2023 Oct. 26 (Thu) - STI Policy with Impact

14:10 - 14:40 (Online)
(AM 8:10-8:40 German Time)

任務導向創新政策：期許、挑戰與成功要素

Mission-oriented innovation policies: Promise, challenge and requirements

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International Conference on Industrial Technology Innovation (ICITI, 2023)

Mission-oriented innovation policies: Promise, challenge and requirements

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- **Staff**: 307 (as of July 2023)

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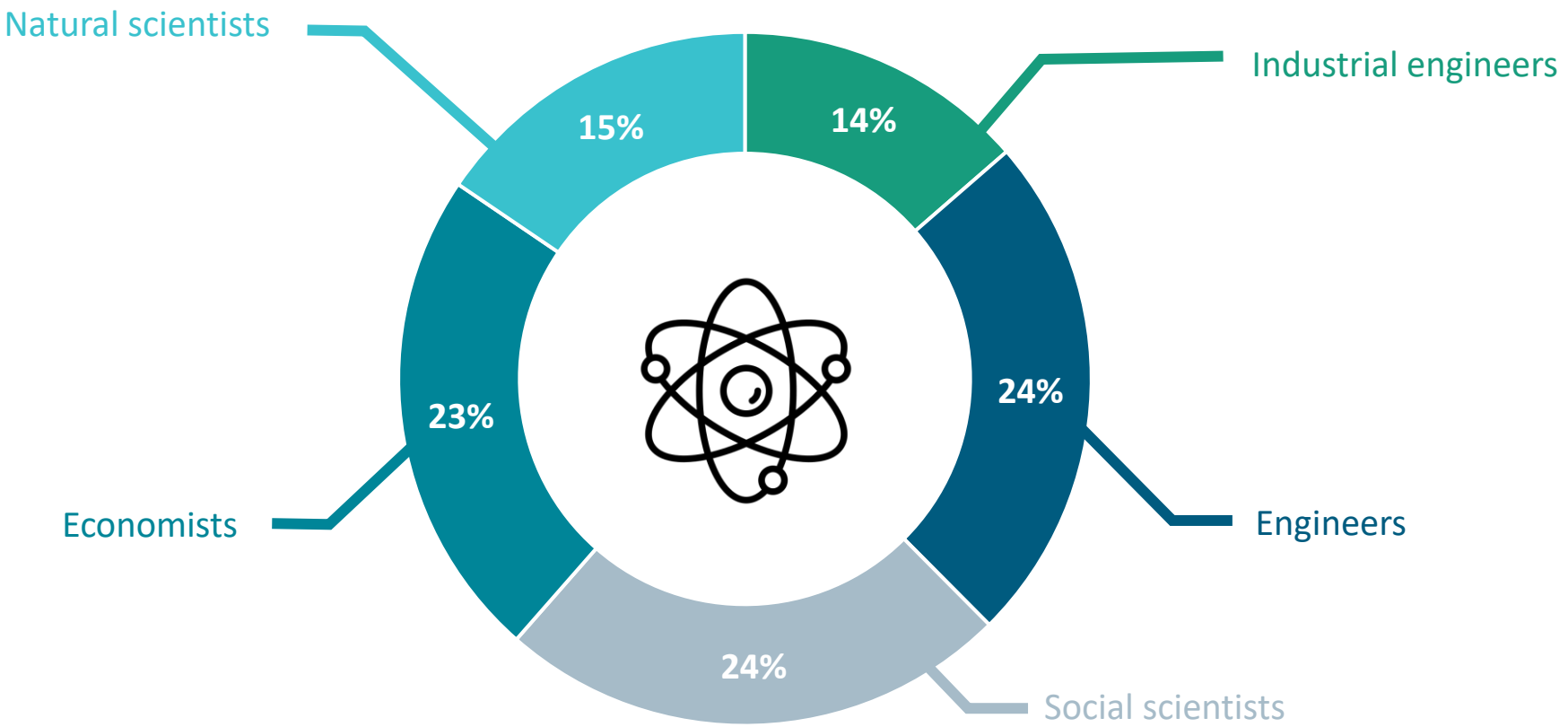

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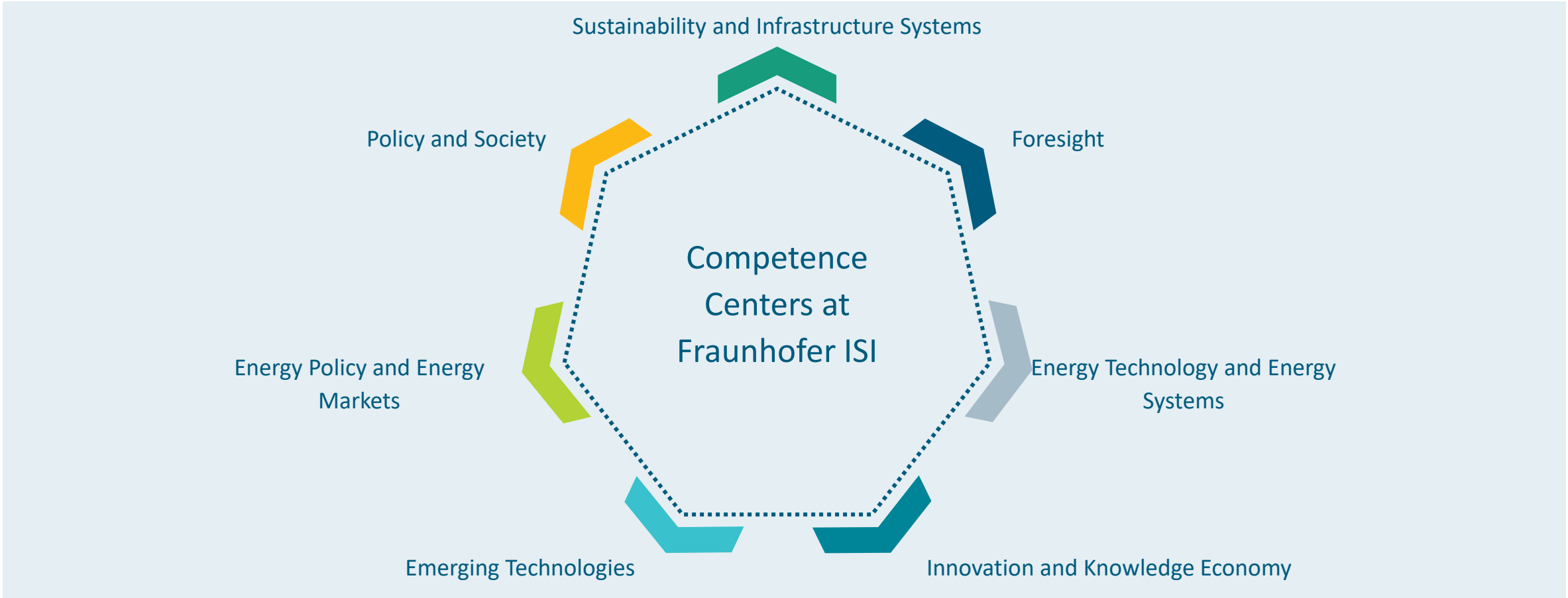

