



# Policy mixes

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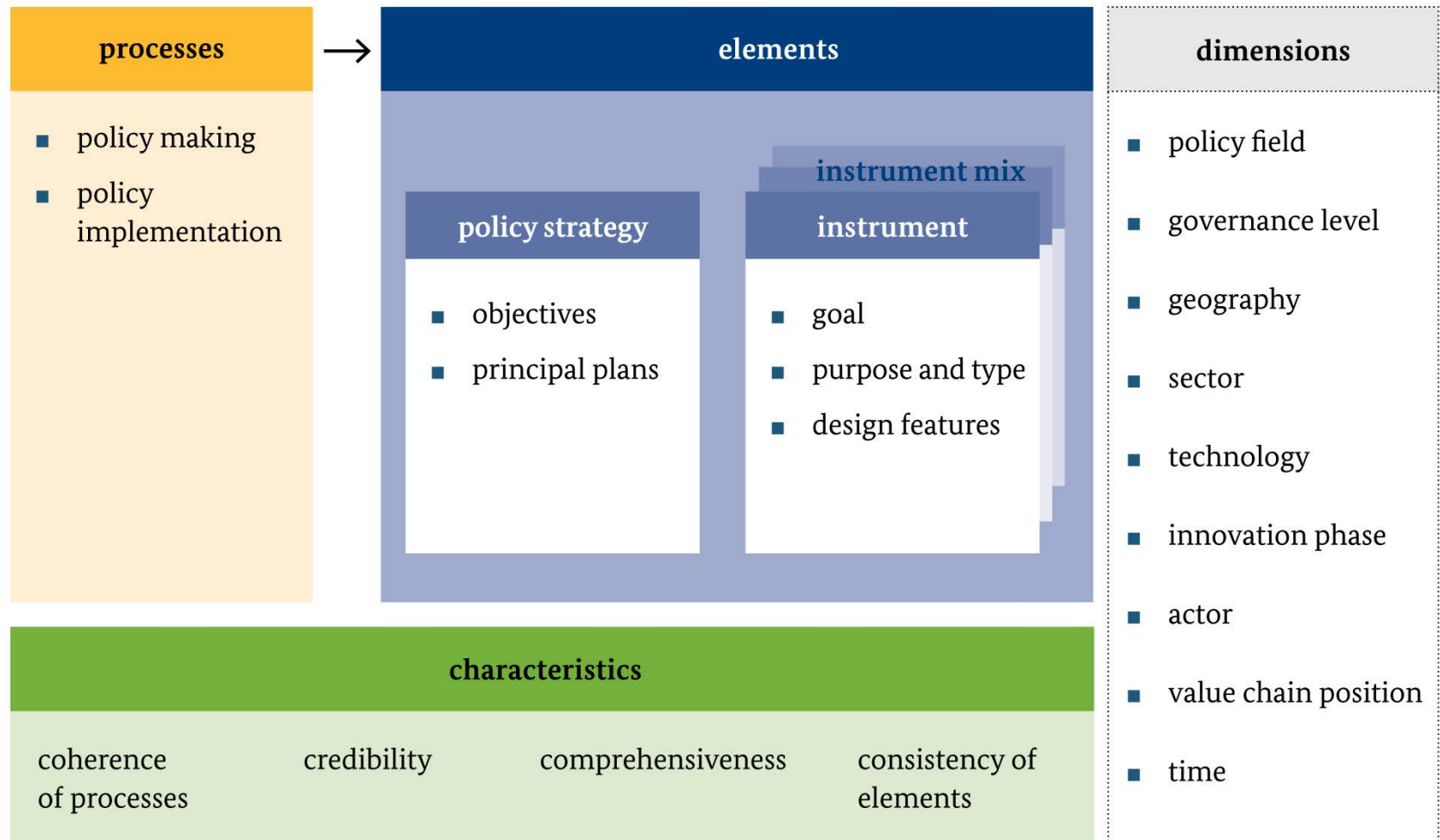
# My background: Policy analysis from the perspective of innovation/transition in multiple sectors



# What are policy mixes?

- Combination of policy goals, instruments (and processes)
- Portfolios of purposefully designed mixes in a given area (e.g. energy efficiency)
- Mixes of "real world" policies influencing a given sector or a phenomenon

# Policy mix goes beyond instruments mixes (Rogge & Reichardt, 2016)



# Coherence and consistency of policy mixes

- Measurement of synergies and conflicts (e.g. Del Rio, 2010)
- “in the real world” policy instruments carry “quite different meanings from time to time, place to place and actor to actor” (Flanagan et al., 2011, p. 706).
- supportive policies in one sector can be made inefficient by unsupportive policies, instruments and practices in others (Huttunen et al. 2014)
  - But sometimes trigger innovation!

