New problem orientation in STI policies:

Three governance challenges

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STI policies targeting societal challenges on the rise

Examples of high-level strategies

Health and Care; Sustainability; Mobility; Urban and Rural Areas, Safety and Security; Economy and work 4.0; Germany.

Healthcare, competitive industries, sustainable attractive cities, information society. Sweden (2011)

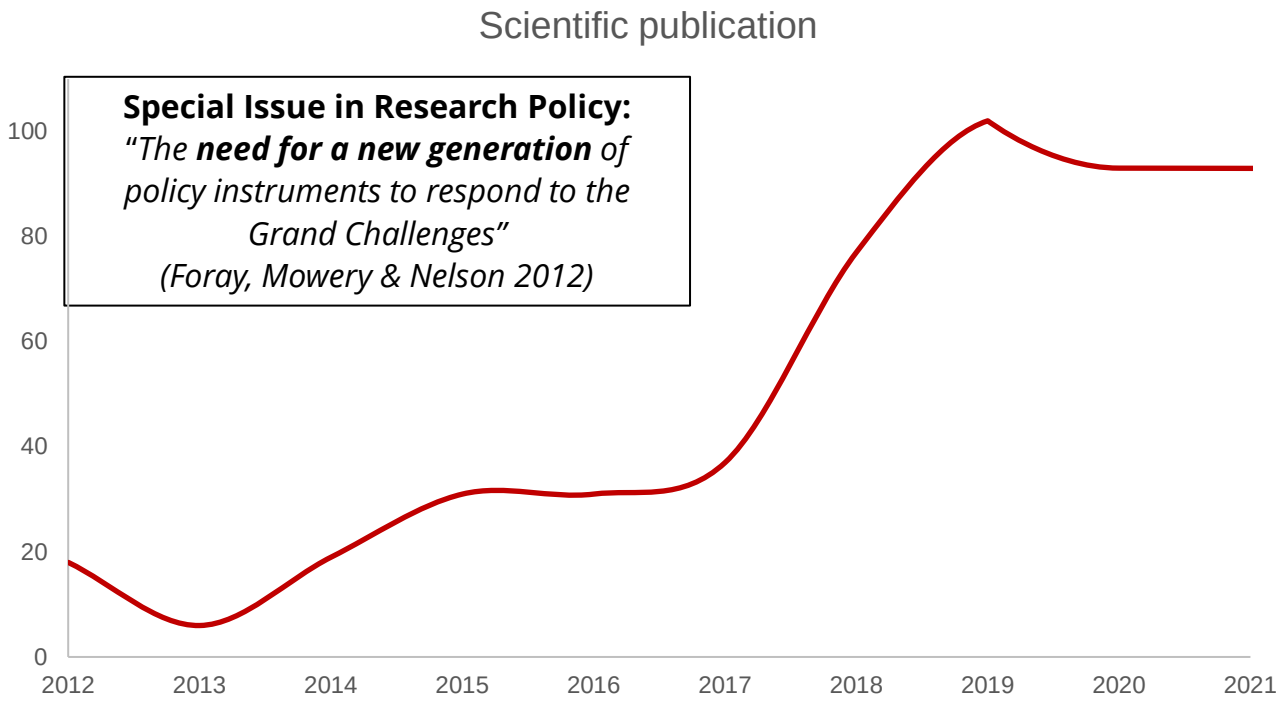
Societal challenge Pillar incl. Health; Food; Security; Transport; Environment, etc. (EU 2014 – 2020)

Mission areas: cancer, adaptation to climate change, healthy oceans, seas coastal and inland waters, climate-neutral and smart cities, soil health and food. EU (2021)

UK industrial strategy challenge fund - Artificial intelligence and data, Clean growth, Future of mobility; Ageing society

25 missions in energy transition & sustainability; agriculture; water & food; health & care and security. (The Netherlands, 2019)

A new generation of STI policies?



Web of Science Records: Mission oriented innovation, transformative innovation policy, or challenge oriented innovation policy, since 2012

A 'new generation' of STI policy

- challenge-driven innovation policy
- mission-oriented innovation policy
- transformative innovation policy

(a.o.) Mowery et al. 2012; Weber & Rohracher 2012; Edler and Boon 2018; Kuhlmann & Rip 2018; Mazzucato 2018; Schot & Steinmueller 2018

A new generation: What is new?

