



Legitimation and effects of mission-oriented innovation policy: A spillover perspective

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Introduction

- R&D policy is commonly legitimized by the existence of spillover externalities
- R&D policy and STI policies are evolving into 'mission-oriented innovation policy' (**MIP**)
- MIP is systemic, cumulative and directional
- MIP involves firms in collective transformations

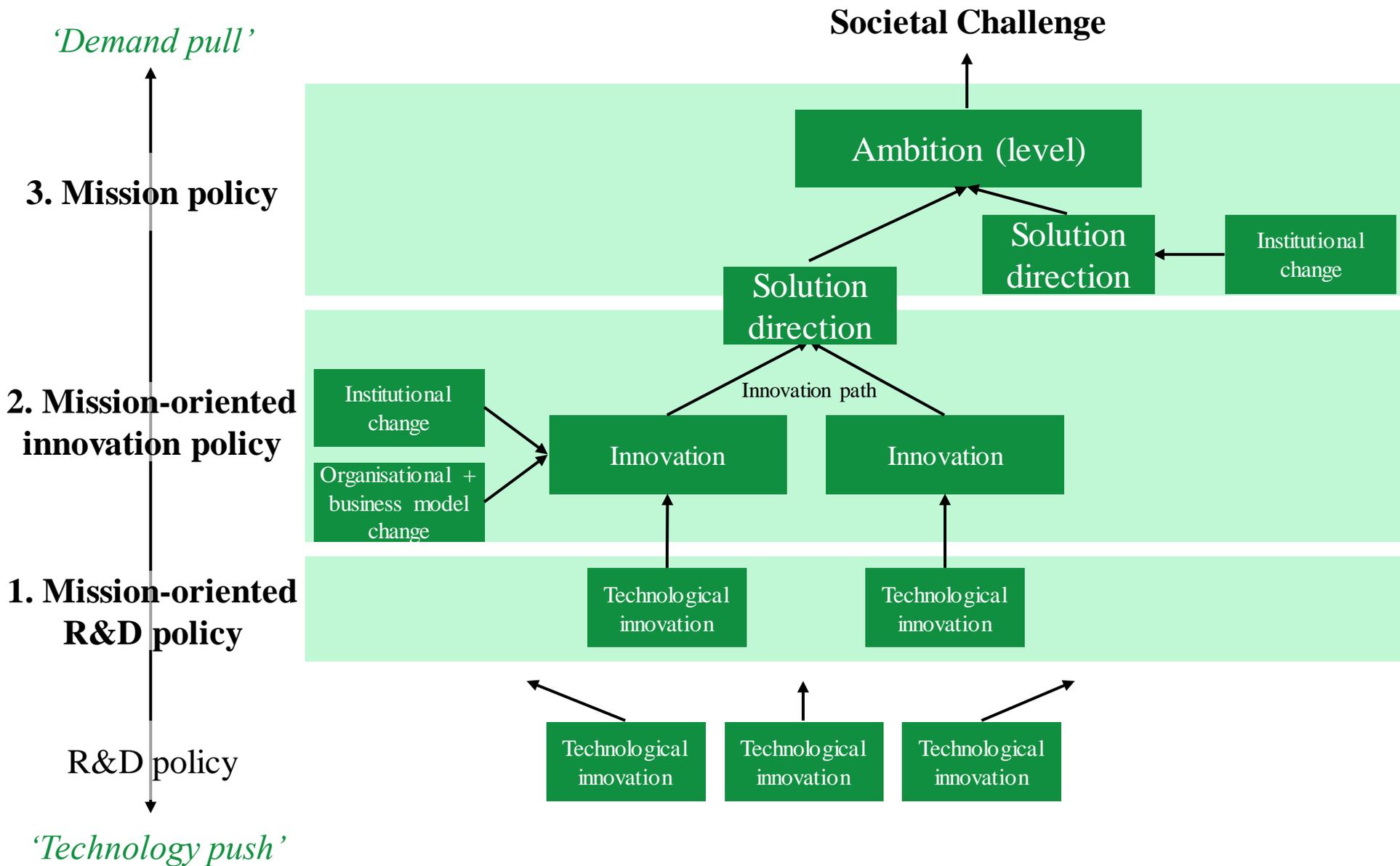
What spillover externalities may we expect?