# Innovation policy mixes for “creative destruction”

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## Creative destruction or mere niche support? Innovation policy mixes for sustainability transitions



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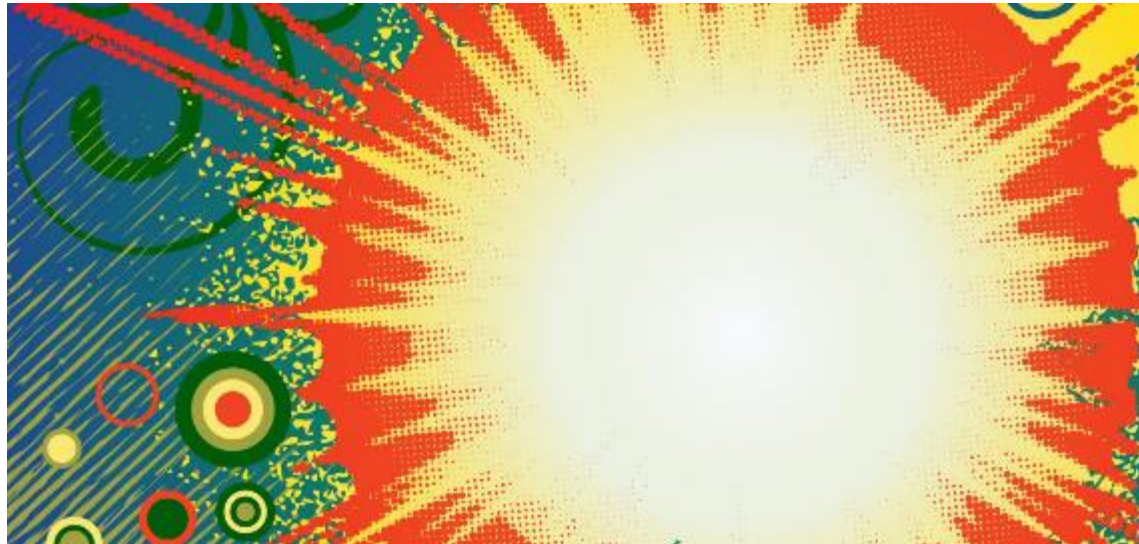
### ABSTRACT

Recently, there has been an increasing interest in policy mixes in innovation studies. While it has long been acknowledged that the stimulation of innovation and technological change involves different types of policy instruments, how such instruments form policy mixes has only recently become of interest. We argue that an area in which policy mixes are particularly important is the field of sustainability transitions. Transitions imply not only the development of disruptive innovations but also of policies aiming for wider change in socio-technical systems. We propose that ideally policy mixes for transitions include elements of ‘creative destruction’, involving both policies aiming for the ‘creation’ of new and for ‘destabilising’ the old. We develop a novel analytical framework including the two policy mix dimensions (‘creation’ and ‘destruction’) by broadening the technological innovation system functions approach, and specifically by expanding the concept of ‘motors of innovation’ to ‘motors of creative destruction’. We test this framework by analysing ‘low energy’ policy mixes in Finland and the UK. We find that both countries have diverse policy mixes to support energy efficiency and reduce energy demand with instruments to cover all functions on the creation side. Despite the demonstrated need for such policies, unsurprisingly, destabilising functions are addressed by fewer policies, but there are empirical examples of such policies in both countries. The concept of ‘motors of creative destruction’ is introduced to expand innovation and technology policy debates to go beyond policy mixes consisting of technology push and demand pull instruments, and to consider a wider range of policy instruments combined in a suitable mix which may



# Innovation policy mixes for “creative destruction”: key ideas

- Sustainable transformative change = systemic/architectural/ modular innovations AND disrupting unsustainable systems (creative destruction)
- Innovation policy mixes should also contain disruptive policy measures (goals & instruments)