Eu-SPRI Forum

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- 19 member organisations across Europe
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  - Next generation: early carrier conferences and mobility
  - Structuring the field: annual conference
  - Exploratory workshops and publications

European Forum for Studies of Policies for Research and Innovation

https://euspri-forum.eu/

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Mission-oriented innovation policies:
Promise, challenge and requirements

1. Rationales and forms of *Innovation* Policy
2. Supporting Innovations for Transformation: Missions and mission policy
    1. Missions and mission policy
    2. System transformation and the role of the state
3. New Challenges for the state

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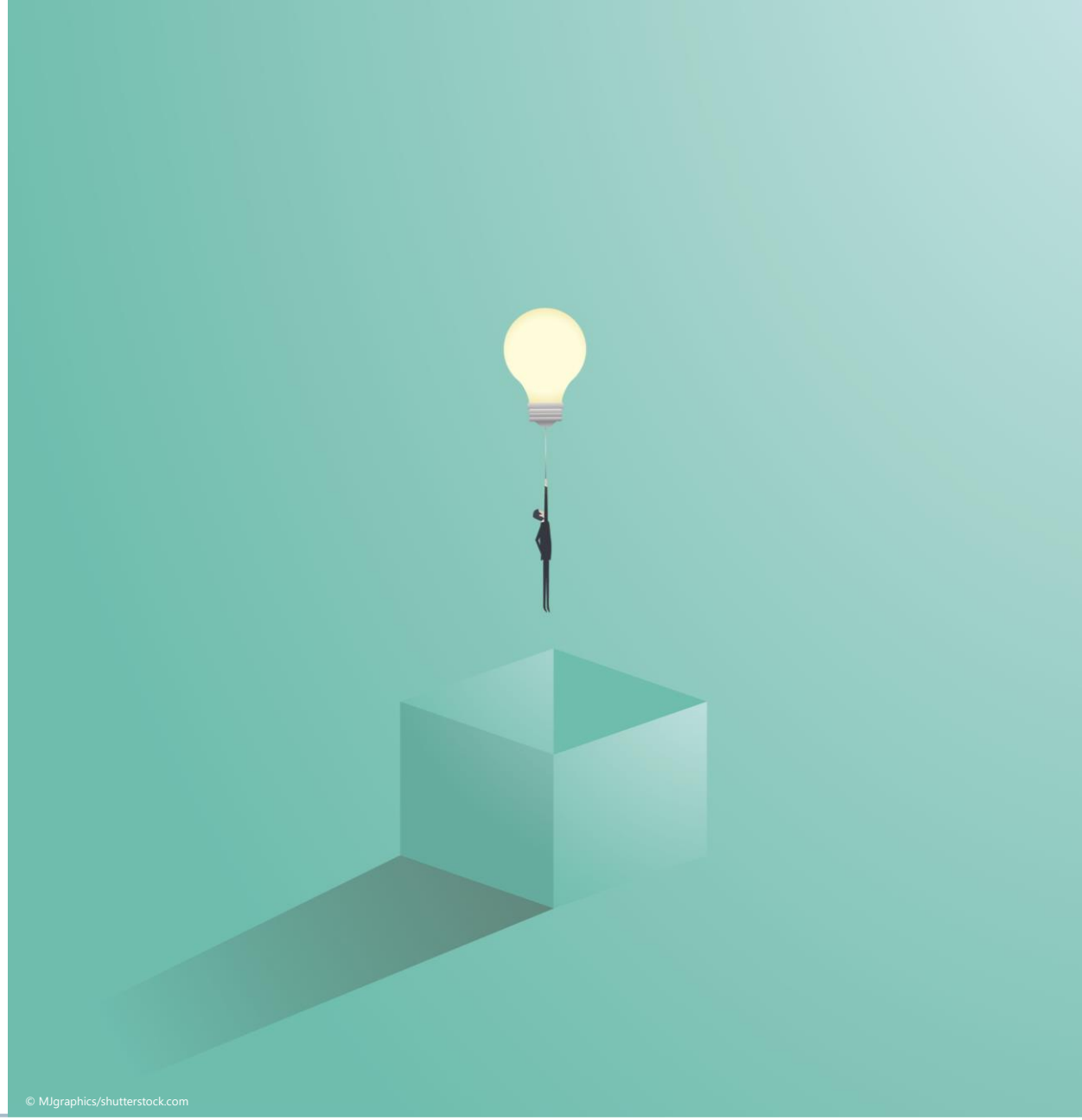
1. Rationals and forms of *Innovation* Policy

Innovation

- a novelty put to use
- introduction of new opportunities or solutions to problems (or challenges) that arise in the social and/or economic system (Edler/ Fagerberg 2018)

Variety of forms of innovation

- Products, processes, business models...
- Technological, social, architectural, systemic



