve bottle necks (Deese, et al. 2024).

The green transition is a broad concept and must be adapted to different contexts with clear, measurable goals tailored specifically to each systems of use innovation.

Context integrated policy platforms are a way to improved governance structures for missions. A combined approach leveraging mission-oriented innovation policy, systems of use innovation, and tightly integrated platform architectures offers a robust framework to address challenges. Embedding policies within systems of use innovation and focusing on critical systemic challenges can significantly enhance policy impact.

The green transition, while a broad policy concept, must be grounded in specific contexts with clear, measurable goals tailored to particular systems of use. Achieving this requires inclusive multi-stakeholder collaboration and cross-sectoral innovation. Detailed value network analyses for zero-emission steel production demonstrates the transition impacts in the society. High-emission industries, including steel, aluminum, cement, and farming, represent key opportunities for green transition efforts, with the potential to achieve substantial CO2 reductions.

A comprehensive evaluation frameworks are needed for mission-driven policies. To maximize policy impact, a tailored evaluation approach supported by advanced analytics and real-time data is essential. This ensures that policies remain adaptive, measurable, and effective in driving the green transition forward.

Policy Recommendations

1. Systemic nature of green transition calls for national level road map for industry de-carbonising, green electricity production and delivery.
2. At the core of effective mission-oriented innovation policy are:
 - a) a strategic approach and clear, achievable goals, b) coordination of actors and policy measures compatibility, and c) tailored policy instruments and flexible strategies for implementation.
3. Recognising the challenges of the Finnish economy, the aim needs to be on high value added sustainable products and services
4. Policy platform organisation, deeply embedded within systems of use innovation, represent potential way to coordinate mission and its key actors and resources effectively.
5. Policy should prioritize system of use innovations in de-carbonising of core industrial processes, recognising the importance of supply chains coordination, infrastructure investments, and energy needs.
6. Adoption of advanced grid technology and AI should be prioritised as a fast and cost effective way to solve bottle necks in electricity supply.
7. Realistic, measurable goals needs to be set, accounting for economic, technological, and societal dimensions of the mission.

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The aim of Innovation and Growth Research funded by Business Finland is to find solutions to the global challenges of the Finnish economy and society.