# Theoretical building blocks

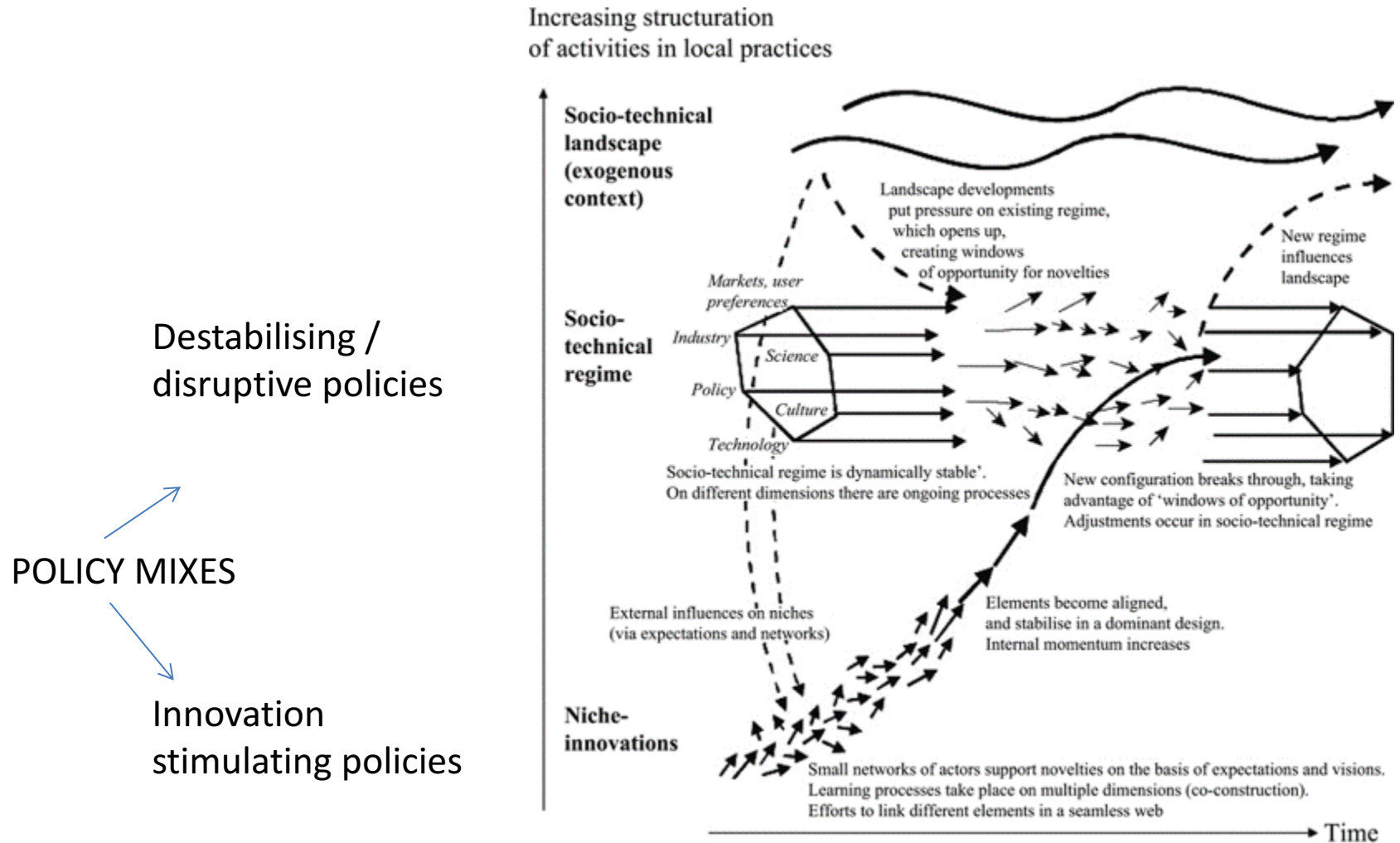
- Joseph Schumpeter's (1942) concept of creative destruction and the literature on disruptive innovation (Abernathy and Clarke, 1989; Christensen, 1997)
- Geels, Schot et al. work on the multi-level perspective (MLP) and Turnheim & Geels (2012, 2013) concept on regime destabilisation
- Literature on technological innovation systems (TIS), including seven functions and motors of innovation (e.g. Bergek et al., 2008; Suurs & Hekkert, 2009)



# Creative destruction

- A process where an innovative entrepreneur challenges existing firms and technologies that makes the existing technology old – forcing incumbent to withdraw from markets (Soete & ter Weel, 1999) or renew (Bergek et al., 2013)
- Competence destroying (Tushman & Andersen, 1986) or disruptive (Christensen, 1997) innovation that reduce the value of existing competences (Abernathy and Clarke, 1985)
- In a policy context, competence destroying policies can reduce the value of environmentally/socially harmful practices and technologies

