Six years of Strategic Innovation Programmes: What have we learnt?

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Presentation outline

- Background
- Impacts on competitiveness
- Tackling transitions
- Take-aways

Background

New policy context

- Growing concern about ‘wicked’ and sometimes existential problems, since about 2000
- Crystalised as ‘societal challenges’ during the ‘noughties’
  - Aho Report 2006
  - Lund Declaration 2009
  - Eventually incorporated into EU Horizon Europe framework programme
- Sustainable Development Goals (2015), UN Agenda 2030
- Essentially shifting the focus of policy from industrial growth towards sustainability …
- … and from supply-driven innovation to systems innovation

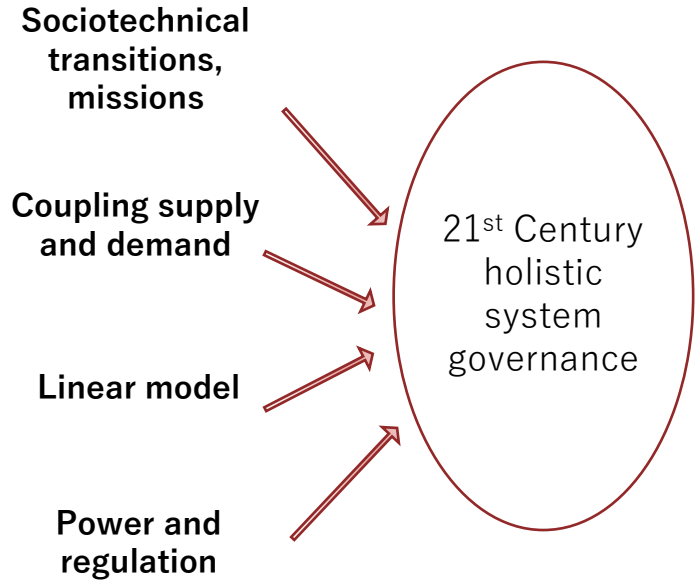
The new policy challenge – integrating transitions into research & innovation governance

3rd generation — ‘Societal challenges’ Sustainable Development Goals

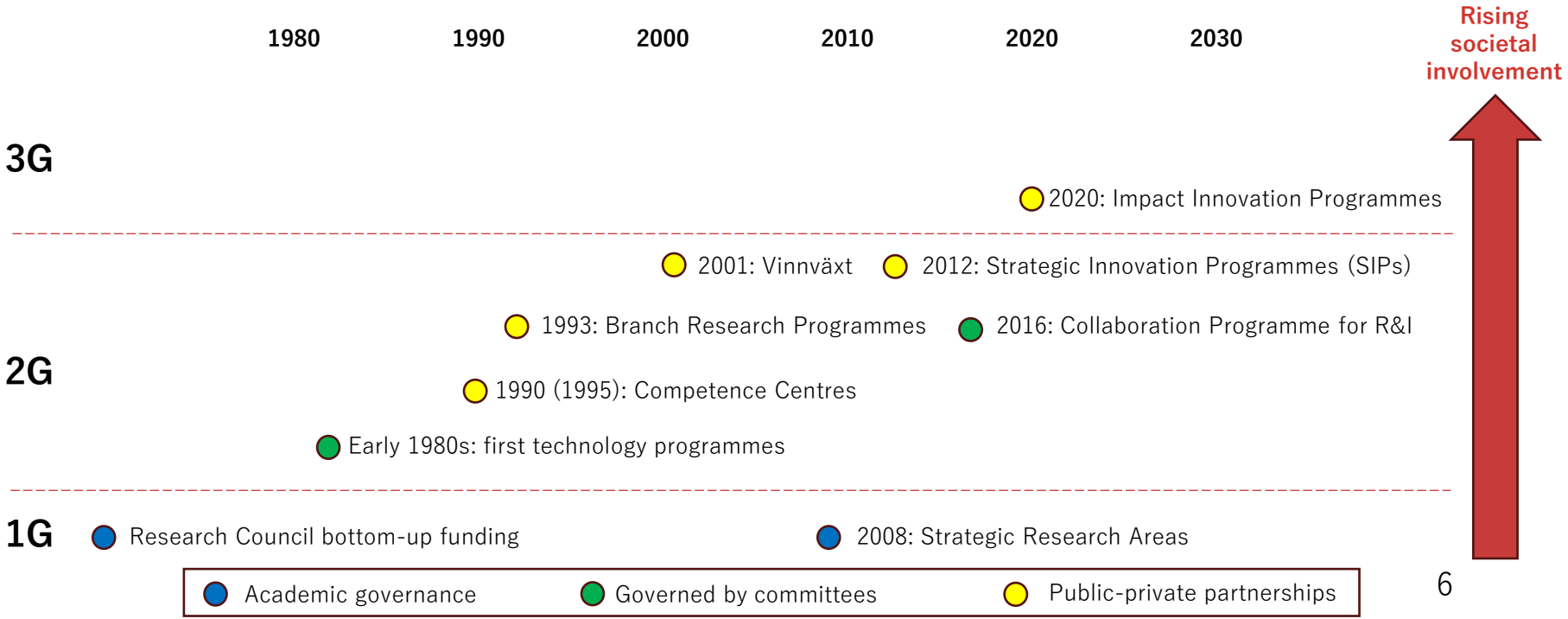
2nd generation — OECD – ‘science policy’ Co-creation, innovation systems

1st generation — Science the Endless Frontier Governance by the scientific community