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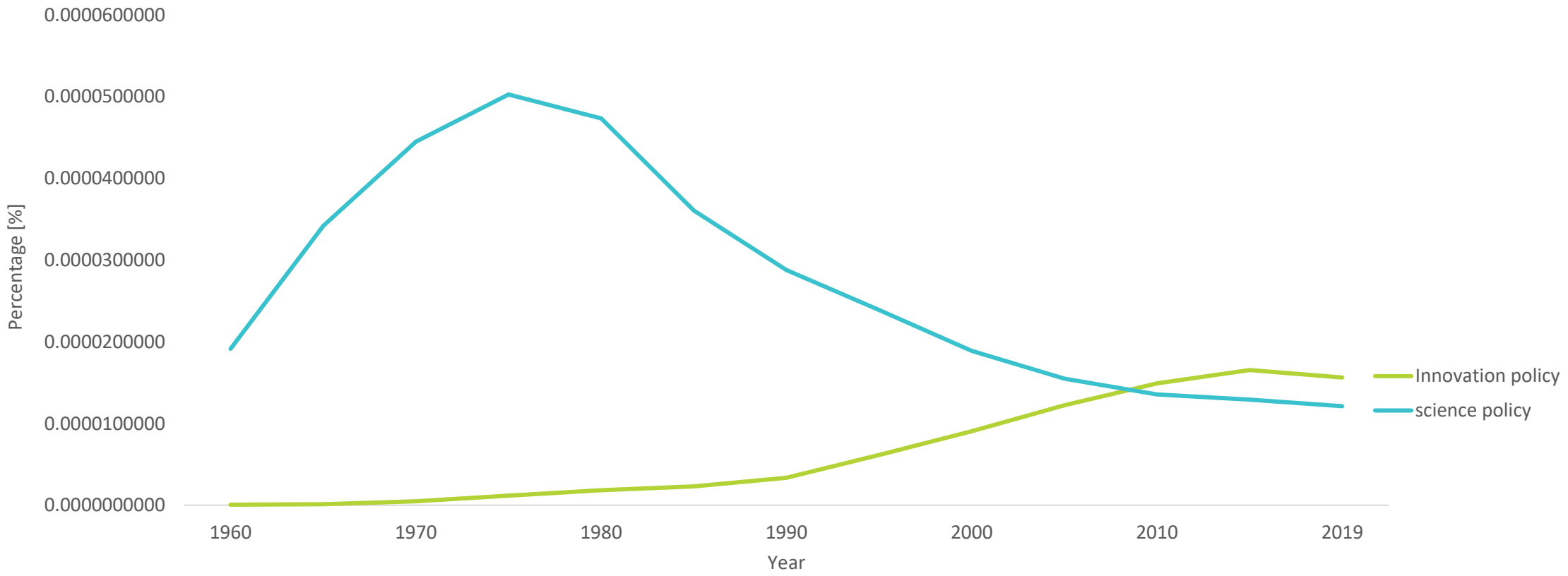
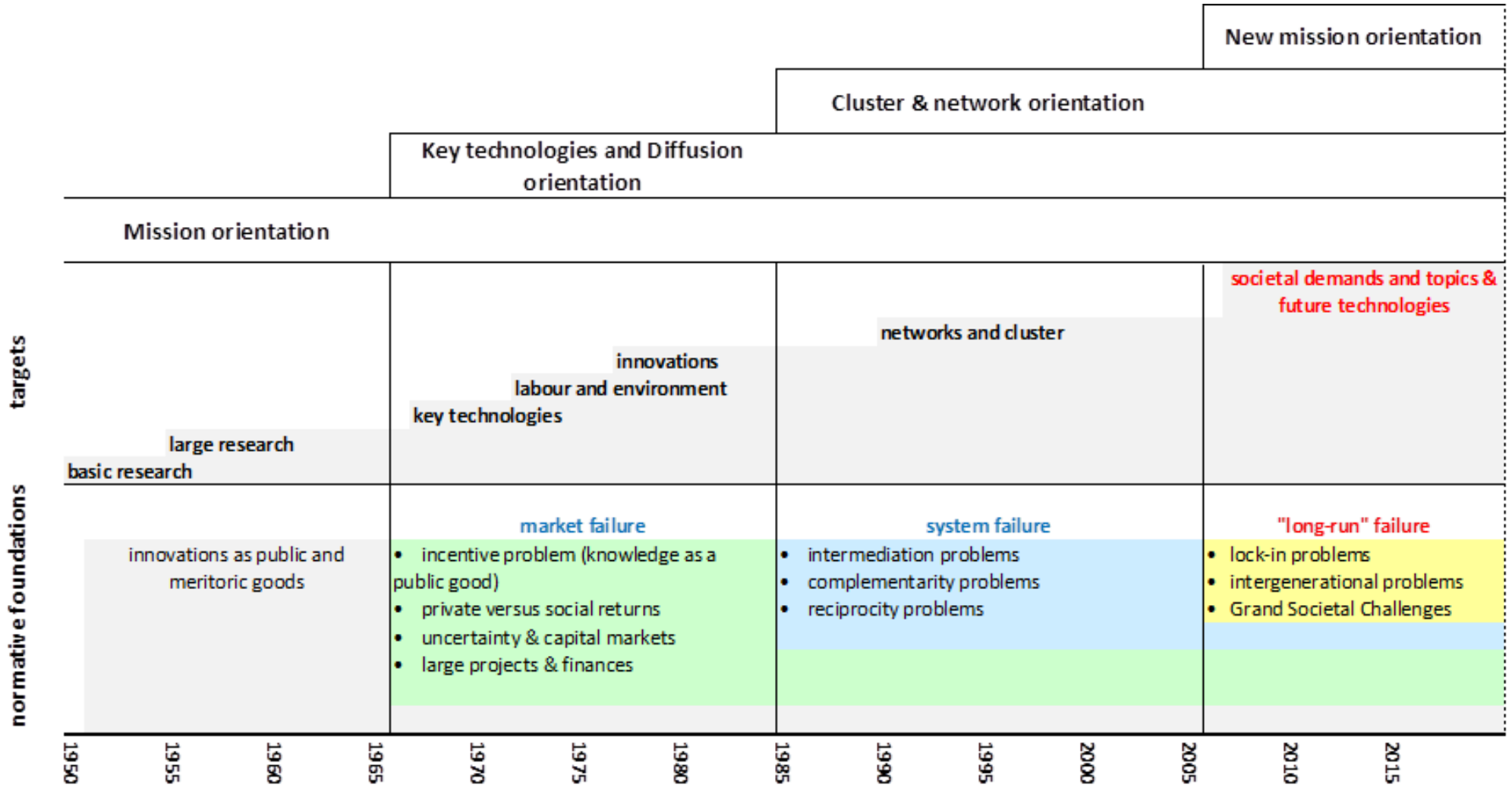
The slow rise of innovation policy



