European Forum for
Studies of Policies
for Research and Innovation

PRESENTATION SLIDES FROM THE 2015 EU-SPRI CONFERENCE

Understanding social innovation: from innovation systems to innovation functions

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EU-SPRI Conference, Helsinki, 10-12 June 2015

Part of the EU-SPRI Exploratory study

‘Social Innovation Futures: beyond policy panacea and conceptual ambiguity’

Paul Benneworth, Un. Twente
Effie Amanatidou, Un. Manchester
Monica Edwards Schachter, Ingenio - CSIC
Magnus Gulbrandsen, Un. Oslo

Overview

- Aim and focus of the EU-SPRI study
- ‘Innovation system’ analysis of social innovation
- ‘Innovation functions’ analysis of social innovation
- Conclusions and further reflections

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Aim and focus of the EU-SPRI study

Aim and focus of the EU-SPRI study

- To bridge the increasing distance between the ways social innovation is understood within policy and scholarly communities, and the mainstream of science, technology and innovation studies, as well as to examine the different ways in which the notion has been used in practice and isolate the underlying innovation processes involved.
- To restore some academic rigour to the concept, by applying some 'classical' approaches in its analysis (disruptive innovation, **innovation systems**, institutional innovation and sociotechnical transitions). (Benneworth et al., 2015).

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‘Innovation system’ analysis of Social Innovation

Technological innovation systems approach (1/2)

- Interpreting ‘technology’ in a wider sense referring to either a knowledge field, a product or an artefact, or a set of related products and artefacts aimed at satisfying a particular function, such as health care or transport. (Carlsson et al. 2002)
- But national, regional and sectoral innovations system also relevant

Technological innovation systems approach (2/2)

- A network of agents interacting in a specific technology under a particular institutional infrastructure and involved in the generation, diffusion and utilization of that technology (Carlsson and Stankiewicz, 1995, p. 49).
- Systems: components, relationships, and attributes.
- The system is more than the sum of its parts. Dynamism and co-evolution of the system elements are also valid. (Carlsson et al. 2002)
- A more holistic picture of the topography of actors and the relations between them considering also the interactions of the system with the wider environment through established institutions and social norms.

Vast variety of SI research

29 projects in FP6 and GP7

http://socialtech.org.uk/map/

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OFBUG

Two broad extremes - Social innovation Group 1

Social INNOVATION - Group 1
More ‘classical’ definition of innovation but for a social purpose;
Create new social relationships, collaborations;
Underpinning values: private profit combined with social / env. considerations

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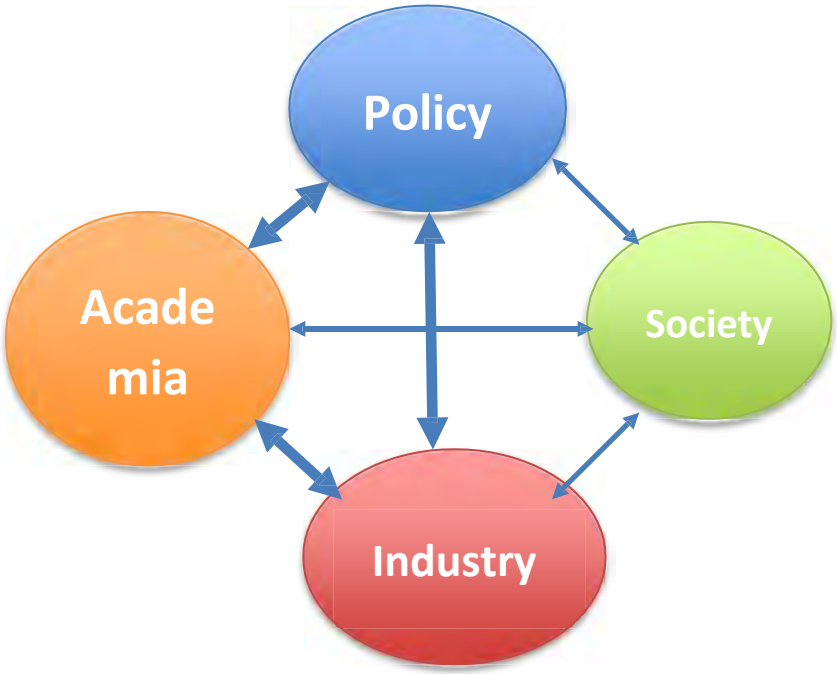
Applying the systems approach to examples of “social innovations”- example 1