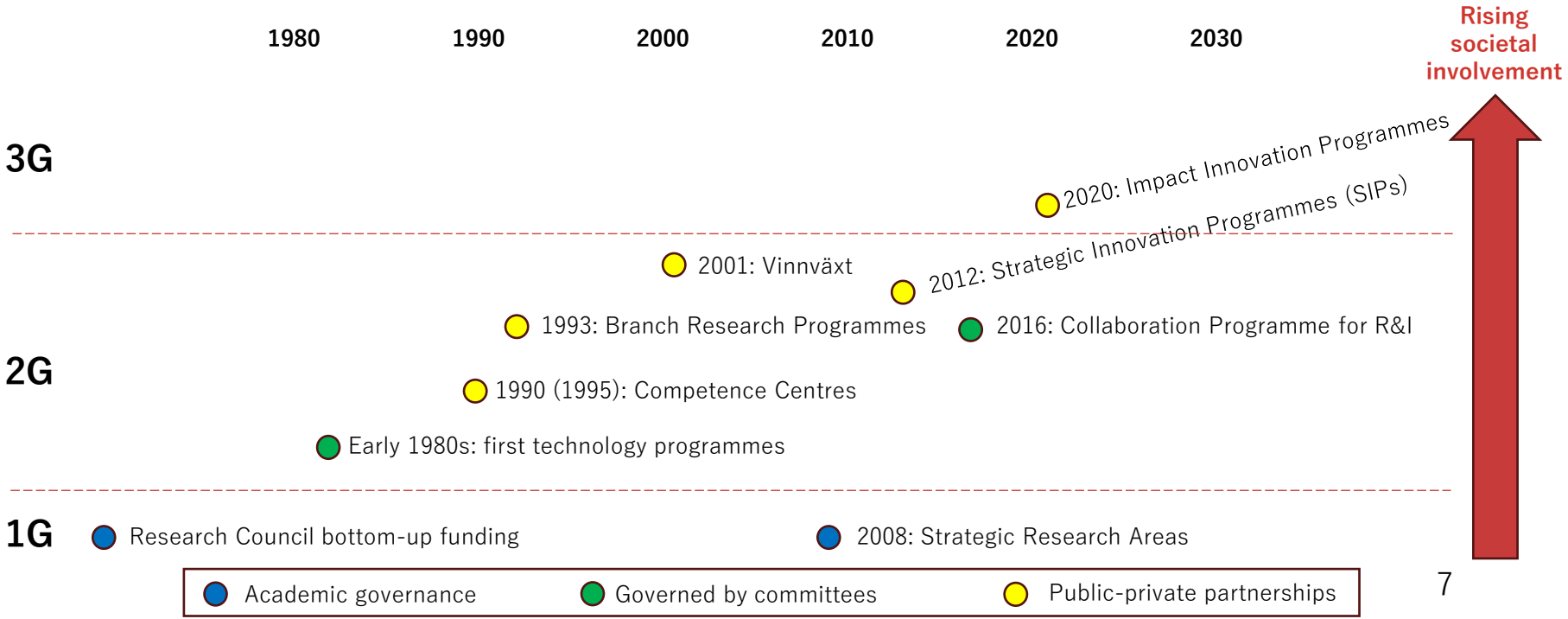
Government — Science in the service of government Government labs



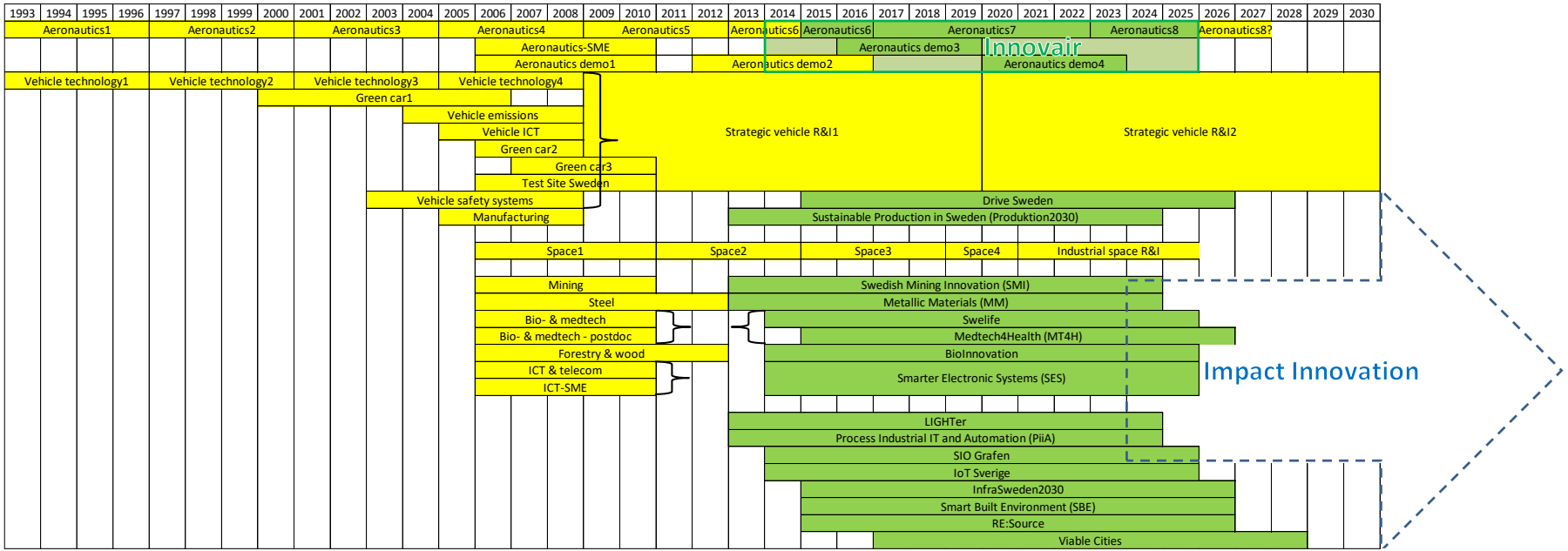
How some major Swedish programmes map onto the generations



(Or perhaps like this?)