Emerging mission-oriented policies

Overall outlines of 'the rise of MIP policy':
(Mazzucato, 2018; Schot & Steinmueller, 2018; Foray, 2019, ...)

- Evolution from generic to specific policy
- Targeted at 'grand societal challenges'
- Innovation as one part of the solution
- Policy for socio-economic transformation
- "Systemic, preferential, experimental, adaptive"

Which MIP types (steps and their key features)?



	R&D policy	Mission-oriented R&D policy	Mission-oriented innovation policy	Mission-oriented policy
<i>Objective / Policy priority</i>	Boost innovative economic activity	Boost innovative economic activity with wider societal impact	Spur complementary innovative solutions to societal problems	Search solutions, with or without innovative market parties
<i>Rationale</i>	Market failures	Same, especially coordination failures. + System failures (NIS)	System failures (TIS) / directional failures / etc.	Transition failures
<i>Mechanism</i>	Push: Generic innovation policy	Push: Targeted innovation policy	Push-Pull: Demand-driven innovation policy / programs	Disentangle challenges into underlying problems
<i>Transformation focus</i>	Knowledge creation	Novelty creation	Novelty implementation + institutional change	Institutional change
<i>Responsibility</i>	Industry (<i>or</i> science; not both)	Industry-science complex	Triple helix coordination	Policy makers + citizens + societal parties
<i>Governance</i>	Via policy execution agency	Priority setting (Top-down, <i>or</i> bottom-up)	Facilitate collective roadmap development ("top-down-bottom-up")	Wicked = organize debate; Non-wicked = Project mgmt., procurement
<i>Suitable instruments</i>	Tax credits	Norms, subsidies, vouchers	Purchasing (PPI), regulation, spurring broad interaction	Public discourse, nudging, prizes, contests
<i>Monitoring</i>	R&D expenditure, patent rate, etc.	Do R&D and innovation efforts follow priorities?	Are regime pressures converging and cumulating?	Are we reaching the actual goals?
<i>Challenges</i>	Trickling down of knowledge production	Accumulation of inventions	Conflicting solution paths, market distortion	Identifying urgent + manageable problem
<i>Examples (NL)</i>	<i>WBSO, Patent box</i>	<i>Valorisation grant, Topsector policy</i>	<i>Catalytic SBIR, Launching customership</i>	<i>Direct SBIR, National science agenda</i>



Spillovers as a policy rationale

- Spillovers = innovation-based value benefitting other parties, without full compensation
- Innovation *externalities* (Breschi & Lissoni, 2001): not just unintended, but incomplete appropriation
- Implication: private returns below social returns
- Policy for *internalizing* externalities: e.g. via protection (IP) and/or compensation (subsidies)
- From an innovation systems and industrial policy perspective: policy for *augmenting* spillovers.

But which ones?



Different types of spillovers

Rent spillovers (Grilliches, 1992)

- Innovation-induced value not fully charged in prices (“customer surplus not entirely captured”)
- Inherent uncertainty of innovation obscures how customers will use it → Exaptation

Policy response targeted at strong competition, asymmetric information, transaction costs, etc.



Different types of spillovers

Business stealing (Bloom et al., 2013)

- Firms using their innovation to capture a disproportional large share of the market.
- The R&D investor appropriates more than it creates; it is a *negative spillover* (good for the firm, bad for society)

Policy response: competition law



Different types of spillovers

Knowledge spillovers (Hall et al., 2009; Aghion & Jaravel)

- ‘Technical’ knowledge (stemming from e.g. research, production, usage) informing others on how to do something. *Codified* or *tacit*.
- *Public good* nature if not protected → Imitation
- Leakage of knowledge can cause positive or negative *product rivalry effect* (Bloom et al., 2013)

Policy response targeted at protection and compensation

Different types of spillovers

Absorption externalities (Bye et al., 2011)