Actors and interactions



Social & environmental considerations

Profit making

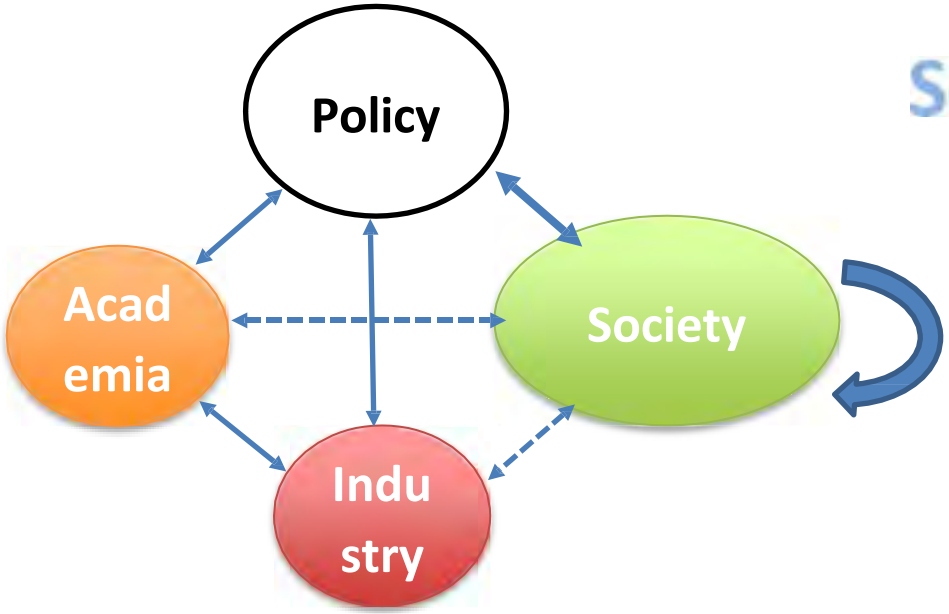
Two broad extremes – Social Innovation Group 2

Social INNOVATION - Group 1
society in the driving seat throughout the process: from identifying to solving a societal challenge
solutions alternative to the mainstream market economy
underpinning values: citizens' empowerment, social justice, solidarity, social cohesion, openness, social responsibility

The Aconchego or 'Cuddle' project

Applying the systems approach to examples of “social innovations”- example 2

Actors and interactions



Social & environmental

responsibility

social inclusion

equity, solidarity

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‘Innovation functions’ analysis of Social Innovation

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Innovation functions (Bergek, et. al. 2008)

- Knowledge development and diffusion
- Influence in the direction of search
- Entrepreneurial experimentation
- Market formation
- Legitimation
- Resource mobilisation
- Development of positive externalities

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Knowledge development and diffusion

GOLDFINGER FACTORY

Vs.

freecycle.org®
changing the world one gift at a time™

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Influence in the direction of search

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Entrepreneurial experimentation

- New venture is based on the experience of other similar initiatives in the local area or country or even in other countries.
- Important role of IT and social media – IPR?
- Development of a specific community where social learning takes place both through on and off-line means and sometimes across neighbourhoods and countries

Market formation

Business innovations	Social innovations
Create a market: from 'nursing' to 'bridging' to 'mature' market	Society as a whole need not be convinced of the benefit of a new practice in the case of social innovations
Type of users; purchasing processes and power; compatibility of demand profile; existence of institutional stimuli	target groups: elderly, disabled, socially excluded, disadvantaged, unemployed, etc.
Beneficial for less?	Beneficial for more?