Branch Research Programme heritage



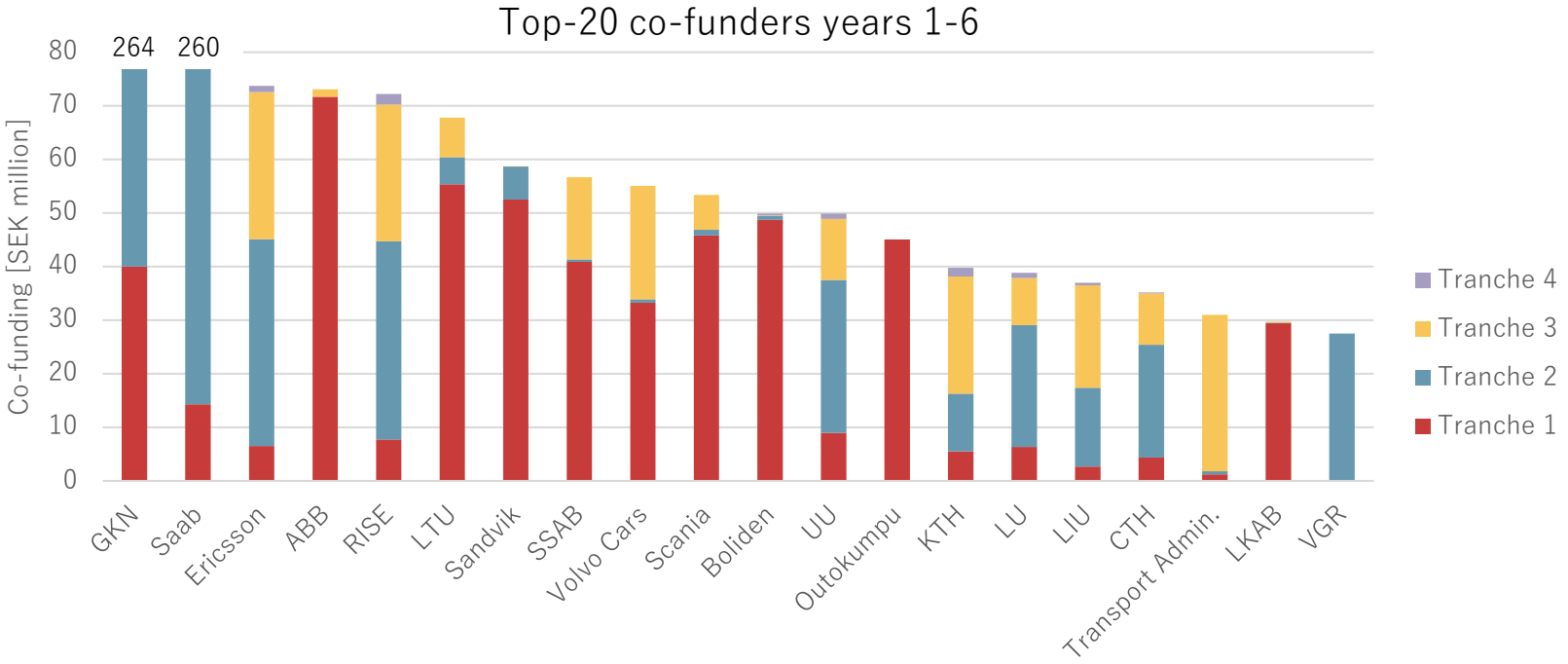
Novelties of the SIP initiative

- Support to the entire sequence from research to implementation by focusing on user needs
- Implementation of Strategic Innovation Agenda delegated to public-private partnerships
- Open to any actor
- Long-term funding
- Overarching objectives: increase competitiveness and support sustainable development; attention to societal challenges added in hindsight

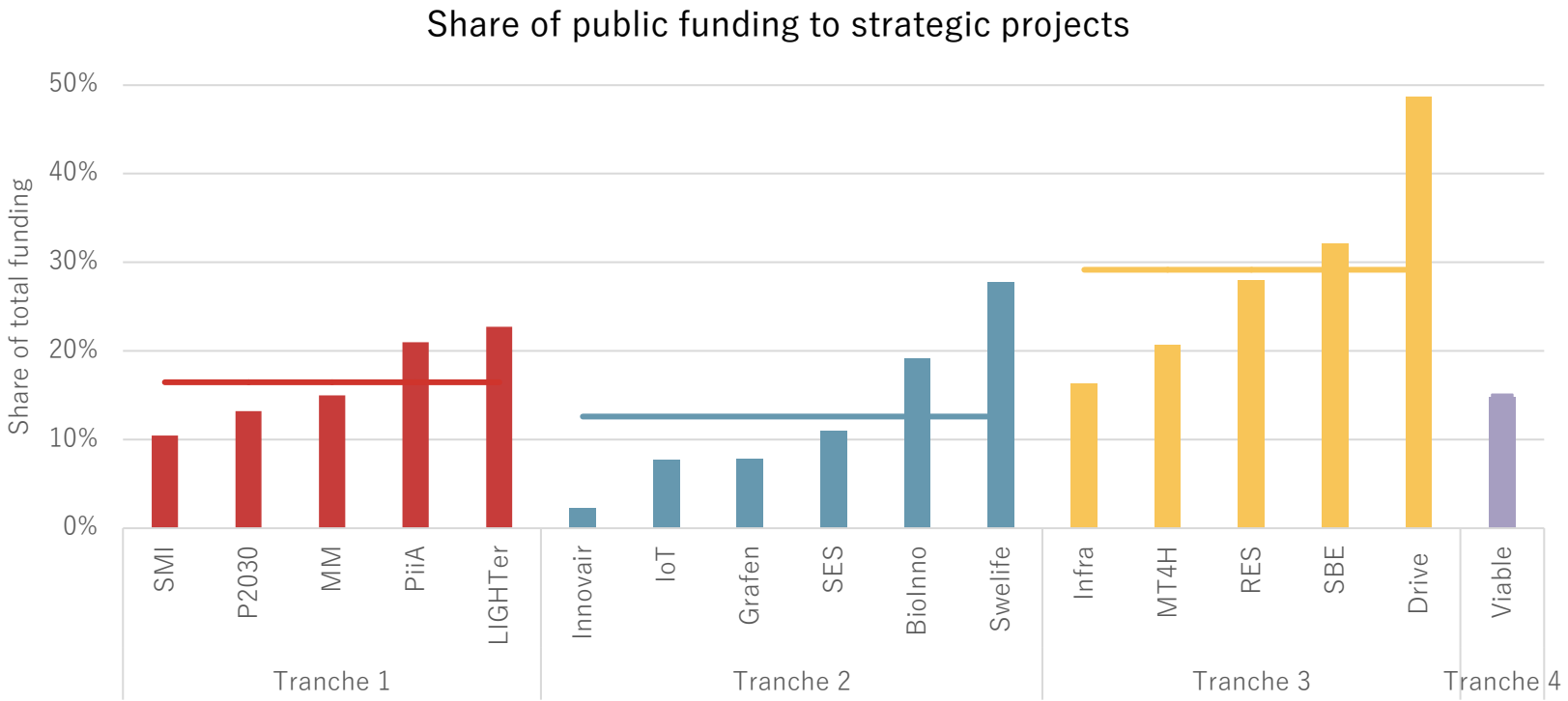
The 17 SIPs

- Clear focus on industry needs in the first tranche; public-sector needs gradually emerged in subsequent tranches
- Total budget SEK16b over 12 years, of which:
  - SEK5.9b in public funding through the SIP initiative
  - SEK1.3b in public funding through the Collaboration Programme
  - The remainder co-funding from industry and other societal actors
- Budget implemented through:
  - Competitive calls for R&I projects
  - Strategic projects (negotiated)
  - Coordination and complementary activities
- Six-year evaluations conducted in 2019, 2020, 2021 and 2023