- Unaccounted improvements in *absorptive capacity*
→ Enhanced ability to receive and use spillovers
(Cohen and Levinthal, 1989)

Network trust

- Unaccounted improvements in reputation and partnership possibilities

Policy response: capacity + system building



Different types of spillovers

Information externalities (Hausmann & Rodrik, 2002)

- 'Commercial' knowledge informing others on the existence of some unfulfilled demand.
- Typically the result of self-discovery processes.
- *Public good* nature → Imitation ('crowding in')

Policy response: *new industrial policy* driving bottom-up entrepreneurial experimentation (Rodrik, 2004)

- Also: green industrial policy (Rodrik, 2014)



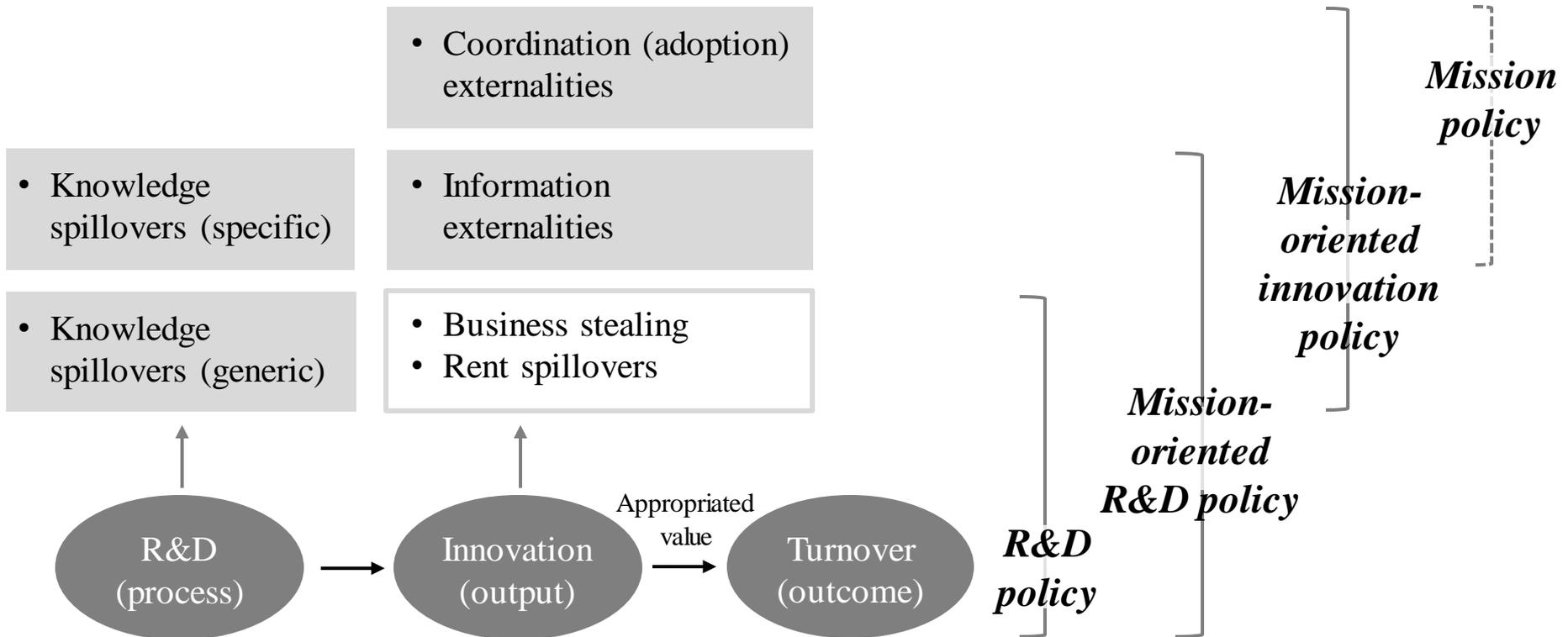
Different types of spillovers

Coordination externalities (Rodrik, 2004)