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Legitimation

- Social acceptance
- Compliance with existing institutions
- Alignment with the current legislation and the value base in industry and society

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Resource mobilisation

- Competence/human capital mobilised through education (in s&t, management, financing, etc.)
- Complementary assets such as complementary products, services, network infrastructure, etc.
- Education for knowledge and creativity vs. education in social values
- Financial support vital in early stages
- Role of micro-credit and crowd-funding in social innovations

Development of positive externalities

- Peculiarities regarding new entrants in a social innovation system
- A multiplying than a competing role in influencing the direction of search
- A proliferation and high diversity of social initiatives in several sectors

Durability and scale

- Scale important for durability
- But political, cultural or economic opportunities / discontinuities can bring boost irrespective of the volume of adoption

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Conclusions and further reflections

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Special factors of social innovation *(not so special)*

- Formation of social networks around the social innovation to facilitate social experimentation, diffusion and advancement through social learning
- Existence of similar social innovations to enable a multiplying effect and market identification
- Existence of a favouring regulatory and institutional (and financial) environment to encourage social innovations' generation and scaling up
- Existence of a critical mass of people to endorse the values underlying the social innovation
- Important role of the academy to educate society in these values so that the social innovation can scale up and become sustainable.

But … from ‘networks of power’ to ‘networks of change’

- If these factors are in place then the social innovation functions can bring changes to the innovation system actors, and institutions.
- The social networks formed can generate social actors that will become key actors in the system both affecting established ‘networks of power’ and becoming ‘networks of change’.
- But does this justify the definition of a social innovation system? or
- Is a social innovation system better embedded in a wider innovation system and be characterised as such depending on who takes action and what types of needs are tackled and how?

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Thank you for your attention!

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Social innovation as radical innovation – a review and agenda

Magnus Gulbrandsen
TIK Centre for Technology, Innovation and Culture, University of Oslo

EU-SPRI Annual Conference, Helsinki 10-12 June 2015

Background

- The popular yet unclear notion of “social innovation” may need to be tied more explicitly to well-established concepts within innovation studies
- In our EU-SPRI exploratory initiative we develop conceptual papers discussing social innovation in light of “institutional change”, “sociotechnical transitions”, “innovation systems” and “disruptive/radical innovation”
- This paper/presentation deals with the latter term

Social innovation?

- No agreed upon definition
- Tied to specific social purposes (health, education, welfare), institutional change, public goods, needs not covered by markets (Pol & Ville 2009)
- Often refers to new activities/services that lead primarily to social value/ social benefits, involving non-profit and public sectors (Phills 2009)
- Difficult to distinguish from social entrepreneurship and other buzzwords (Martin & Osberg 2007)
- Popular all over the world, including the US and famous innovation/management scholars like Porter and Christensen (i.e. both “idealistic” and “capitalistic”)

The issues

- Why is radical innovation an important issue for social innovation?
  - "Grand challenges" may need radical solutions
  - Policymakers tend to focus on radically new prospects and opportunities (incremental improvements take care of themselves)
  - Social innovation is itself often presented as a paradigm shift
- RQ: What does the literature on radical innovation tell us that can be useful for understanding, analysing and creating policies for social innovation?

The dual notion of radical innovation

Radical change something to be strived for and necessary to solve the great societal challenges related to global health, climate change, the financial crisis and so on

Radical change tied to the notion of “creative destruction” in which whole industries may disappear, urban areas deteriorate, societal structures become unstable

Perspectives from the literature

- Radical innovation can be discussed using various lenses derived from a careful reading of relevant literature
  - Dichotomy/distinction
  - Cumulativeness
  - Competence destruction
  - The incumbent's curse

Dichotomy/distinction

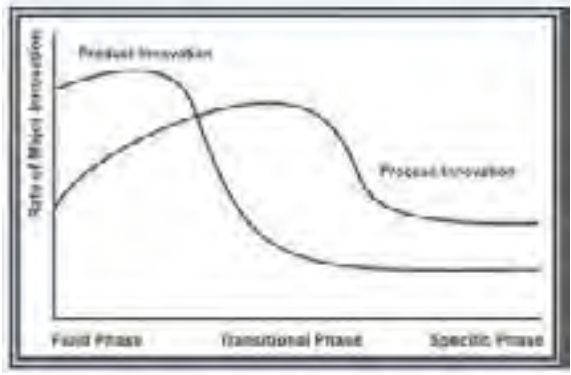
- Radical innovation defined as the opposite of “incremental” or “normal” innovation (distinction goes back at least to Schumpeter)
- Radical innovations contain a “core element”, technology or design that departs in significant ways from existing ones (Chandy & Tellis 2000)
- Commonly defined in relation to markets (e.g. in the CIS survey)
- Definition is comparative/relative