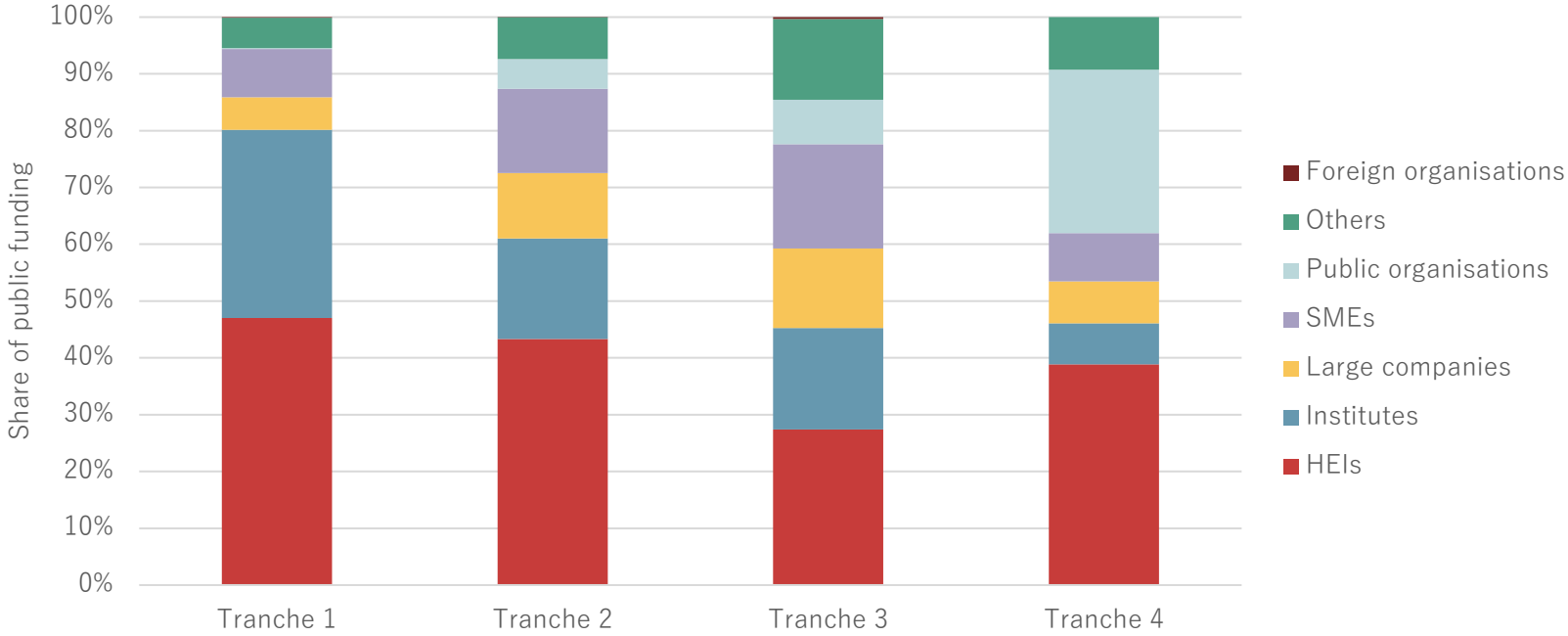
Familiar Swedish organisations dominate co-funding contributions



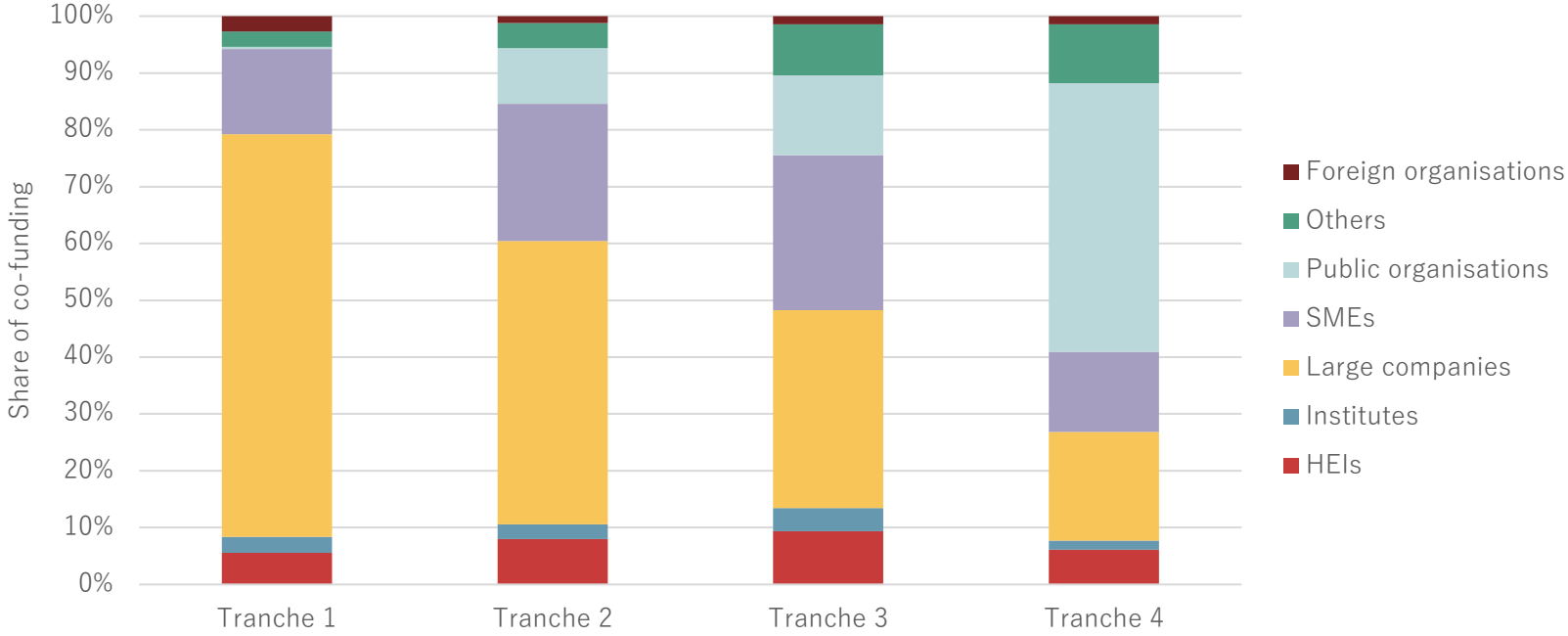
Later SIPs took greater control of the portfolio