Google Books Ngram Viewer, 2023

Innovation policy Development

Rationales and Targets



Cantner et al (2018), Cantner (2012), based on Fier/Harhoff (2002), modified

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Innovation Policy Instrumentation

	Chapter Title and Instruments	Overall orientation		Goals						
		Supply	Demand	Increase R&D	Skills	Access to expertise	Improve systemic capability comple-mentarity	Enhance demand for inno-vation	Improve frame-work	Improve discourse
1	Fiscal Incentives for R&D	●●●		●●●	●○○					
2	Direct Support to Firm R&D & Innovation	●●●		●●●						
3	Policies for Training and Skills	●●●			●●●					
4	Entrepreneurship Policy	●●●				●●●				
5	Technical Services and Advice	●●●				●●●				
6	Cluster Policy	●●●					●●●			
7	Policies to Support Collaboration	●●●		●○○		●○○	●●●			
8	Innovation Network Policies	●●●					●●●			
9	Private Demand for Innovation		●●●					●●●		
10	Public Procurement Policies		●●●	●●○				●●●		
11	Pre-Commercial Procurement	●○○	●●●	●●○				●●●		
12	Innovation Inducement Prizes	●●○	●●○	●●○				●●○		
13	Standards	●●○	●●○					●○○	●●●	
14	Regulation	●●○	●●○					●○○	●●●	
15	Technology Foresight	●●○	●●○							●●●

Taxonomy of innovation policy instruments

●●● = major relevance, ●●○ = moderate relevance, and ●○○ = minor relevance to the overall orientation and stated innovation policy goals of the listed innovation policy instruments

Source: Adapted from Edler, Gök, et al., 2016, p. 11

2. Supporting Innovations for Transformation: Missions and mission policy

The turn to innovation for transformation:
Mission orientation

- Missions are ways to frame the challenges into **concrete problems** ...missions not just galvanise but also **transform** production, distribution and consumption patterns across various sectors in new directions (European Commission (2017), ESIR Memorandum).

- Missions....can provide the means to **focus** our research, innovation and investments on **solving critical problems**, while also spurring growth, jobs and resulting in positive **spill-overs across many sectors** (Mazzucato, 2018)

- "But we do offer a set of principles: **missions** should **privilege impact**, they should define a **clear goal** which **captures public imagination**, and they should **mobilise many different actors**" (Pascal Lamy, 2017)

- "It should be possible, within the appropriate timeframe, to ascertain to what extent the mission has been ***accomplished***" (EU HL Group, Lamy Report, 2017)

The Transformation and Mission turn in Innovation Policy


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Legitimizing research, technology and innovation policies for transformative change

Combining insights from innovation systems and multi-level perspective in a comprehensive 'failures' framework

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ABSTRACT

The recent policy debates about orientating research, technology and innovation policy towards societal challenges, rather than economic growth objectives only, call for new lines of argumentation to systematically legitimize policy interventions. While the multi-level perspective on long-term transitions has attracted quite some interest over the past years as a framework for dealing with long-term processes of transformative change, but the innovation systems approach is still the dominant perspective for devising innovation policy. Innovation systems approaches stress the importance of improving innovation capabilities of firms and the institutional settings to support them, but they are less suited for dealing with the strategic challenges of transforming systems of innovation, production and consumption, and thus with long-term challenges such as climate change or resource depletion. It is therefore suggested to consider insights from transition studies more prominently in a policy framework that is based on the innovation systems approach and the associated notion of 'failures'. We propose a comprehensive framework that allows legitimizing and devising policies for transformative change that draws on a combination of market failures, structural system failures and transformational system failures.

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1. Introduction

Since almost 40 years, namely since the publication of the "Limits to Growth" study by Dennis Meadows and his collaborators (Meadows, 1972), the idea that we need to change fundamentally our industrial societies has continuously gained support. The debate about sustainable development has given this paradigmatic shift in thinking further momentum, and more recently the European debate about Grand Challenges has reinvigorated it (EU, 2008). It is widely recognized that innovation in its various forms has a crucial role to play for realizing the kind of transformative change needed. The notion of long-term transformative change captures the idea that fundamental changes in our models for production and consumption are needed if either major threats to our

more is needed than individual product or process innovations at firm level, but comprehensive system innovations, i.e. novel configurations of actors, institutions and practices that bring about a new mode of operation of entire sectors or systems of production and consumption.

Current innovation policies nevertheless still put their main emphasis on economic growth and the ability of national economies or industrial sectors to generate innovations per se, but hardly deal with the challenges of more fundamental types of transformative change (Allemade et al., 2011). Modifying a distinction introduced by Smits et al. (2010)[2], we argue that 'structural innovation policies' which focus on optimizing the structure of innovation

Mission-Oriented Research and Innovation

Inventory and characterisation of initiatives

FINAL REPORT

A study prepared for the European Commission, DG Research and Innovation, by:

The Joint Institute for Innovation Policy (JIIP), Joanneum Research, Tecnalia, TNO, VTT, and the Danish Technological Institute (DTI)

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Mission-oriented innovation policies: challenges and opportunities

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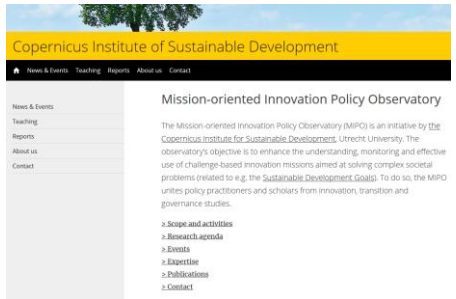
Abstract

This article focuses on the broader lessons from mission-oriented programs for innovation policy—and indeed policies aimed at investment-led growth. While much has been written about case studies on missions, this has not resulted in an alternative policy making toolkit. Missions—in the least—require those tools to be just as much about market cocreating and market shaping, as they are about market fixing. The article reviews the characteristics of mission-oriented programs, looks at key features of those programs that can provide lessons, and discusses how to choose and implement mission-oriented policies, with an example.