- Collective benefits due to *complementarities* between innovation activities (private & public)
 - Regime pressures, infrastructure, regulation, etc.
- Firms yield more than they can appropriate; (selfish?) contributions to niche development
→ system transformation as a *club good*.
 - Similar to 'supply-side' network externalities, or adoption externalities (Arthur, 1983; Foray, 2019)

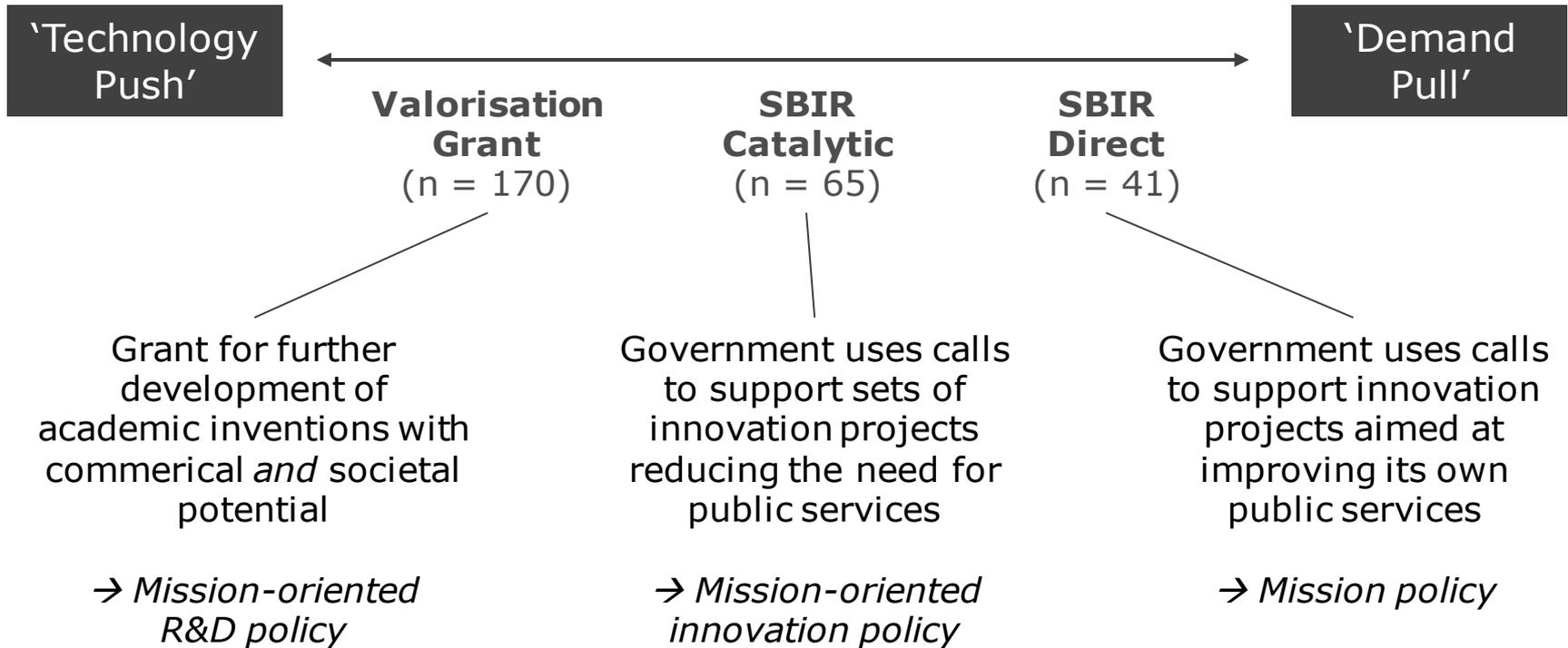
Policy response: transformative innovation policy
(Weber & Rohracher, 2012; Schot & Steinmueller, 2018)

An integrated spillover framework



Empirical illustration (case study)

How are the various spillover types dealt with?