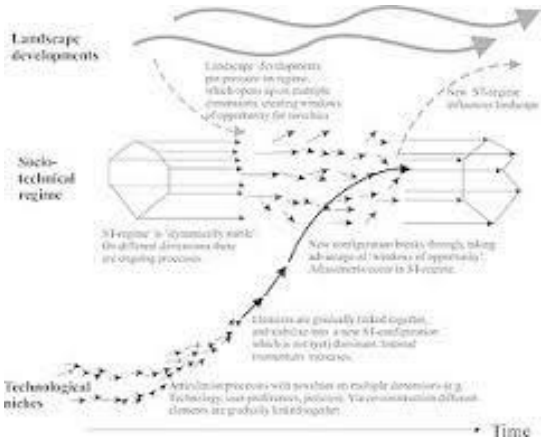
Dichotomy and social innovation?

- In this perspective, radical social innovation needs a concept (and/or dataset) of “normal” or “incremental” social innovation
- Radical social innovations may be characterised by a core element, design, organisation, service delivery idea etc. that departs in significant ways from conventional approaches
- How much will this differ between different areas such as health, the environment etc.?

Cumulativeness

- The importance of the cumulative effect of small changes and upscaling processes (cf. Fagerberg 2005; Marquis 1986)
- Profits tied to phases of incremental, not radical, innovation
- Radically new inventions may need a long incubation period before they are implemented and/or need many subsequent incremental innovations into a new “platform” or “complex system innovation” (Abernathy & Utterback 1978, Abernathy & Clark 1985; Kwan et al. 2013; Shapiro 2007)
- Links to life cycle theory and the Multi-Level Perspective (Geels 2002 and more; Markard & Truffer 2008; Smith et al. 2010)





Cumulativeness and social innovation

- Can we see life cycles in social innovation areas with needs for “renewal” at the end of the curve (even in non-profit situations)?
- Is it possible to offer support for social innovation related “inventors”?
- Is there a reinforcement between radical and incremental innovation in social innovation areas?
- Do (potential) radical social innovations need protected niches like radical renewable energy technologies (cf. Benneworth later today)

Competence destruction

- Innovations can be radical along many dimensions
  - Completely new/unserved markets/users
  - Use of new materials/technologies
  - Merging well-known pieces into a new (and often deceptively simple) design or business model
- All of which may require new competences in the organisations involved (Henderson & Clark 1990; Abernathy & Clark 1985; Christensen et al. 2006)
- This is very complicated and challenging for well-established organisations/sectors

Competence destruction and social innovation

- Relevant because social innovation frequently tied to disadvantage groups not served by traditional markets or government services
- Radical social innovation may challenge government bureaucracies and maybe also powerful non-profit organisations
- Radical social innovation may have a potential with the involvement of competent users and other stakeholders?

The incumbent's curse

- Large organisations seen as bad at radical change due to problems of perception, cognitive filters and routines/institutionalisation (Hannan & Freeman 1977; Smith 1982; Nelson & Winter 1982; Henderson 1993; Chandy & Tellis 2000)
- Radically new products often come from smaller and younger firms, frequently leading large firms to bankruptcy (Rosenbloom & Christensen 1994; Christensen 1993)
- Radical new technologies often emerge from the state and publicly funded research and development (Mazzucato 2013)

A similar curse in social innovation?

- Do radical social innovations come from new players outside of established structures?
- Is there a role for public research and development in the area of radical social innovation?
- Are large public organisations in health, social services as unable to engage in radical change as their private sector counterparts? How is this related to the social innovation agenda? Does the problem vary by country?

Examples of radical social innovation?