JEL classification: B52, O25, O33, O38

1. Introduction

Innovation has not only a rate but also a direction: the 21st century is becoming increasingly defined by the need to respond to major social, environmental, and economic challenges. Sometimes referred to as "grand challenges," these include environmental threats like climate change, demographic, health and well-being concerns, and the difficulties of generating sustainable and inclusive growth. These problems are "wicked" in the sense that they are complex, systemic, interconnected, and urgent, requiring insights from many perspectives. Poverty cannot be solved without attention to the interconnections between nutrition, health, infrastructure, and education, as well as redistributive tax policy. Grand challenge thinking is being applied both in developed and developing countries, with some of the most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Mission-oriented Innovation Policy Observatory

The Mission-oriented Innovation Policy Observatory (MIPO) is an initiative by the Copernicus Institute for Sustainable Development, Utrecht University. The observatory's objective is to enhance the understanding, monitoring and effective use of challenge-based innovation missions aimed at solving complex societal problems (related to e.g. the Sustainable Development Goals). To do so, the MIPO unites policy practitioners and scholars from innovation, transition and governance studies.

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CIRCLE LUND UNIVERSITY

An innovation system framework for system innovation policy: the case of Strategic Innovation Programs (SIPs) in Sweden

Papers in Innovation Studies

Paper no. 2017/08

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Three frames for innovation policy: R&D, systems of innovation and transformative change

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ABSTRACT

Science, technology and innovation (STI) policy is shaped by persistent framings that arise from historical context. Two established frames are identified as co-existing and dominant in contemporary innovation policy discussions. The first frame is identified as beginning with a Post-World War II institutionalisation of government support for science and R&D with the presumption that this would contribute to growth and address market failure in private provision of new knowledge. The second frame emerged in the 1980s globalising world and its emphasis on competitiveness which is shaped by the national systems of innovation for knowledge creation and commercialisation. STI policy focuses on building links, clusters and networks, and on stimulating learning between elements in the systems, and enabling entrepreneurship. A third frame linked to contemporary social and environmental challenges such as the Sustainable Development Goals and calling for transformative change is identified and distinguished from the two earlier frames. Transformation refers to socio-technical system change as conceptualised in the sustainability transitions literature. The nature of this third framing is examined with the aim of identifying its key features and its potential for provoking a re-examination of the earlier two frames. One key feature is its focus on experimentation, and the argument that the Global South does not need to play catch-up to follow the transformation model of the Global North. It is argued that all three frames are relevant for policymaking, but exploring options for transformative innovation policy should be a priority.

1. Introduction

Public policies, including those directed at science and technology, arise from understandings of past experience with actions, reflections on contemporary challenges and perceptions of future potentials for action. The past, present and future are interpretively connected by policy scholars and practitioners as well as many others as a guide to analysis and action. These interpretive connections produce forceful framings – interpretations of experience, ordering of present circumstances and imaginations of future potentialities that create the foundations for policy analysis and action and shape expectations concerning potentials and opportunities (Coffman, 1974; Rosford and Snow, 2000; Taylor, 2003). Framings evolve over time and change when they are perceived as inadequate to current circumstances. Because they influence peoples' imaginations, they also extend beyond the public policy sphere to influence the mobilisation and activities of non-governmental organisations as well as the private enterprise sector and even families and individuals. Some have argued that frame reflection might hamper action. Following Schön and Rein (1994) we believe the opposite; it is necessary to engage in frame reflection for designing and implementing effective policy solutions for complex policy problems.

Modern economic growth is generated by a collection of socio-technical systems based upon industrial mass production and individualized mass consumption that extensively employ fossil fuels, is resource and energy intensive and produces a massive amount of waste. Despite important improvements in life expectancy and material welfare in many countries, persistent problems of economic crises and rising inequality coincide with a growing realisation that current socio-technical systems for meeting our basic needs – whether in food, energy, mobility, materials, water or resources more generally – are unsustainable. While available framings of science and technology policy that evolved since World II remain relevant, they offer little guidance for managing the substantial negative consequences of the socio-technical system of modern economic growth to which they have contributed and of which they are a part.

Our view is that it is time to articulate more forcefully and to experiment in practice with a framing for science, technology and innovation policy that emphasises socio-technical system change. Three framings related to science and technology policy can be delineated, two of which are available and are systematically employed in policy

DEVELOPING AND ENACTING TRANSFORMATIVE INNOVATION POLICY

A COMPARATIVE STUDY

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Paper prepared for 8th International Sustainability Transitions Conference, 18 – 21 June 2107 in Gothenburg, Sweden