Appendix of this presentation



Discussion

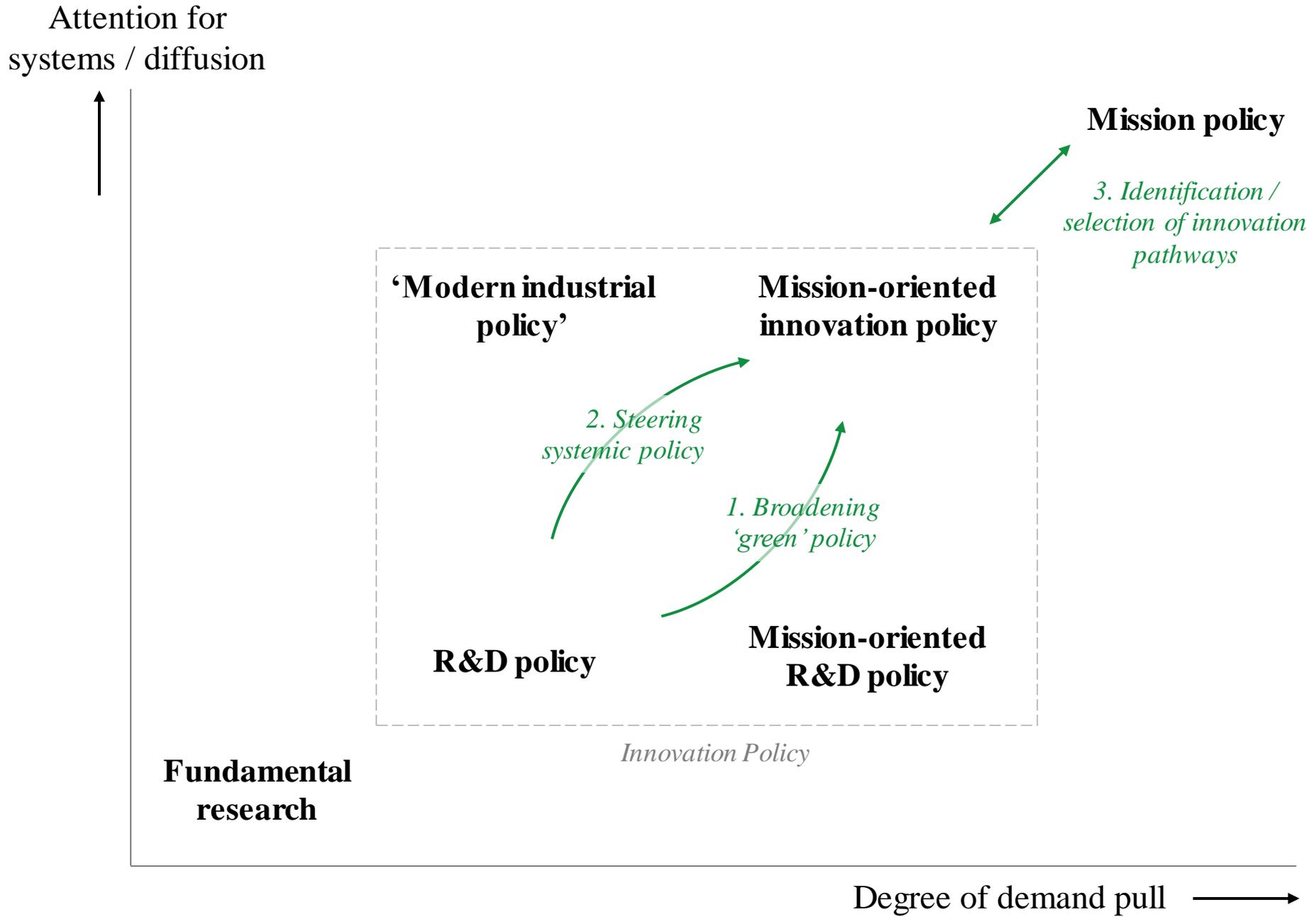
(In)consistencies rationale vs. spillovers

- Mission-oriented R&D: mostly new knowledge
- M-o innovation policy: transformative effects
- Solution policy: just incidental ('local') adoption?
→ Solution-focus can hamper scaling up?
MIP-related policy myopia
- New positioning expects even more transformation, without policy changes
→ *MIP-related policy drift*

Discussion

The relation between MIP approaches

- Evolution of innovation policies
 - From R&D policy to mission-oriented innovation programs, or 'working back' from solution-oriented policy?
- Extension of innovation policies
 - Complementarities in the policy mix?