Microfinance

- A new idea (or maybe an old one) gaining momentum in the 1970s through the work of Nobel Peace Prize laureate Mohammed Yunus, then developed by a new entrant in the finance system (Grameen Bank) (i.e. a *distinction* from conventional financial services)
- Many further incremental innovations through upscaling, institutionalisation and adaptation to local conditions; also some radical innovations related to mobile phones (i.e. success through *accumulation*)
- Conventional financial actors seemed unable to offer this kind of service, despite potential profits (grey area especially with new technology)(*curse/destruction?*)

Concluding remarks

- Discussing radical innovation is relevant for social innovation
- Need more cases to determine how relevant it really is, there seems to be a lack of empirical investigations
- To develop policies for radical social innovation we need to understand better how they develop over time and in a larger system and context

Thank you for your attention

Comments are welcome

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‘Social Innovation as Institutional Innovation’

Mónica Edwards-Schachter, INGENIO (CSIC-UPV)

Social Innovation Futures: beyond policy panacea and conceptual ambiguity

EU-SPRI Exploratory study

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Magnus Gulbrandsen, Centre for Technology, Innovation & Culture (TIK), University of Oslo, Norway

EU-spri 11th Feb 2015

Social
Innovation
Futures

The long story of wicked problems & narratives about our common future & the (*multi*) planetary crisis

(*Homo-linguisticus*)

Stockholm in 1972, Rio in 1992, Johannesburg in 2002; Río+20…

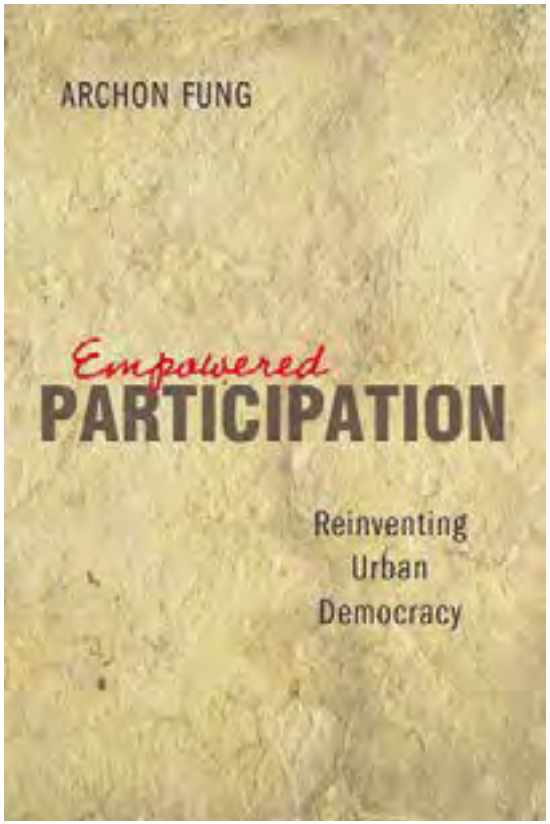
Rationales to policy (state) intervention

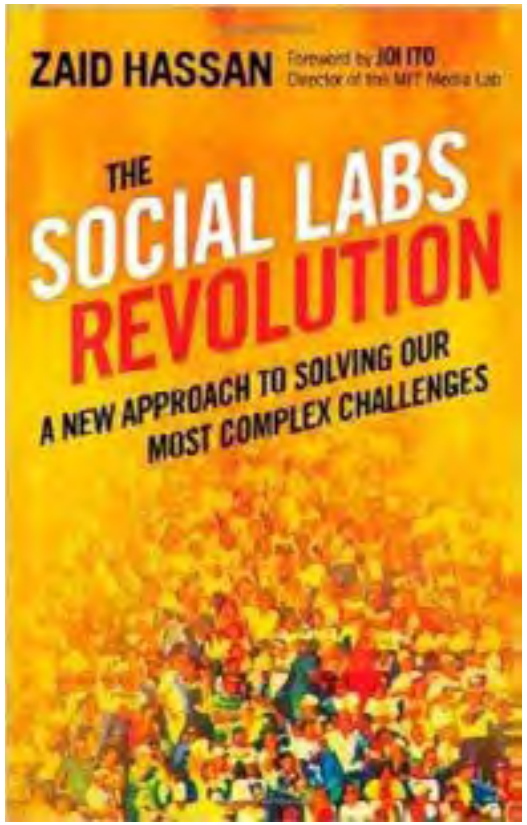
- mission-oriented
- market failures
- systems failures