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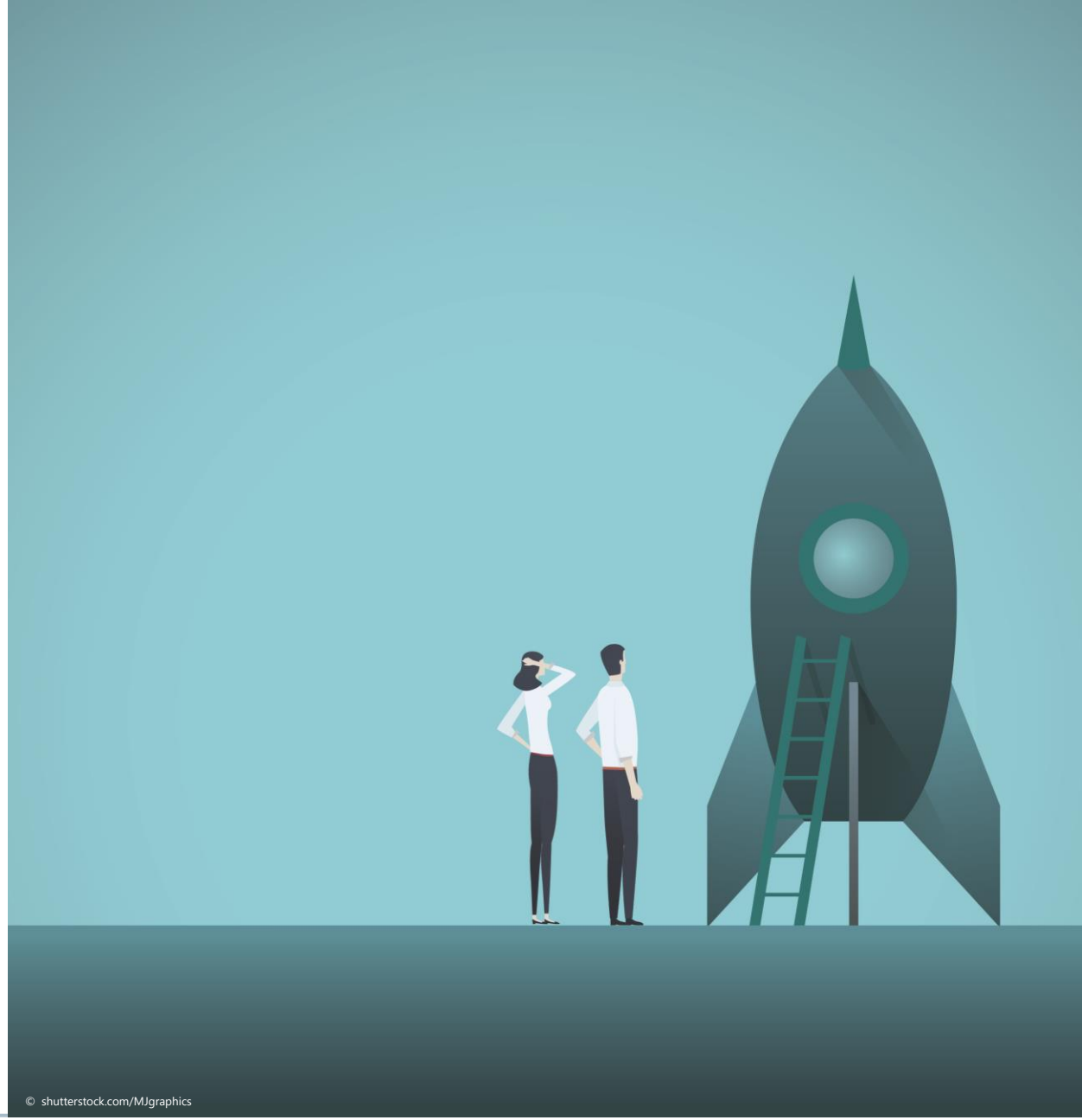
2. Supporting Innovations for Transformation: System transformation and the role of the state

Missions as system transformation

- Improvement of socio-economic conditions
- Socio-technical systems: the actors, practices, technologies, institutions interacting to provide a specific societal function
- Interplay: technological and non-technological innovations and societal behaviour
- Mission oriented innovation policy = attempt for a conscious change of socio-technical system (u.a. Geels, Schot-Steinmuller, Borras/ Edler, Dreher et al)

➢ Directionality – mobilisation – concertation of actors
➢ Knowledge and innovation only one aspect

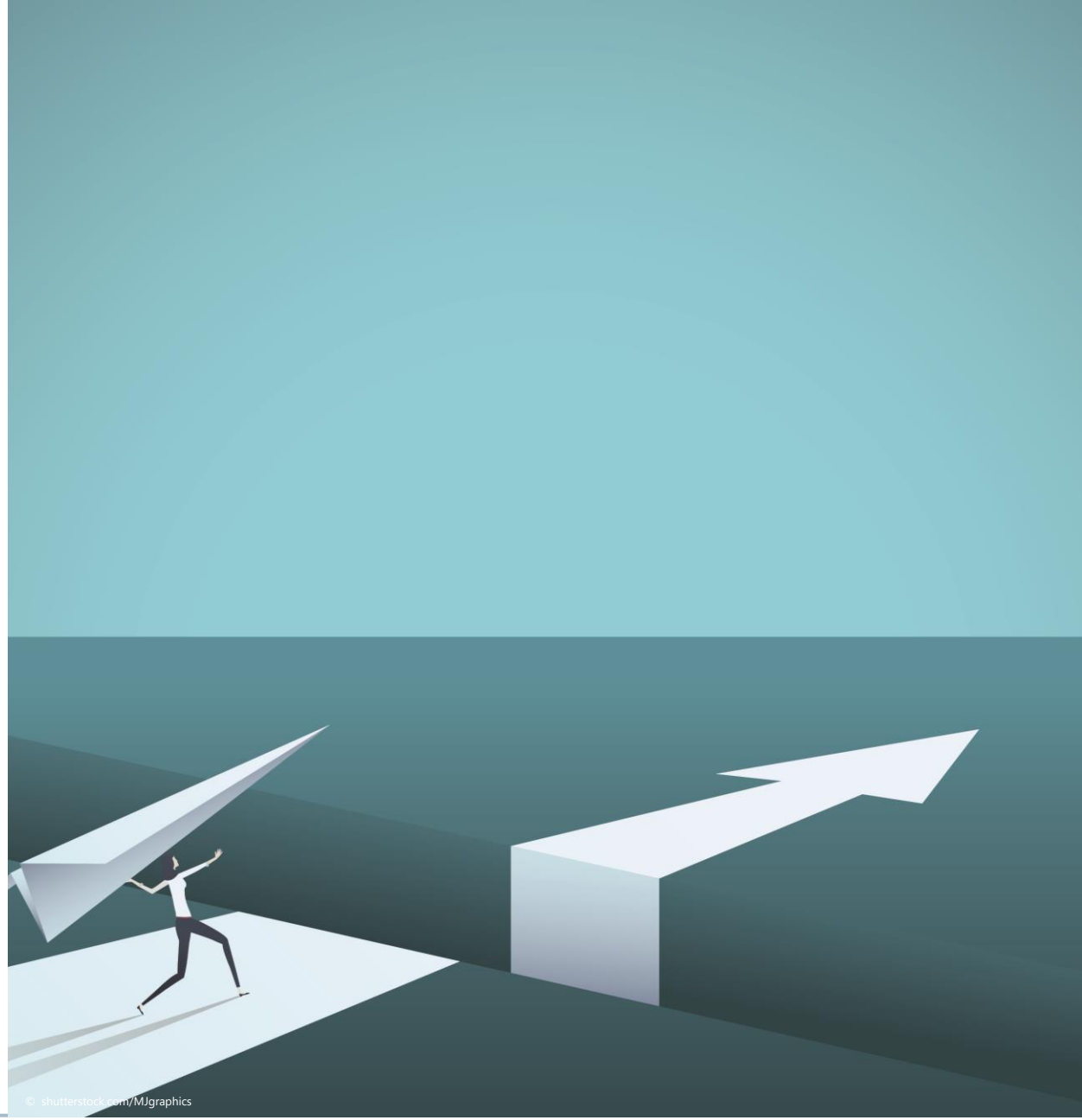


Achieving missions means transforming (sub-)systems

- System properties and characteristics of transformations determine...
  - likelihood of change,
  - likelihood of state intervention to lead to change and
  - the relative role of the state and STI policy

- Which properties matter?