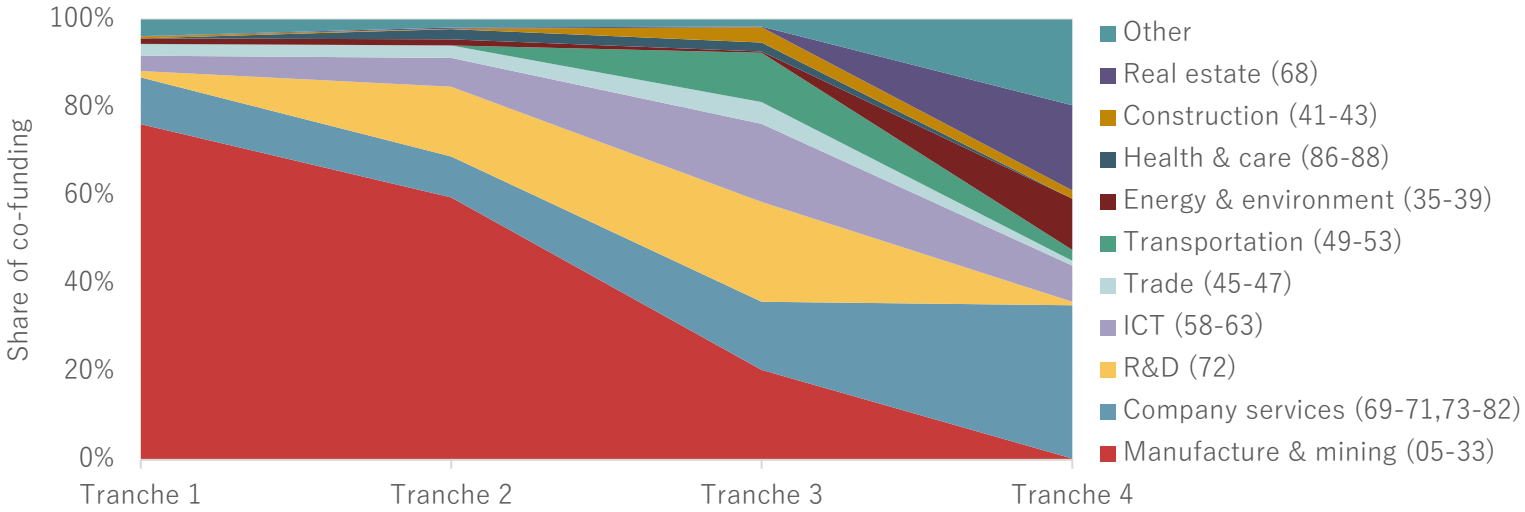
Public funding recipients became more diversified over time



The trend is even clearer for co-funding, with focus shifting from manufacturing to broader society



Source of company co-funding by NACE group



The four largest NACE groups accounted for 88% of total co-funding, which correlates with the same groups doing 90% of Sweden's BERD. They also contributed half (53%) of Sweden's value added.

Impacts on competitiveness

Main impacts of projects

New R&I project with Swedish public funding

Development of demonstrator/prototype

In-house funded follow-on project

More scientific working practices

Improved quality of product/service/process

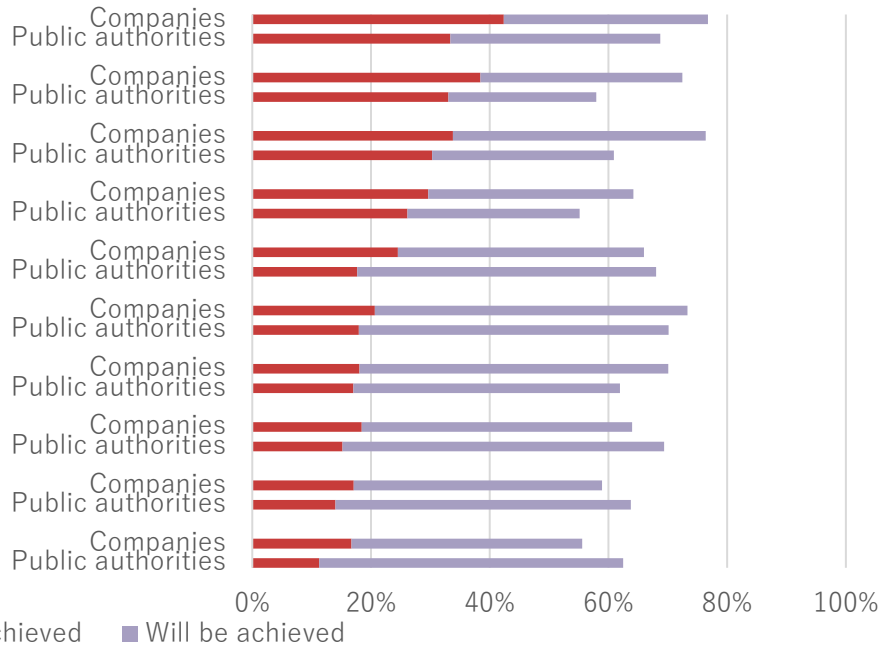
Implementation of new material/technique

Introduction of new product/service/process

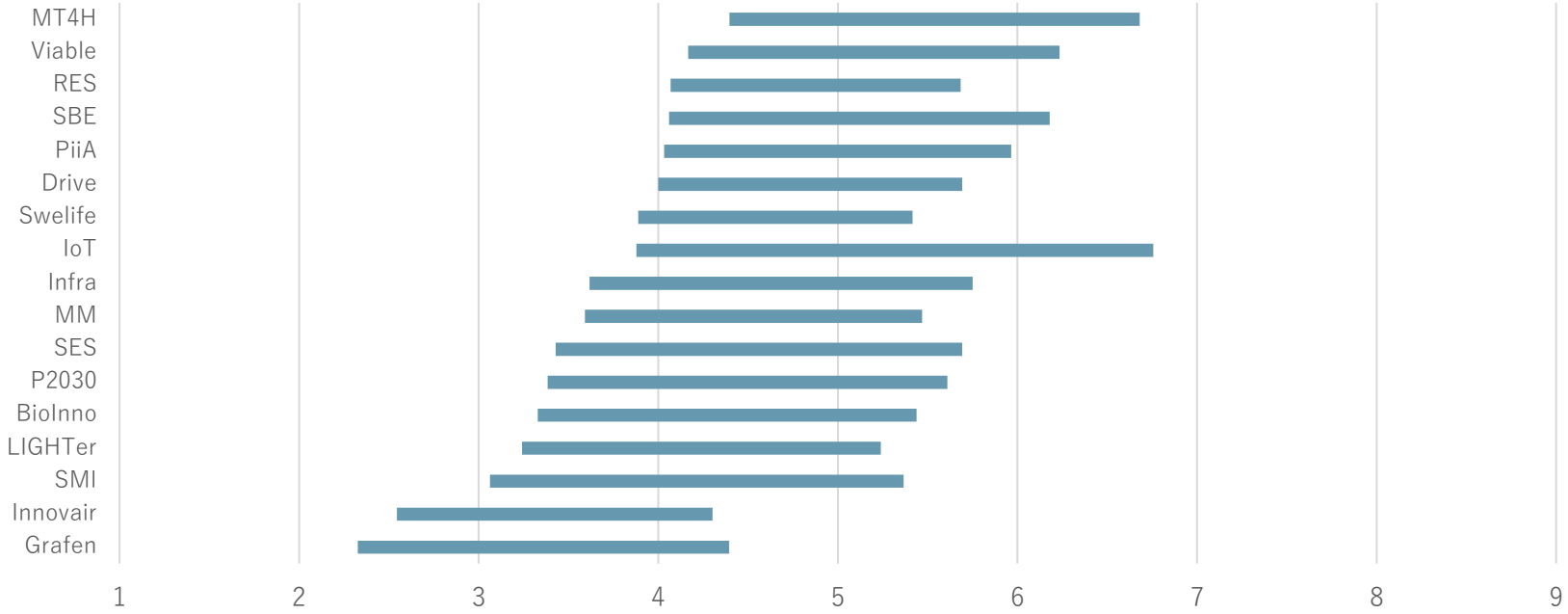
Implementation of new method for prod./serv./proc. dev.