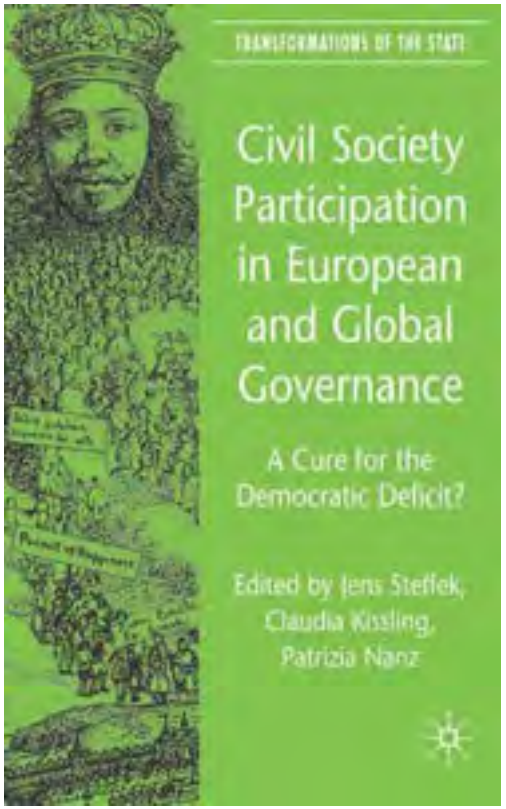
(Borras & Edler, 2015)

Mentions both technological and social innovation (1972)

SI…a solution to Grand Challenges of the 21st Century?







emergence of cross-sector collaborative innovation

…beyond policy **panacea?**

A socio-technical (and *cultural*) paradigm shift?

...at the shadow of normativity

…and the shadow of (institutional) governance

Overview

1. Why institutions & institutional innovation?

2. But…what does institution mean?

3. Two ways to explore institutional dimension of SI
   3.a From the ‘mainstream’ of innovation & STS studies
   3.b From a provisional definition of SI

4. Backing to any innovation process …and outcomes

5. Conclusion

1. Why institutions & institutional innovation?

Institutions constitute a key concern as an intermediary level between the organisational and the societal levels

(Whyte & Sexton, 2011)

Institutions shape and can contribute (or not) to improve learning (and innovation) processes

(Johnson, 2010)

Institutions are at the heart of the co-evolution of socio-technical (*and cultural?*) change… and their governance

(Casper & Whitley, 2004)

2. But…what does institution mean?

Diversity of connotations: ‘entities’, ‘contexts’, ‘frames’, ‘actors’, ‘components’, ‘set ups’, ‘arrangements’, ‘fields’, etc.

‘Institutions are sets of common habits, routines, established practices, rules, or laws that regulate the relations and interactions between individuals, groups and organisations’

(Edquist & Johnson 1997: 46)

‘Soft’ and ‘hard’ institutions as a domain of action for the social agenda… related to new action goals, innovative intentionality and reshaping or ‘demand’ of new capabilities

(Crawford & Ostrom 1995; Canibaño et al., 2006)

3. Two ways to explore institutional dimension of SI

3.a From the mainstream of innovation & STS studies

Institutions are present in theoretical approaches and heuristic innovation models

Innovation systems (national, regional, sectorial, local)

Technological innovation systems

Triple Helix, Cuadruple Helix…

Socio-Technical Transitions

Innovation Functions

The ‘old’ economic institutionalism:

‘actors’ (*players*) & ‘rules of the game’

(North, 1990)

Not only diversity of institutionalisms but …

Institutions and institutional innovation are likewise largely 'invisible' in innovation studies

(Lundvall, 2010; Martin, 2013)

'the 2008 financial crisis was partly caused by changes in the regulatory framework, i.e., institutional innovations' …**not still investigated**