# Policies from the perspective of creative destruction & transitions



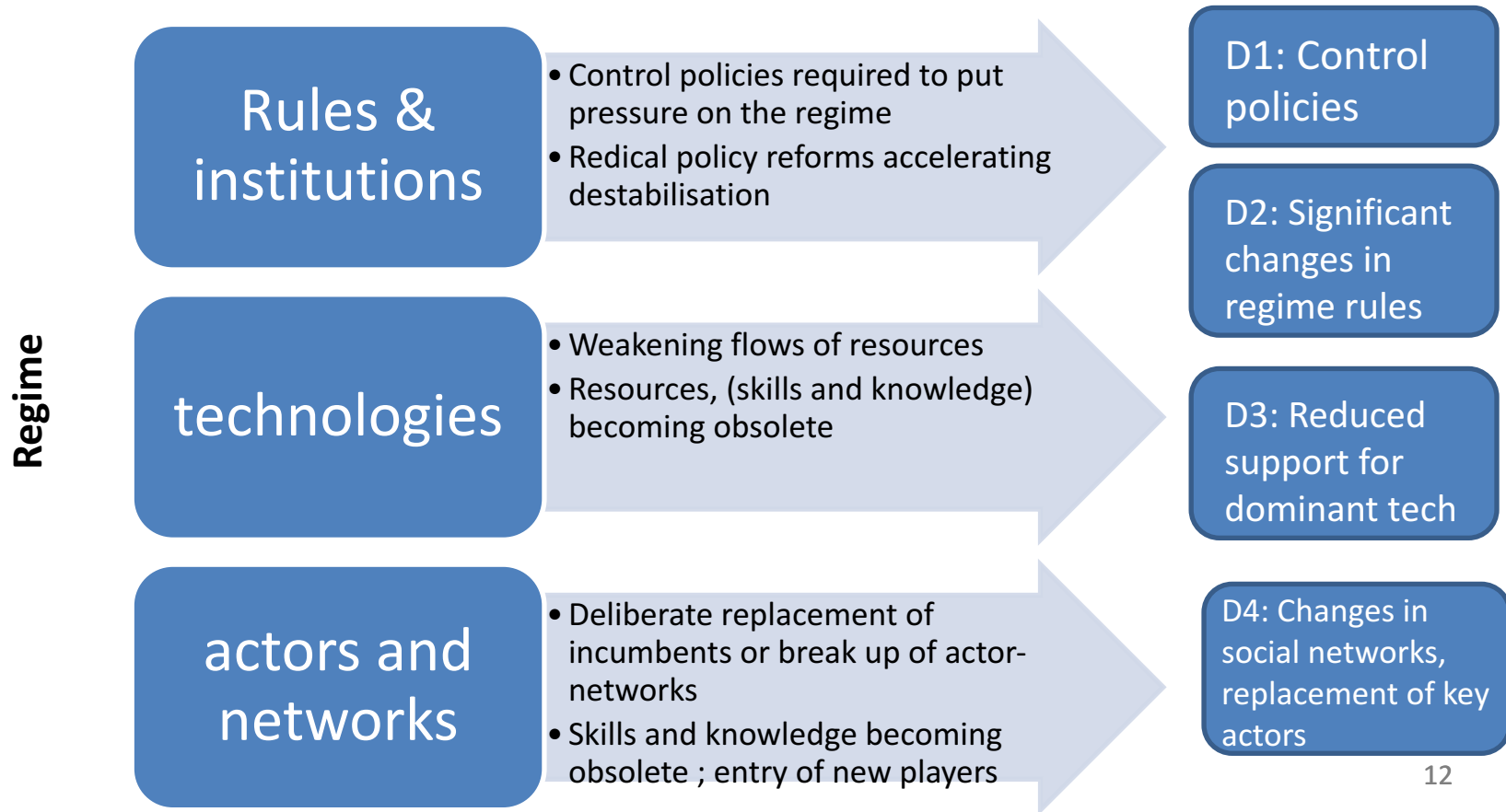
Source: Geels and Schot (2007, p. 401)

# Building on TIS functions

## Functions of technological innovation systems (building on Bergek et al., 2008)

Knowledge development and diffusion	Breadth and depth of knowledge base around TIS
Market formation	From niche to more mature, may be influenced by policies
Price-performance improvements	Strengthening the performance of innovations vis-à-vis incumbent markets
Entrepreneurial experimentation	Experimentation to reduce uncertainty
Resource mobilisation	Human and financial capital
Legitimisation	Social acceptance and compliance with institutions
Influence on the direction of search	Incentives and pressures, including changes in prices, landscape factors, regulations, perceptions, etc.