Increased sustainability of prod./serv./proc.

Improvement of method for prod./serv./proc. dev.



TRL advances according to the companies



Industrial and societal impacts

- The SIPs provided platforms for strategic dialogue that resulted in long-term visions based on stakeholder needs; societal objectives became more pronounced over time
- The SIPs have mobilised actors, addressed system-related weaknesses, increased the competitiveness of all types of actors, and offered generous, long-term public funding
- Project results have laid the foundation for positive impacts on the competitiveness of both industry and nation
- Few concrete impacts after 6 years, but high expectations
- Tech transfer between sectors, including beyond SIP networks

Systemic impacts

- Three SIPs developed networks from scratch, the remainder developed theirs, resulting in defragmentation of R&I
- Most relevant Sweden-based actors have participated
- Concentration to incumbents is a feature of the instrument's focus on user needs in combination with competitive calls
- Companies and public authorities have developed more scientific working practices, while R&D performers have adapted theirs better to serve industry and the public sector
- Strategic projects have addressed system-related deficiencies
- The SIPs have contributed to R&I subsystems characterised by wide participation, relevance, quality and efficiency

Additionality

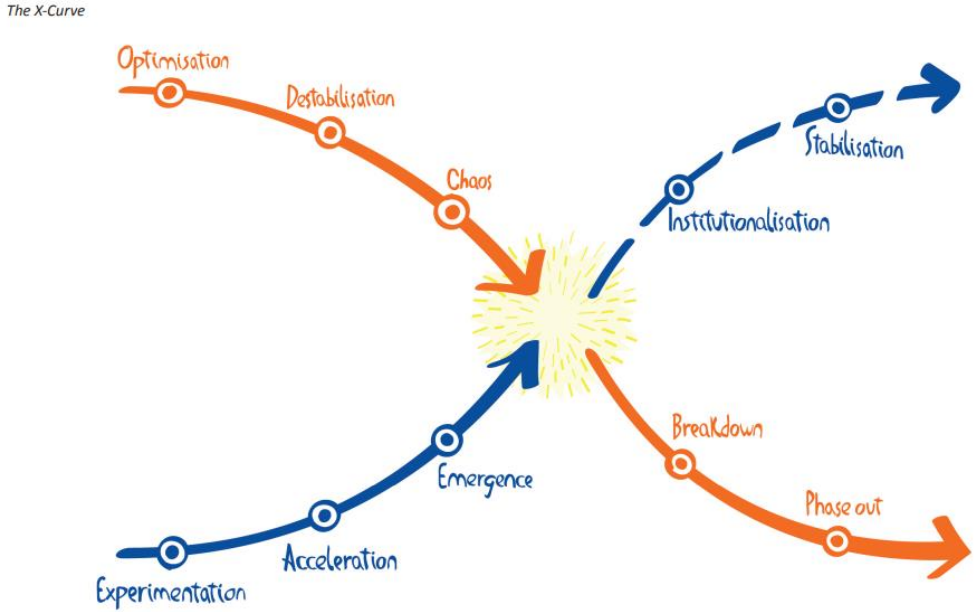
- Many, perhaps most, projects would not have been conducted had they not been funded by the SIP, meaning that co-funding and corresponding activities have increased
- Projects have contributed to outputs that would not otherwise have emerged
- R&D performers have become more competitive and attractive as partners
- The joining of forces has generated synergies that have increased productivity of the innovation system

Additionality compared to Branch Research Programmes

- A scope beyond traditional sectors and including value chains
- A bottom-up focus based on broader user needs
- An openness to any legal entity in Sweden
- A genuine actor engagement due to outsourced management and to the SIPs providing platforms for strategic dialogue
- An opportunity to formulate long-term visions
- An opportunity to use strategic projects to address subsystem needs and deficiencies