STI policy 'with a purpose'

tackle 'grand challenges' of current society

beyond novelty creation, tech strength or competitiveness

societal concerns outside the 'STI domain'

Goal-oriented STI policy

quality of innovation is important to progress

beyond the rate of innovation

goals not based on specific problems or specific solutions

Transformative STI policy

societal change as target not outcome of innovation

moving target

systemic, open-ended and fuzzy by nature

policy not only shapes but is part of transformation

Societal problem orientation calls for more emphasis on the <u>process</u> not only the outcome of policy

Governance of societal change

'… the way in which societal and state actors intentionally interact […], by regulating issues of societal concern, defining the processes and direction of how technological artefacts and innovations are produced, and shaping how these are introduced, absorbed, diffused and used within society and economy' (Borrás and Edler 2014: 14).

Borrás S., Edler J. (2014) 'Introduction on Governance, Systems and Change.' In: Borrás, S. and Edler, J. (eds.) *The Governance of Socio-Technical Systems: Explaining Change* , Edward Elgar Publishing: Cheltenham, Northampton.

Widening scope: Three governance challenges of a societal problem orientation

I. Taking an active role – tackling a collective matter

II. Setting direction – for which problem(s), for which solution(s)?

III. (Re-)defining problem scale and scope – which actors, at which levels?

I. Expectations on STI policy. Taking an active role in ....

facilitating interaction of a ***variety of actors***

- Innovation users and producers, including the public sector
- Beyond science & technology; and beyond R&D, industry and firm innovation

the diffusion and integration of a ***variety of solution types***

- New technologies in combination with behavioural and institutional change
- Novelty creation and societal diffusion are equally necessary

stimulating ***dynamics to transform*** systems

- Beyond optimizing existing socio-technical structures – transformational failures
- Novel configurations of actors, institutions and practices in producing and consuming societal core functions

starting from a ***societal problem, issue or goal***, not a solution

- Policy aimed at latent needs or societal demand
- Nature of problem is ill-structured and systemic, no clear target per se

variety of actors

variety of solution types

dynamics to transform

societal problem orientation

Active role of STI policy …

- in supporting interaction in new actor arrangements
- and facilitating experimentation & co-creation
- for the production and diffusion of system-level innovation
- by providing directionality for innovation

… to tackle a collective matter of concern that is not yet defined or definable.

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II. Setting direction –

for which problem(s),
for which solution(s)?

Societal problems and STI policy. Setting direction for ‘wicked problems’

Wicked problems are ill-defined and unstructured, with potentially very different ideas about the underlying **problem** and the **solution**

Societal problems show different problem-solution structures

Contestation - What is the problem?
What is ‘the best’ solution?

Complexity - Who is responsible for (solving) the problem?

Uncertainty - What are feasible and effective solutions?
What is the consequence of (no) action?

Wanzenböck, I., Wesseling, J.H., Frenken, K., Hekkert, M.P., Weber, K.M., 2020. A framework for mission-oriented innovation policy: Alternative pathways through the problem–solution space. Science and Public Policy 47(4), 474-489.

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Problem-oriented governance starts with problem framing

The questions we ask shape the answers we get
(Rein and Schön, 1977)

OR:
The problems we address shape the solutions we are searching for (?)
The 'missions' we formulate shape the innovations we get (?)

Policy targets are the result of framing processes (Rein and Schön 1994)