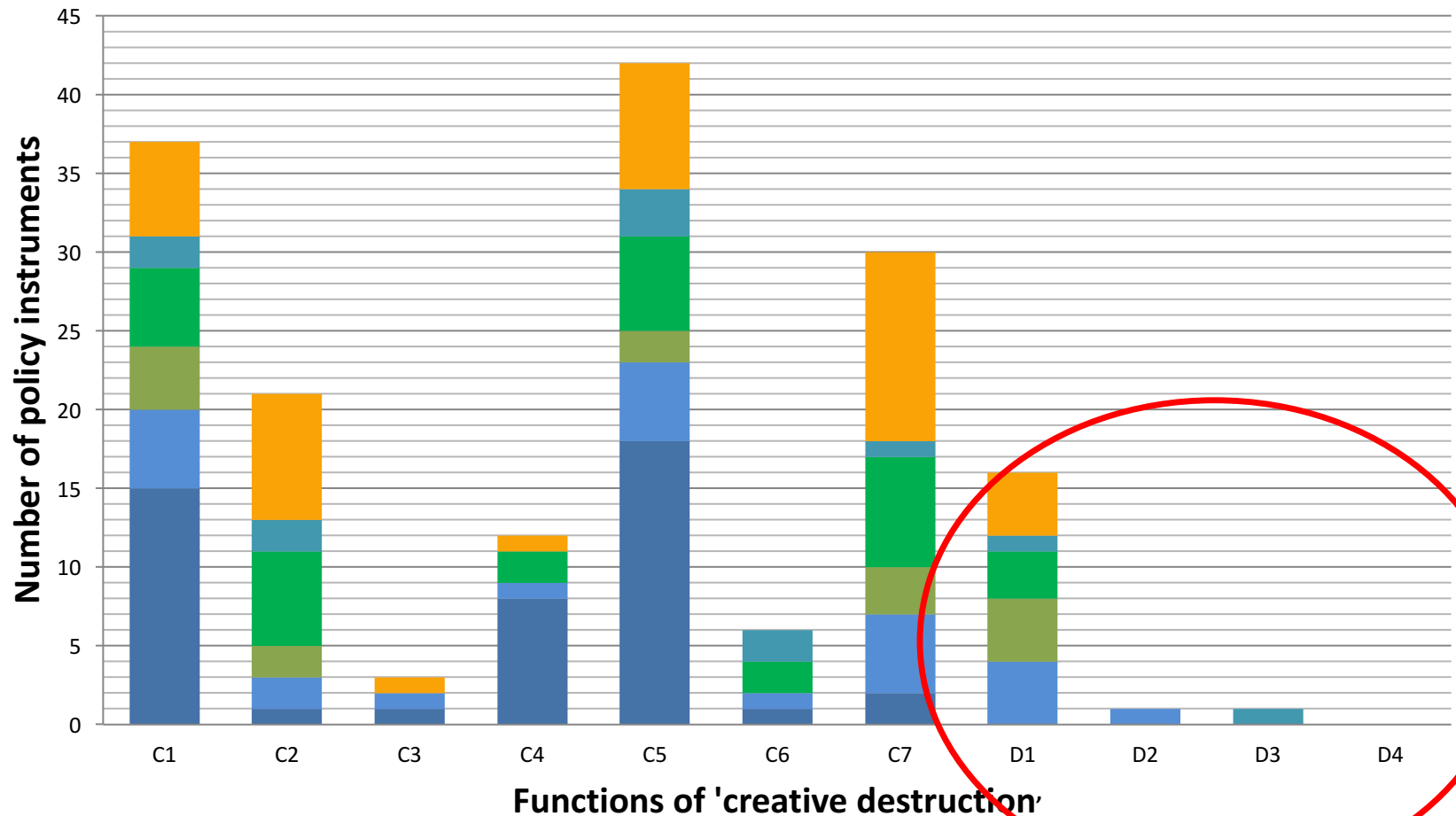
# Complementing TIS functions with "destruction functions"



# Functions for destabilising/destroying regimes

Destruction functions (regime destabilisation)	
Control policies (D1)	Emission regulations, carbon taxes, technology bans, etc.
Significant changes in regime rules (D2)	E.g. structural reforms in legislation, significant new overarching laws.
Reduced support for dominant regime technologies (D3)	Removal/reduction of subsidies and R&D funding, technology bans, etc.
Changes in social networks, replacement of key actors (D4)	E.g. creation of new powerful committees with involvement of niche actors
Changes in organisational and institutional routines and practices (D5)	E.g. Environmental policy integration in practice

# Policy mix for low energy innovation in the UK (N=72)



■ Innovation (generic)

■ Heating and electricity

■ Electricity

■ Climate and energy (cross-domains)

■ Heating of buildings

■ Mobility



# “Destablising” policies for low energy innovation

Function	UK
D1: Control policies	Emission performance standards for new vehicles, company car tax reform (based on carbon), fuel duty escalator, requirement to private landlords to make reasonable energy efficiency improvements required by tenants, government buying standards
D2: Significant changes in regime rules	Climate Change Act
D3: Reduced support f dominant regime technologies	EU ban of incandescent light bulbs
D4: Changes in social networks, replacement of key actors	Climate Change Committee?

# Other examples of disruptive policies focused on reduction of support

- Removing of subsidies for coal mining operating costs (UK)
- Decisions to close down nuclear power (Germany, Sweden)
- Decision to limit the tax deductible share of commuting costs by private vehicle (Finland)
- Decisions (or consultations) on coal phase out (UK, Finland)
- Many such political decisions have later been reversed