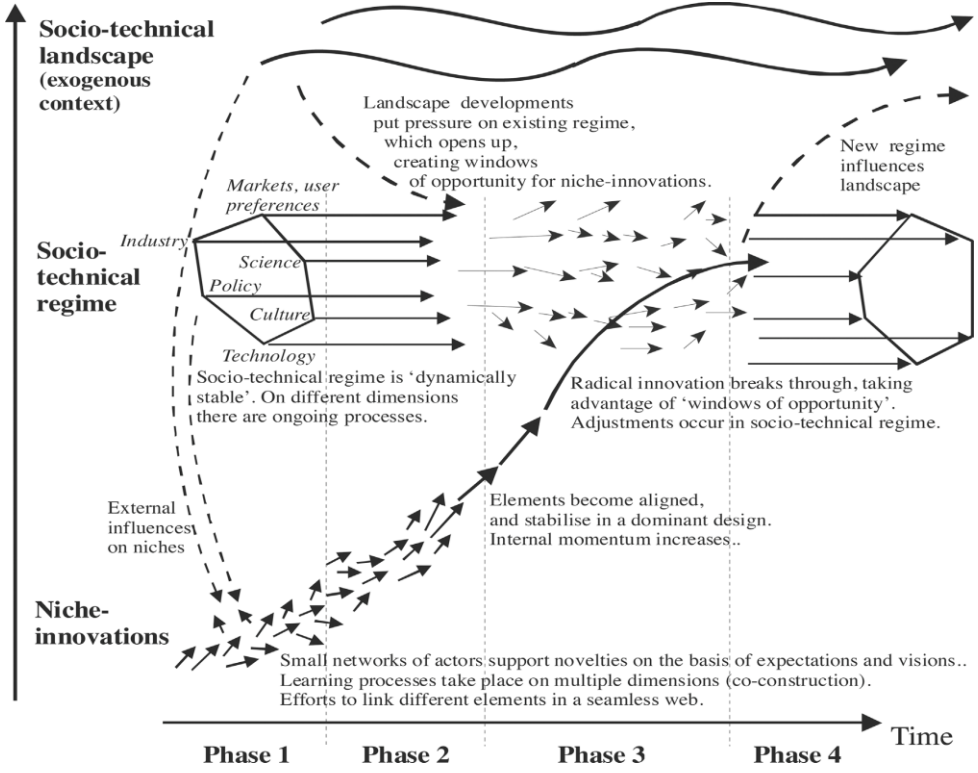
Tackling transitions

The societal challenges goal confronts policy with the need to make transitions



Source: Drift/EIT

The multi-level perspective (MLP) – a useful heuristic for transitions



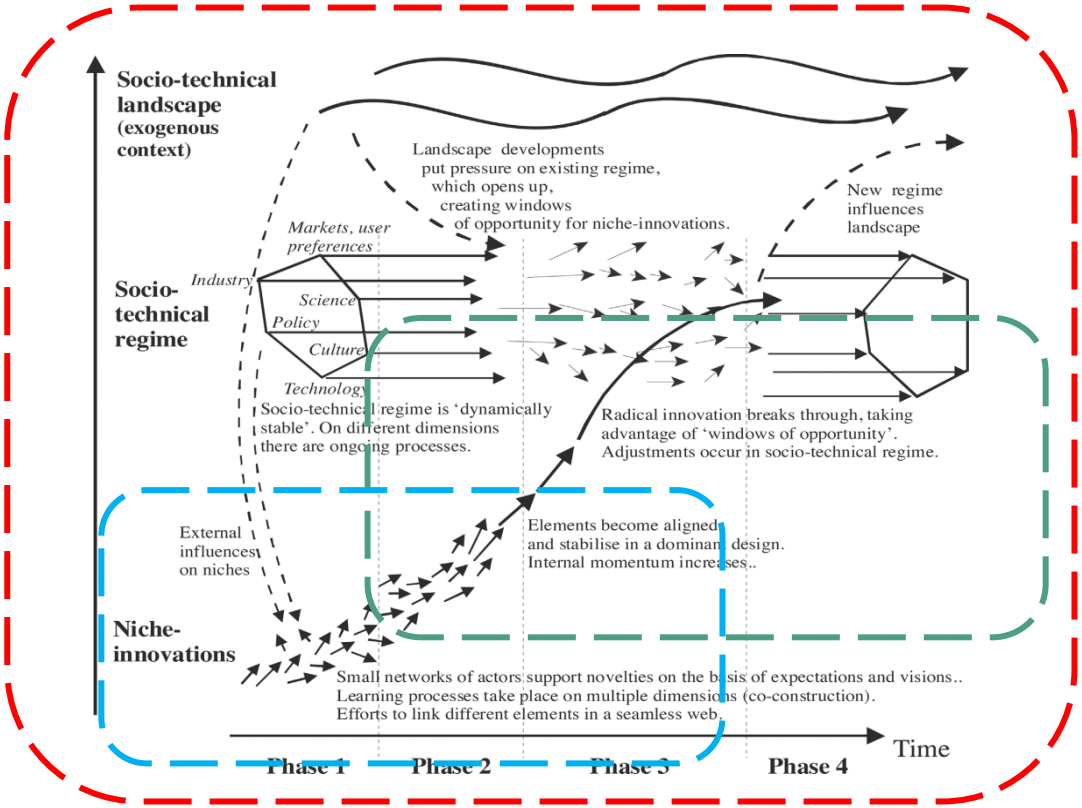
Source: Geels, 2018

What makes transitions policy different?

- **Directionality**: sets a conscious direction for innovation activities (and supporting policy interventions), based on a *joint vision* and *articulated objectives*
- **Societal goal:** The policy follows a societal agenda*, beyond an economic, industrial or technological rationale,* that is related to environmental or societal aspects of development (e.g., SDGs). Multiple forms of innovation (e.g., technological, institutional) contribute, but innovation is not a goal in itself
- **Cross-cutting policy field**: Innovation cuts across policy domains and is involved in implementation. The aim is to move beyond policy silos
- **Mobilising the demand side:** The initiative pays attention to supply- and demand-side policy instruments, stimulates interaction between innovation producers and consumers / users and promotes societal embedding of the innovation
- **Stakeholder involvement:** increasing role of public-private cooperation and interaction. The government is a facilitator, (not leader) of new and more inclusive governance arrangements, achieving more open, transparent and diverse policy

Source: Janssen et al., 2023

Our programming tools in relation to the MLP



Transition management

Strategic Niche management

TIS functions

Why no missions?

Because they simply package up ideas from the three other traditions

The tools overlap – TIS functions over the most comprehensive approach

Function	Technological Innovation Systems (TIS)	Multi-level Perspective (MLP)	Transition Management	Niche Management
TIS functions				
Entrepreneurial experimentation with new technologies, markets and business opportunities	B,H	X	X	X
Knowledge development, via R&D and learning-by-doing	B,H	X	X	X
Knowledge diffusion through networks	H	X		
Directionality, via activities that encourage new innovators to enter and focus the directions of technical change they pursue	B, H	X	X	X
Market formation by opening market space or articulating demand	B			
Market formation by creating protected space for niche innovations	H		X	X
Legitimation	B, H			
Resource mobilisation	B, H			
Other transition management functions				
Creating or using a transitions intermediary			X	X
Creating arenas for priority setting			X	X
Building actor networks or coalitions		X	X	X
Developing guiding visions			X	X
Action at the political and policy levels			X	X
'Creative destruction', phase-out management		X		
Reflexivity			X	X

B = (Bergek, et al., 2008)
H = (Hekkert, et al., 2008

Source: Arnold, forthcoming

Classifying SIPs using ‘transition lenses’

- **Reinforcers**, centrally concerned with traditional innovation and competitiveness goals. They generally said little about sustainability or systems innovation at the outset, but have in most cases increased the attention paid to sustainability goals
- **Transformers**, which to varying degrees aim at systems innovation or changes in existing socio-technical systems and regimes
- **TIS-builder** (Grafen), aiming to create a new technological innovation system (and by implication a new sociotechnical regime)
- In one case (IoT) the SIP appeared to be **mixed**, with some parts acting like reinforcers and others as transformers. IoT radically changed its strategy in the early stages, from a broad concern with IoT technologies to focusing on using IoT in state sector services