  Differentiation needed (SYSTRA, Fraunhofer ISI Project)



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Systems differ

- Level of uncertainty, system switching costs
- Nature of technological change, maturity
- R&D competencies, interaction
- Role of non technological innovation
- Need for new infrastructure
- Role of regulation
- Interdependencies with other systems, between sectors
- Routines, practices of consumers and firms

New Governance Challenges

- Higher level of politicisation:
  - “Sense of urgency”: Consensus? Prioritisation?
  - Legitimacy challenge
  - Normative and material contestations

- Increasing complexity of actors - Alternative governance models?
  - Domain and STI policy: Inter-policy coordination
  - Strong institutional and cultural differences

- Beyond “STI”: So many other dimensions....

Governance rationales in mission policy

	Traditional innovation and "industrial" policy	Domain policy (energy, health etc.)	Mission policy
Rationality			
Output Legitimacy			
Input Legitimacy			
Strategic Intelligence			

Governance rationales in mission policy

	Traditional innovation and "industrial" policy	Domain policy (energy, health etc.)	Mission policy
Rationality	Improving innovation system, market and system failures; technology, sector or actor focus		
Output Legitimacy	Innovation performance, economic performance		
Input Legitimacy	coordination with scientific organisations, economic groups, credibility in innovation system		
Strategic Intelligence	established methods for the evaluation of STI interventions gaps as for market and societal effects		

Governance rationales in mission policy

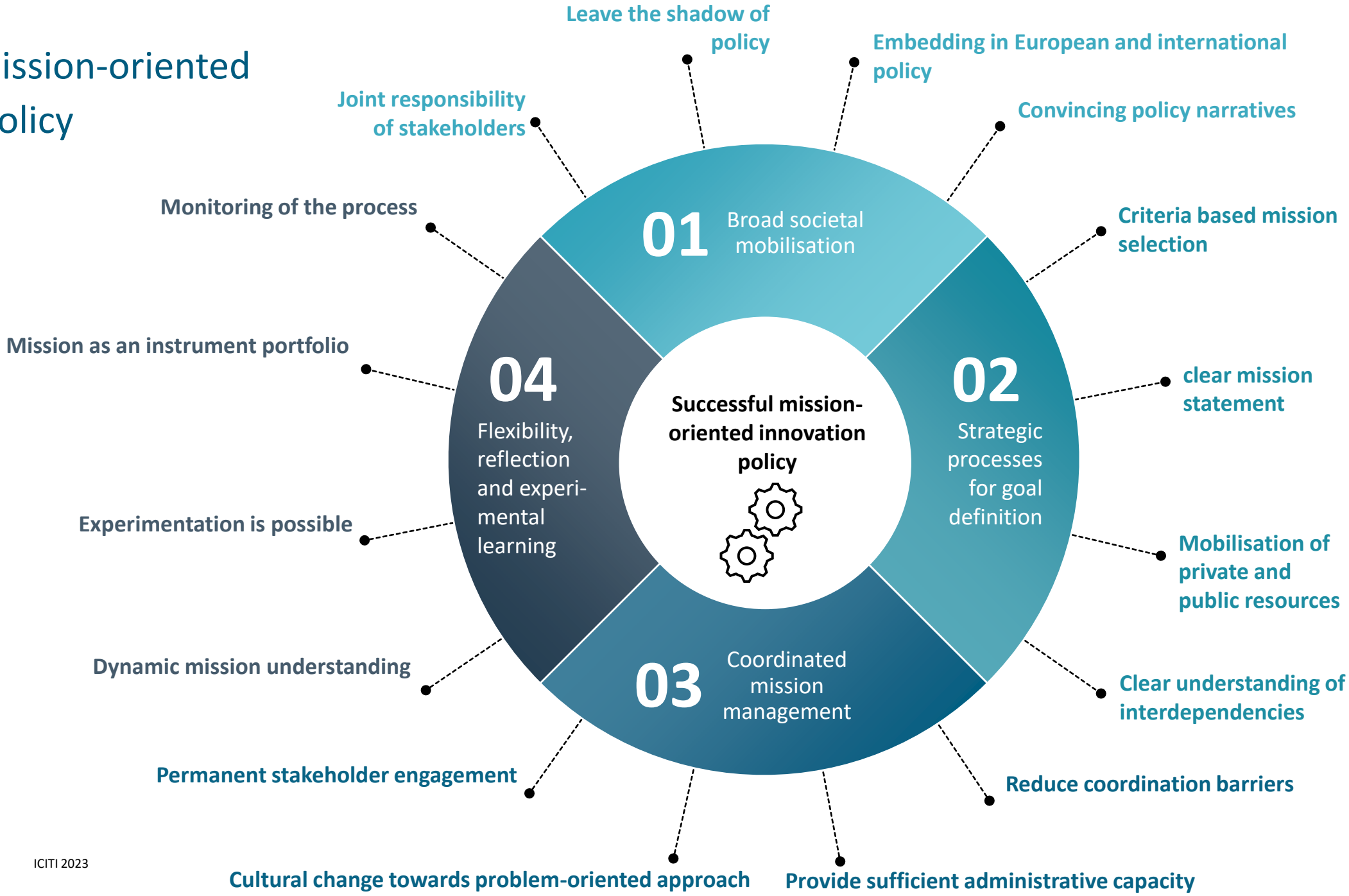
	Traditional innovation and "industrial" policy	Domain policy (energy, health etc.)	Mission policy
Rationality	Improving innovation system, market and system failures; technology, sector or actor focus	achieve domain aims supply/demand instruments STI support optional, erratic	
Output Legitimacy	Innovation performance, economic performance	achieve domain goals innovation performance only means	
Input Legitimacy	coordination with scientific organisations, economic groups, credibility in innovation system	broad domain actor networks credibility: domain knowledge	
Strategic Intelligence	established methods for the evaluation of STI interventions gaps as for market and societal effects	Established methods to evaluate domain interventions	