Conclusions

- Parallel literatures on MIP and spillovers.
Spillovers matter when MIP involves markets.
- STI policies evolving into MIP correspond with
broader range of relevant spillover types
- Case study: not evident that new policies address and monitor the appropriate set of spillovers, fitting their rationale
→ *MIP policy myopia & MIP policy drift*
- Further research: Combination of MIP types?
 - Also: measurement of (neglected) spillovers

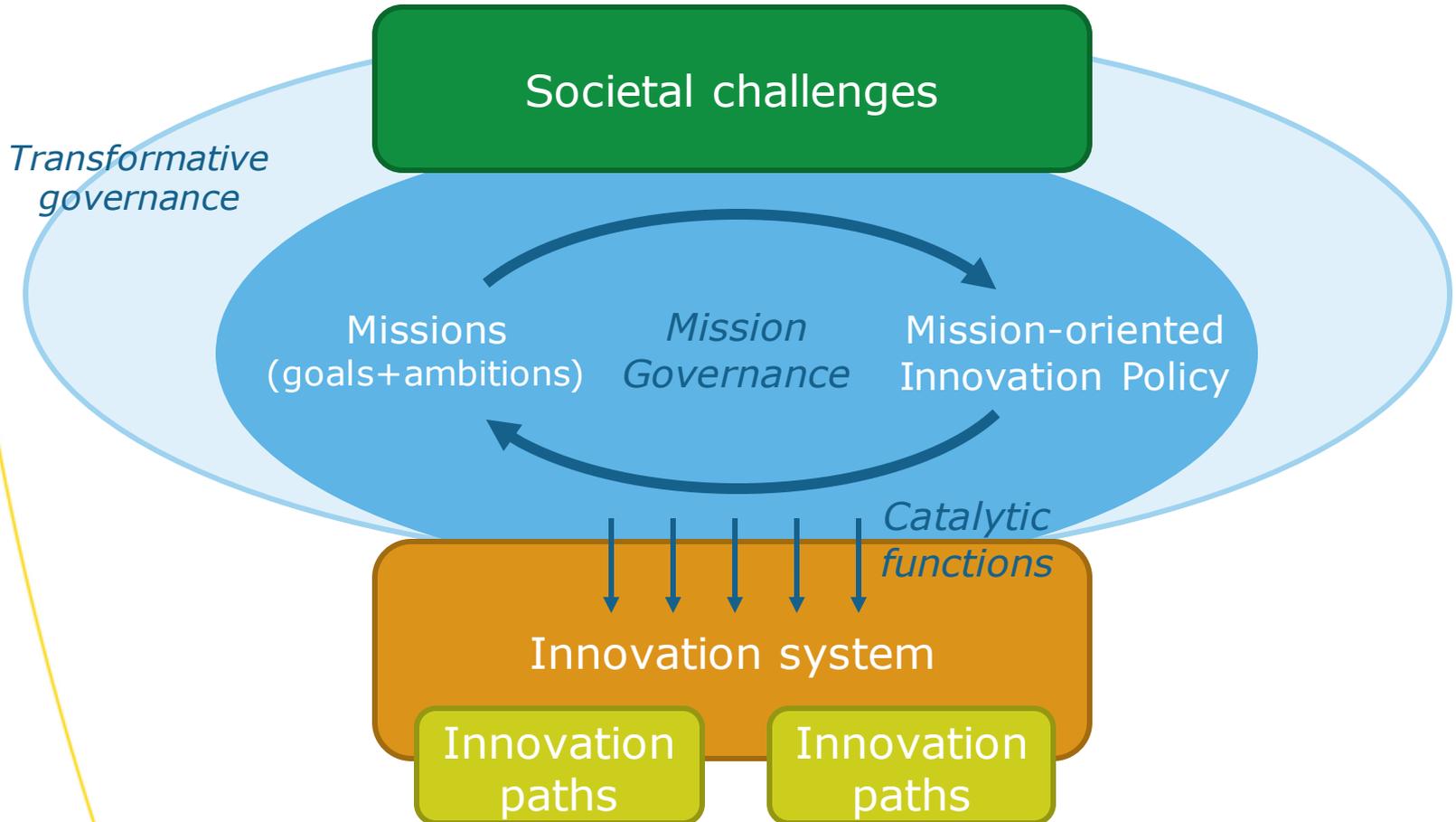


Thank you!