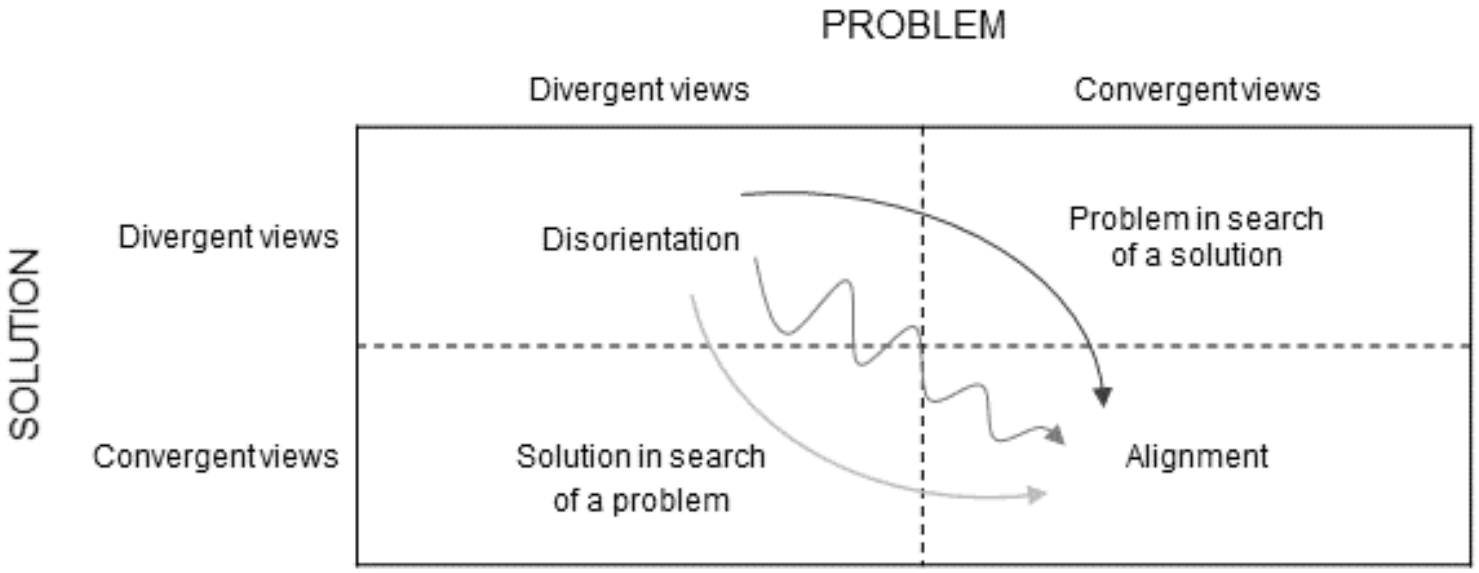
Framing defines

- what counts and what does not (expertise, knowledge, solutions, effects/side-effects, …)
- who will be included or excluded (agenda setting, as potential solution producers or innovation user, …)

By taking societal challenges or specific solutions for granted, risks to neglect the politics in the process of

- identifying specific problems or solutions as matters of concern (Flanagan et al. 2021)
- imposing meaning (interpretation) upon them
- making selection and choices in formulating and implementing priorities ('missions')

Providing directionality is a process …



Wanzenböck et al. 2020

Examples:
Problem driven pathway – smoking bans
Solution-driven pathway – CCTV
Hybrid pathway – wind energy

Problem-oriented STI policy making is more than setting goals or targets ('missions')

It is a *process* of learning about 'the degree of wickedness' at both the problem *and* solution side

with the aim to ultimately achieve some form of coordinated action and societal legitimacy of both problems and innovative solutions

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III. (Re-)defining scale and scope

– which actors, at which levels?

Should we aim ‘big’?

The societal purpose of STI policies is contextual

Challenges and problems perceived differently across space

Potentially high disagreement - high normativity in sustainable transitions - just transitions

Diverging interests (economy vs. environment) depending on local conditions and influences

‘Geography of problems’? (Flanagan et al. 2021)