# Motors of creative destruction



# Policy mixes for building energy efficiency



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Original research article

## Policy packaging or policy patching? The development of complex energy efficiency policy mixes

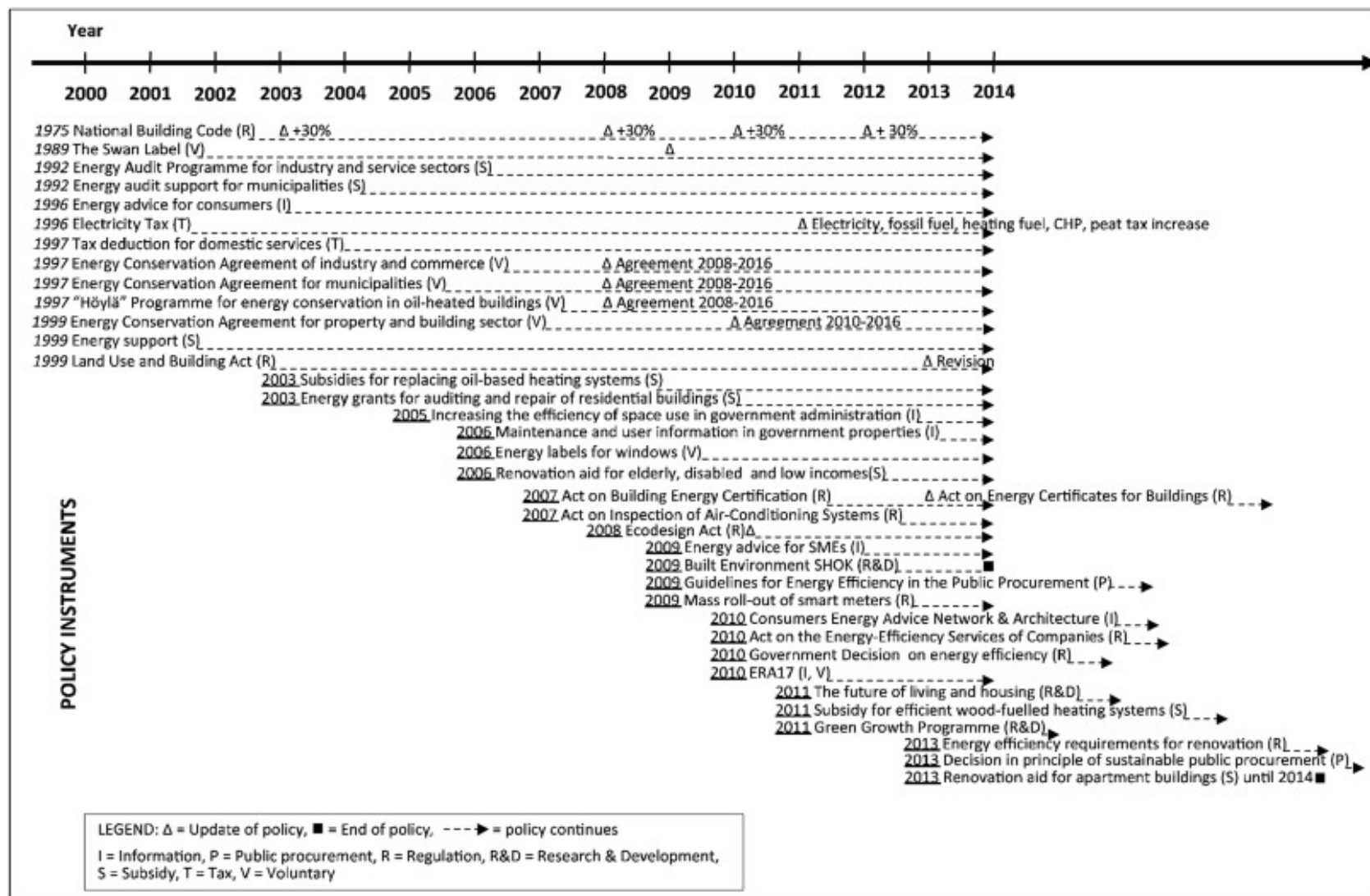


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# Temporal stability vs. change



# Policy packaging and policy patching (Howlett & Rayner, 2013)

- Complete redesign of new policy mixes rare
- Potential of policy patching
  - improving inter-departmental coordination and creating a dialogue between a range of stakeholders regarding policy mix design → policy patching
  - national energy efficiency action plans, a form of patching?
- Will patching work for transformative change?



# Going forward: assessing innovation policy mixes

- Mapping overall policy mixes & assessing their strength from the perspective of systemic change
  - Over time and at present
- Client-oriented or stakeholder evaluation (ex-ante or ex-post)
  - Particular (boundary) actor groups vs. a range of stakeholders
  - Open policy questions vs. surveying specific instruments
- Foresight analyses on policy mixes
  - How to take into account the diversity of policy domains influencing innovation in the boundary of systems?