Governance rationales in mission policy

	Traditional innovation and "industrial" policy	Domain policy (energy, health etc.)	Mission policy
Rationality	Improving innovation system, market and system failures; technology, sector or actor focus	achieve domain aims supply/demand instruments STI support optional, erratic	Directing innovation generation and diffusion to mission goal, Can be horizontal to domains
Output Legitimacy	Innovation performance, economic performance	achieve domain goals innovation performance only means	Accomplishing the mission Announced technological economic and societal effects
Input Legitimacy	coordination with scientific organisations, economic groups, credibility in innovation system	broad domain actor networks credibility: domain knowledge	Mobilising comlementary R&D actors und societal groups Basis for credibility?
Strategic Intelligence	established methods for the evaluation of STI interventions gaps as for market and societal effects	Established methods to evaluate domain interventions	Market and societal effects Holistic strategic intelligence: discursive, conceptional, evaluative (broad)

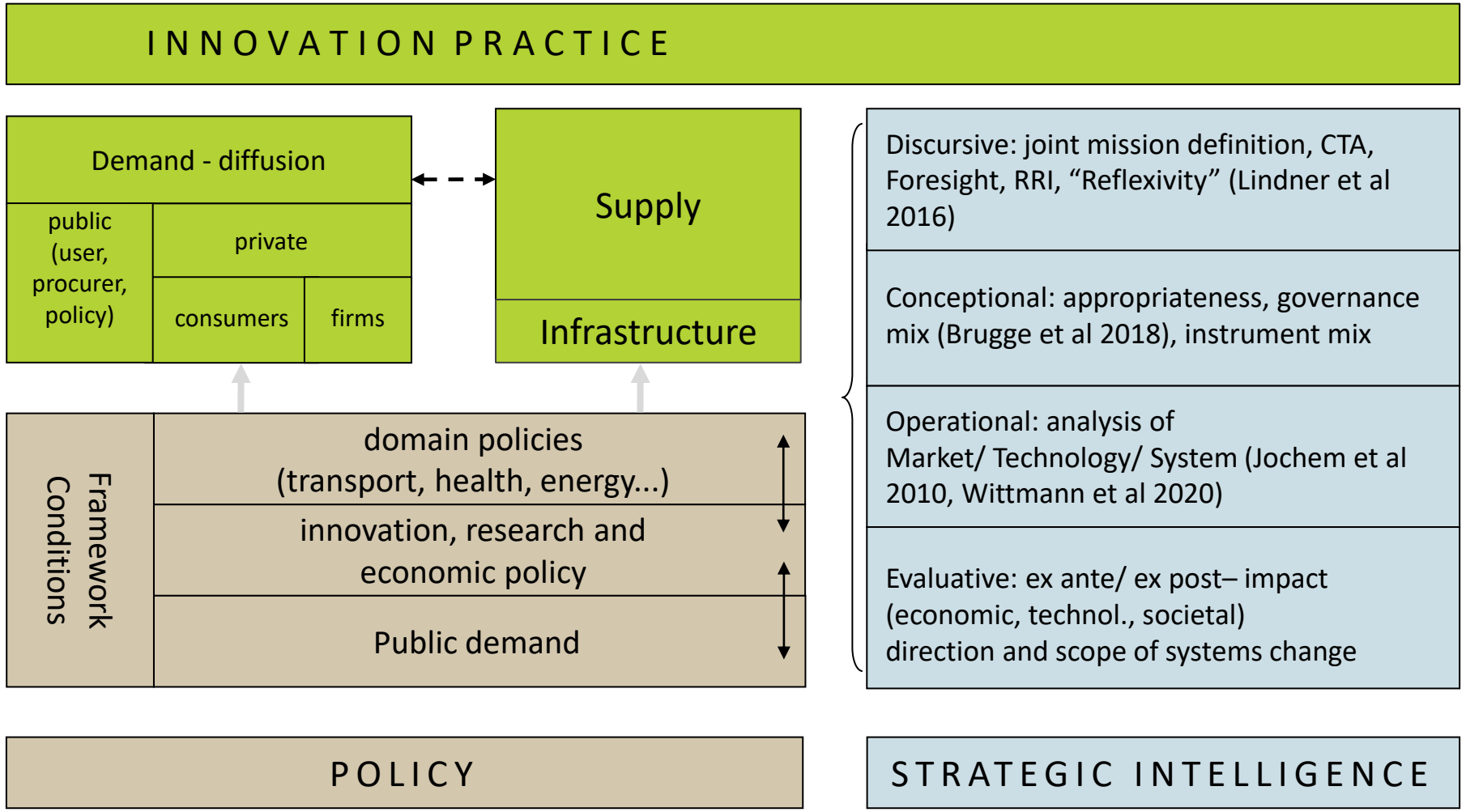
3. “New” Challenges for the State

Successful mission-oriented innovation policy



Lindner, Ralf; et al. (2021)

Holistic strategic intelligence



Conclusion

Guiding principles for mission-oriented policy

Missions are not to be confused with societal challenges, but rather represent a step in specification based on specific problems.

Missions require thinking in the context of problems, not in the context of existing policy instruments and strategies.

Coordinated mix of instruments: research funding, regulation, public procurement, investment, social innovation, etc.

Last but not least

Good intentions everywhere - but: numerous institutional and cultural obstacles

Persistent overestimation of coordination capacity: silo thinking and departmental egoism

Governance and steering mechanisms need to be seriously and fundamentally reformed.

Understand transformation not only as an innovation policy, but as a cross-sectoral, systemic process.

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Many Thanks!

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