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Mission-oriented Innovation Policy Observatory



Empirical illustration

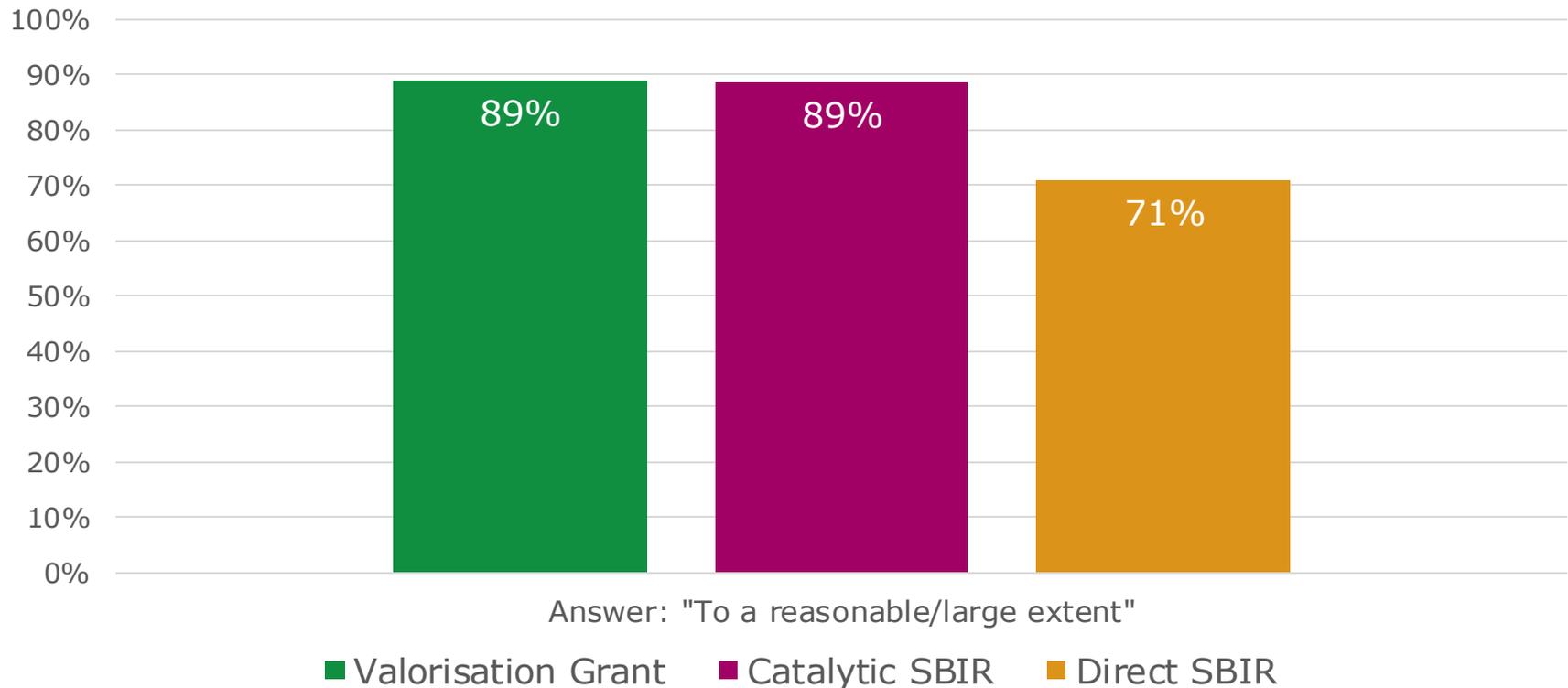
How are the various spillover types dealt with?