# Example of operationalising the Kivimaa/Kern framework

TIS function used in coding	Coding question	Coding values	Range
New control policies	Does the policy outlaw existing practices and products	0=no 0.5=partly by setting significantly stricter standards of products 1=yes	0-1
Significant changes in regime rules	Does the policy change the operating rules with respect to products and manufacturing?	0=no 0.5=partly by strengthening demands on products and manufacturing 1=yes, by introducing new rules on manufacturing	0-1
Reduced support for dominant regime technologies	Does the policy reduce support for dominant non –circular practices?	0=no 0.5=partly by diminishing R&D support 1=yes by removing harmful subsidies	0-1
Changes in social networks, replacement of key actors	Does the policy alter existing network patterns between actors	0=no 0.5=partly by giving actors some new tasks 1=yes, by introducing new actors and removing responsibilities from existing actors	0=1

Source: Hilden et al. unpublished

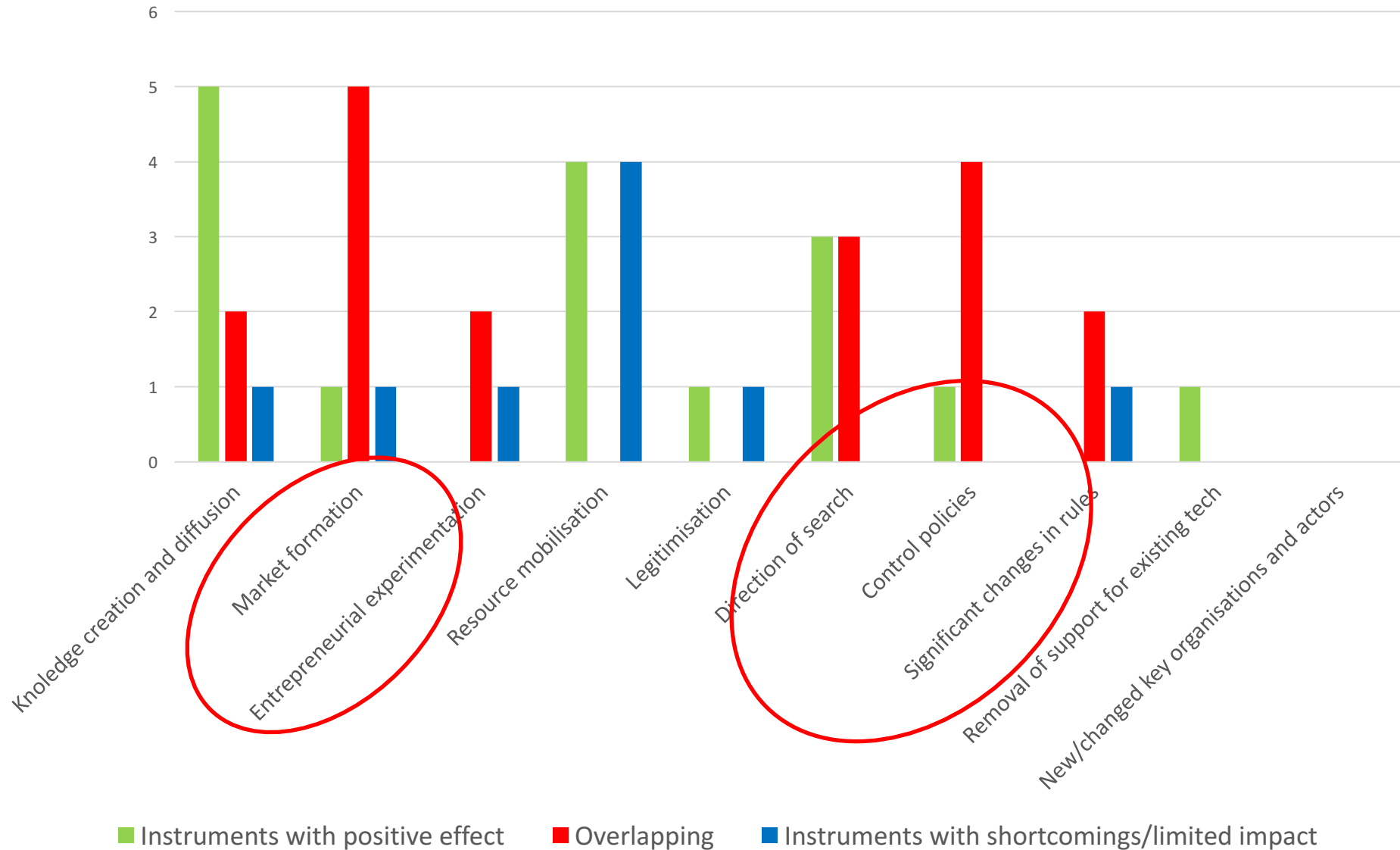
# Client-oriented evaluation shows difficulties identifying if disruption is under way

(source: Kivimaa, Kangas & Lazarevic, unpublished)

- Same instruments at the same time perceived by the same people positively (potential for disruption) and negatively (action, enforcement and sanctions lacking)
- What classifies as disruptive?
  - *“the regulatory affairs and others are in such a big turning point and change. We are going to near zero energy... but much of it is talk and real acts are missing.”*
  - *“Politically decisions are being made that anyone can sell heat, waste heat and energy companies can no longer make consumers selling energy as difficult as possible.”*
  - *“Not exactly in that sense [disrupting the energy system] but if we think for example the energy certificate act that was enforced within a year’s process that came about really quickly... The speed of change in legislation comes nationally in a really quick tempo for someone who does not follow up EU policy.”*