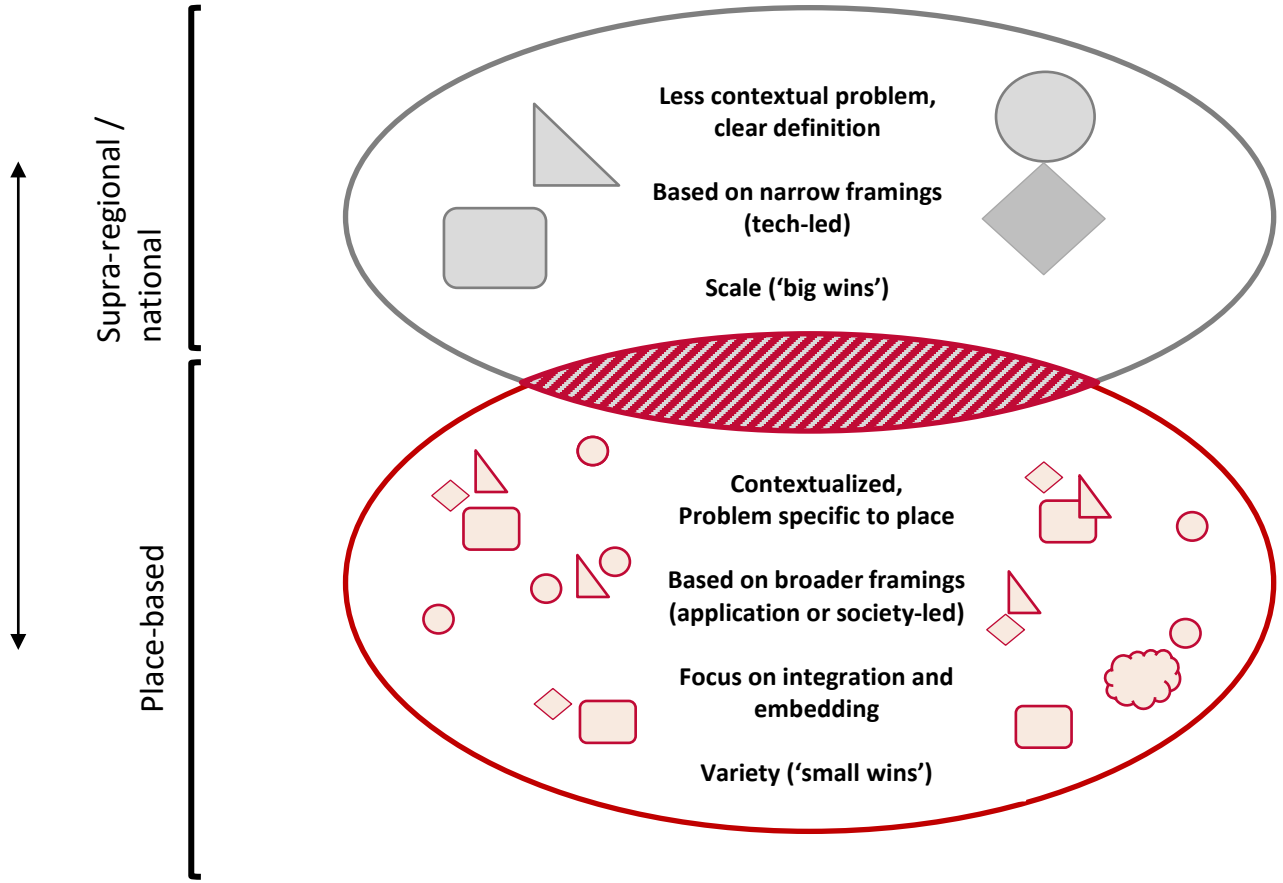
Labels of being ‘big’, ‘grand’ or ‘global’ misleading as policy rationale?

Multi-scalarity: Opportunities of scaling up and down problems – societal problems of different granularity

How do different scales interact?

Governing ‘grand’ societal challenges from a multi-level perspective

How to generate synergies between variety and scale?



Benefitting from **scale**; Avoiding duplication
(in investment, search paths, etc.) by **coordinated action**

Limits to meaningful **participation**; expert-based priority setting;

Examples:
Scientific advancement – inter-national collaboration

Regulatory measures (environmental, etc.)

Opportunities to include **multiple actors** ‘on the ground’

Co-creating local **need and demand: Experimental settings**

Requires **institutional capacities**
Barriers to **scaling**

Example:
Urban initiatives to integrate technology, institutional & social innovations
(health, climate-circular economy, mobility, energy, etc.)

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

Widening scope: Policy implementation in a multi-level and multi-actor context

Societal problems as coordination device?

- vertically and horizontally - new forms of interaction
- limits and resistances: power relationships, interests and coordination costs

Room for organizational learning

- step-wise and experimental, collecting experience
- new modes of learning, funding schemes, or evaluation routines
- role of actors and coalitions, mobilizing allies

New tensions emerging in the public sector

- high-level political legitimacy vs. real problem understanding
- long-term goals vs. policy cycles (uncertainty about resources, etc.)

Three ways forward

Establish an empirical knowledge base
on societal problem-oriented STI policies
and policies not labelled as such

In-depth analysis of policy processes

Understanding the potential and limitations
of multi-actor and multi-level arrangements

Thank you!

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