Case study: Dutch SBIR schemes

- *Valorisation Grant*
- Public Procurement of Innovation (PPI)
 - *Catalytic SBIR*
 - *Direct SBIR*
- >20 interviews
- 267 survey responses

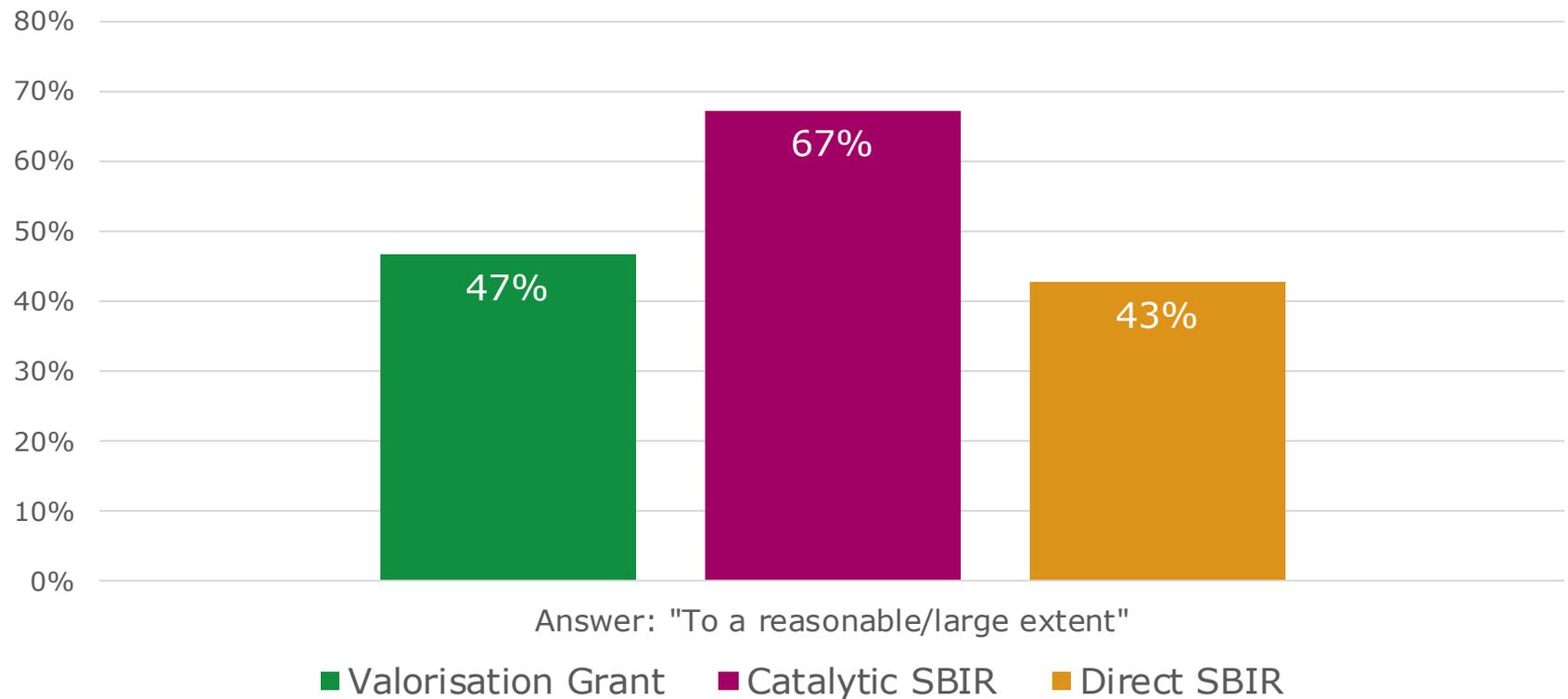
Empirical illustration: spillovers

To what extent do you regard your project as an experiment at the frontier of a broader innovation path?



Empirical illustration: spillovers

Do other parties already provide products/services based on your project?



Empirical illustration: spillovers

Contributions to innovation development/adoption
(Answer: "To a reasonable/large extent")