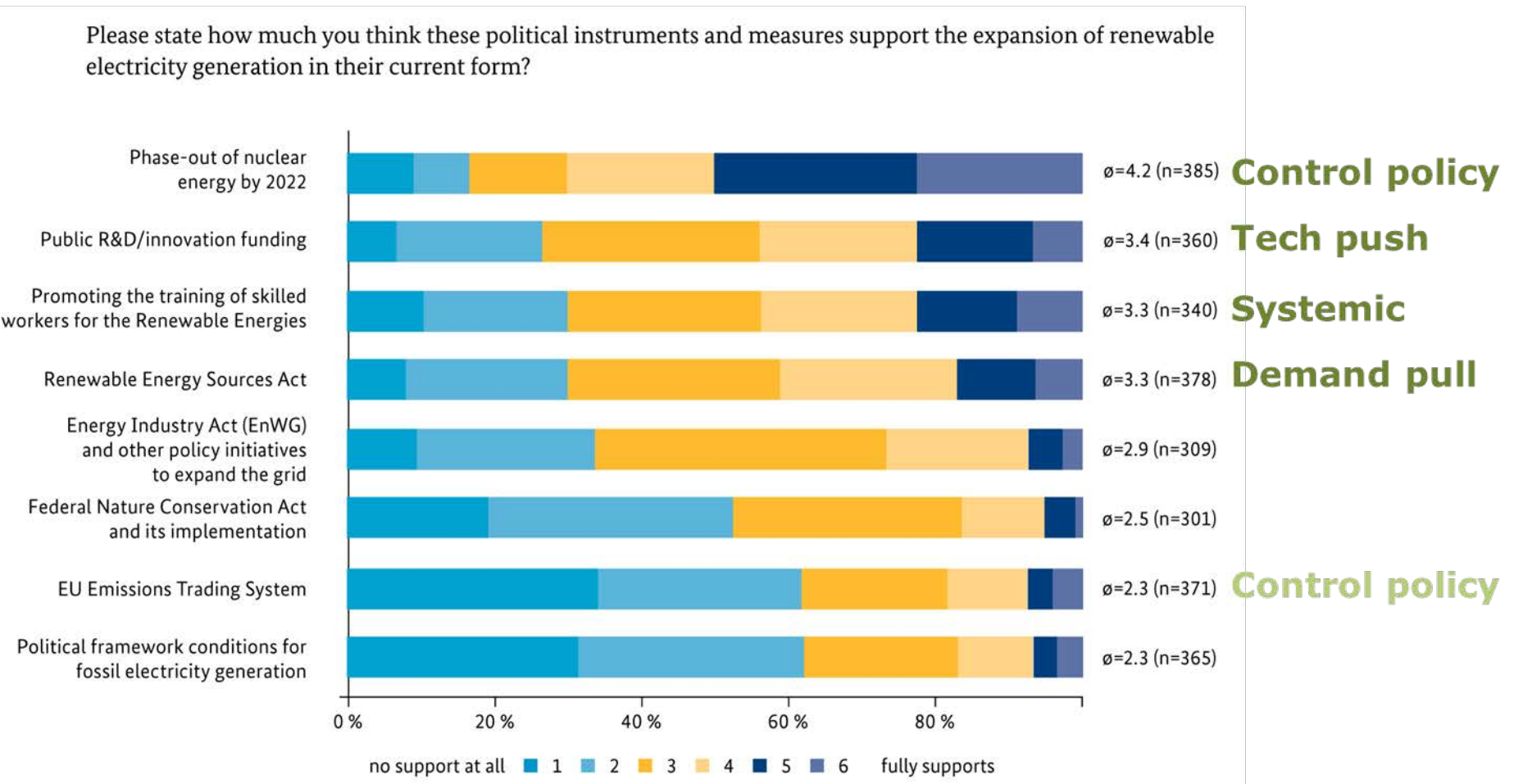
# Example of client-oriented evaluation

(source: Kivimaa, Kangas & Lazarevic, unpublished)



# Consistent instrument mix matters...

...manufacturers see strongest support through nuclear phase-out, followed by combination of R&D funding, training & EEG



Source: Rogge, 2016

# Conclusions

- Destabilising policies are an important complement in the innovation policy mix for transformative change
  - Important to address the system level
  - Implies improved interaction between dedicated S&T&innovation policy and other (sectoral) policy domains
- Four key points:
  - reformulation of rules (adding control policies & making structural reforms in legislation and institutions),
  - changing the technological basis of systems (reducing support for dominant unsustainable technologies)
  - altering the composition of actors and networks (changing social networks and replace key actors)
  - Re-prioritising organisational practices and routines
- Uncertainties regarding how to evaluation, particularly, ongoing disruptiveness