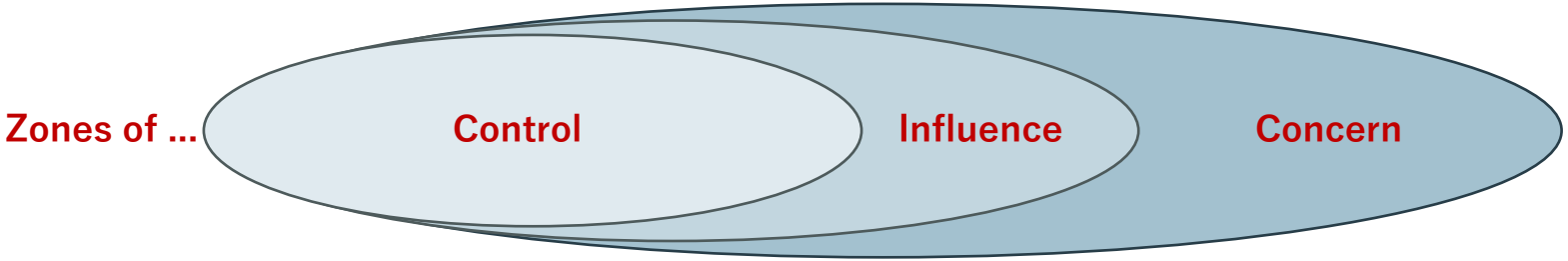
SIP structural characteristics

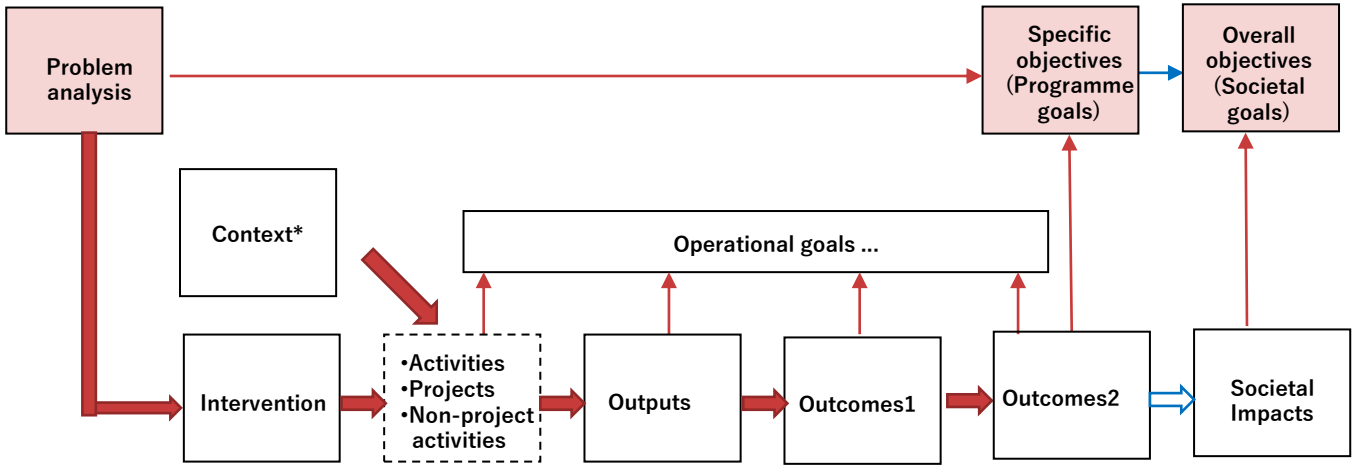
- **Reinforcers** generally have big Swedish players in international, concentrated industries
  - Two reinforcers are SME-focused – in traditional Swedish areas
- **Transformers** are more Sweden-focused, have more fluid industry structures, and stronger directionality
- Grafen is a one-of-a-kind **TIS-builder**
- On average, co-funding concentration and network growth are bigger for reinforcers
  - But for these aspects, as well as for use of strategic projects and mean TRLs, variation among SIPs seems mainly to be behaviour-driven
- Only 4 cases where the public sector is a significant co-funder

Structure-related aspects

Tranche	SIP	Type	Industry Structure	Biggest public funding users	Main co-funders	Public co-funding 18%+	Directionality
4	Viable	Transformer	N/A				H
3	MT4H	Reinforcer	SMEs	HEIs	SMEs	Y	L
3	Drive	Transformer	Oligopoly	Big cos	Big cos		H
3	Infra	Transformer	Mixed	HEIs	Big cos	Y	H
3	RES	Transformer	Mixed	RIs	Big cos		H
3	SBE	Transformer	Mixed	HEIs	Big cos		M
2	IoT	Mixed	Mixed	HEIs/RIs	Big cos	Y	L –> M
2	BioInno	Reinforcer	Oligopoly	HEIs	Big cos		M
2	Innovair	Reinforcer	Oligopoly	HEIs	Big cos		L
2	Swelife	Reinforcer	SMEs	HEIs/SMEs	SMEs	Y	L
2	SES	Reinforcer	Oligopoly	HEIs/RIs	Big cos/SMEs		L
2	Grafen	TIS-Builder	Nascent	HEIs	Big cos/SMEs		H
1	MM	Reinforcer	Oligopoly	HEIs/RIs	Big cos		L
1	PiiA	Reinforcer	Oligopoly	RIs	Big cos		L
1	SMI	Reinforcer	Oligopoly	HEIs	Big cos		L
1	LIGHTer	Reinforcer	Oligopoly	HEIs/RIs	Big cos		M
1	P2030	Reinforcer	Oligopoly	HEIs	Big cos		L

What can innovation agencies control?





Innovation agency legitimacy by function

TIS functions	Agency legitimacy
Entrepreneurial experimentation with new technologies, markets and business opportunities	XX
Knowledge development, via R&D and learning-by-doing	XXX
Knowledge diffusion through networks	XXX
Directionality, via activities that encourage new innovators to enter and focus the directions of technical change they pursue	?
Market formation by opening market space or articulating demand	X
Market formation by creating protected space for niche innovations	X
Legitimation	XX
Resource mobilisation	XX

Other transition management functions	Agency legitimacy
Creating or using a transition intermediary	XX
Creating arenas for priority setting	XX
Building actor networks or coalitions	XX
Developing guiding visions	?
Action at the political and policy levels	?
'Creative destruction', phase-out management	X
Reflexivity	XX

X = little or no legitimacy
XX = some legitimacy
XXX = strong legitimacy
? = Could impose this on projects

How well do the SIPs do the TIS functions?

Already done well

- Knowledge development
- Knowledge diffusion
- Handling incumbents

Done but could be strengthened

- Arenas for priority-setting
- ‘Guiding visions’
- Building actor coalitions
- Action at policy and political levels
- Directionality
- Reflexivity

Need coordination beyond R&I

- Entrepreneurial experimentation
- Market formation
  - Creating new markets
  - ‘Niche management’
- Resource mobilization
- Creative destruction

Take-aways

Reforms for improving competitiveness

- 1G and 2G instruments are (still) needed
- 2G instruments needed for technology development – and possibly to retain industry participation
- 2G PPPs can:
  - Mobilise new technological systems and value chains, as well as new actors
  - Effect major changes over long periods
- But PPPs are not sufficient to tackle **socio**-technical transitions

Reforms needed for transitions

- Governance: national level prioritisation, legitimation, choice of directionalities
- Organisation and instrument designs to extend scope of intervention
- Horizontal mechanisms to handle integration of RDI and implementation, cross-discipline and cross-sector work
- Capability-building and new processes
  - New functions in policy
  - Re-engineering processes, including right-to-left design
  - Inter-funder partnerships and new platforms
- Increasing space for non-government actors

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