(Martin, 2013, p. 6)

Broadening Innovation & STS fields? (specially Management & Sociology)

'Institutions comprise 'regulative, normative and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life'

(Scott, 2008)

Beyond 'bounded-rationality' of actors, focus is on the *'constitutive rules'* as the micro-foundations (the 'law of formation') of the social realm, how structures are formed and transformed

BUT …different questions about micro-foundations of innovation process

- **Innovation field**

How institutions influence/shape learning processes?... and knowledge production

(Lundvall, 1992; Johnson, 2010)

… to improve the efficiency of innovation systems

(and *more or less* oriented to inclusivity and the satisfaction of social needs)

BUT …different questions about micro-foundations of innovation process

- **SOCIAL INNOVATION literature**

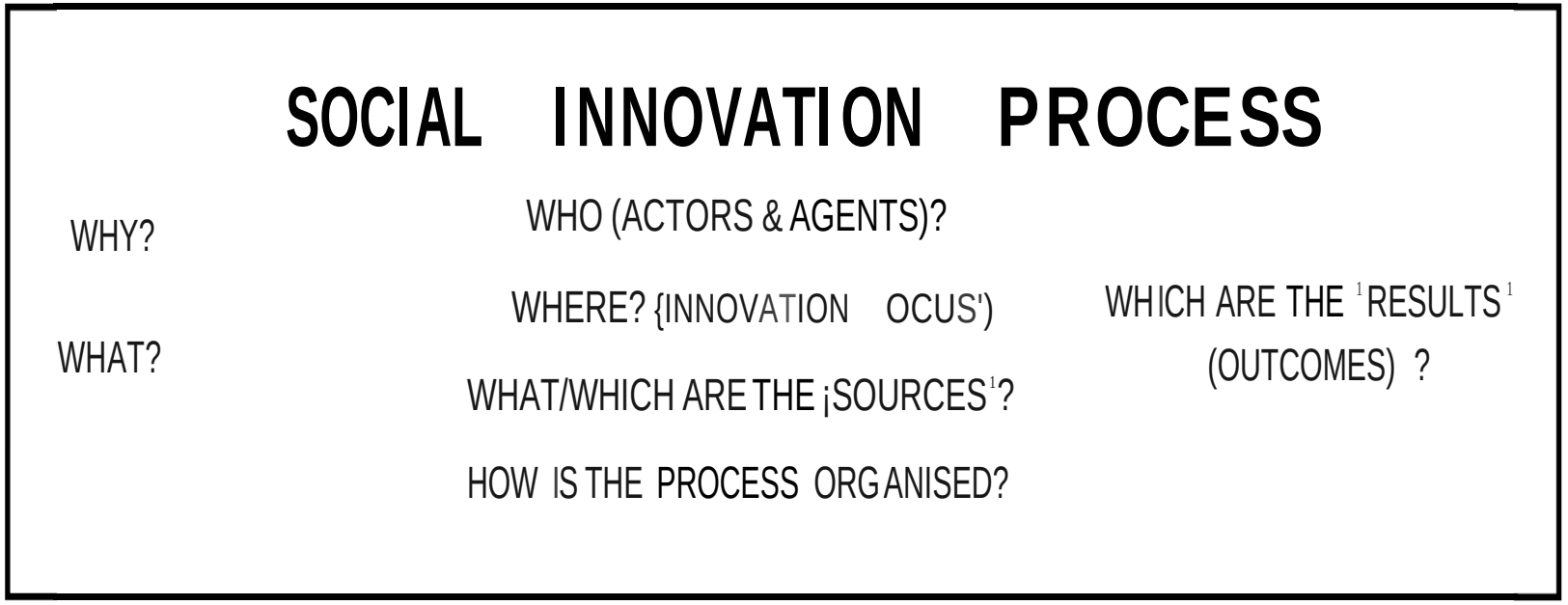
How social practices are institutionalized?

… to understand how change in social practices produce/construct social change

'The process dimension of social innovation concerns the creation and structuring of institutions as well as behavioural change and the empowerment of actors'

(Crozier & Friedberg, 1993, p. 19)

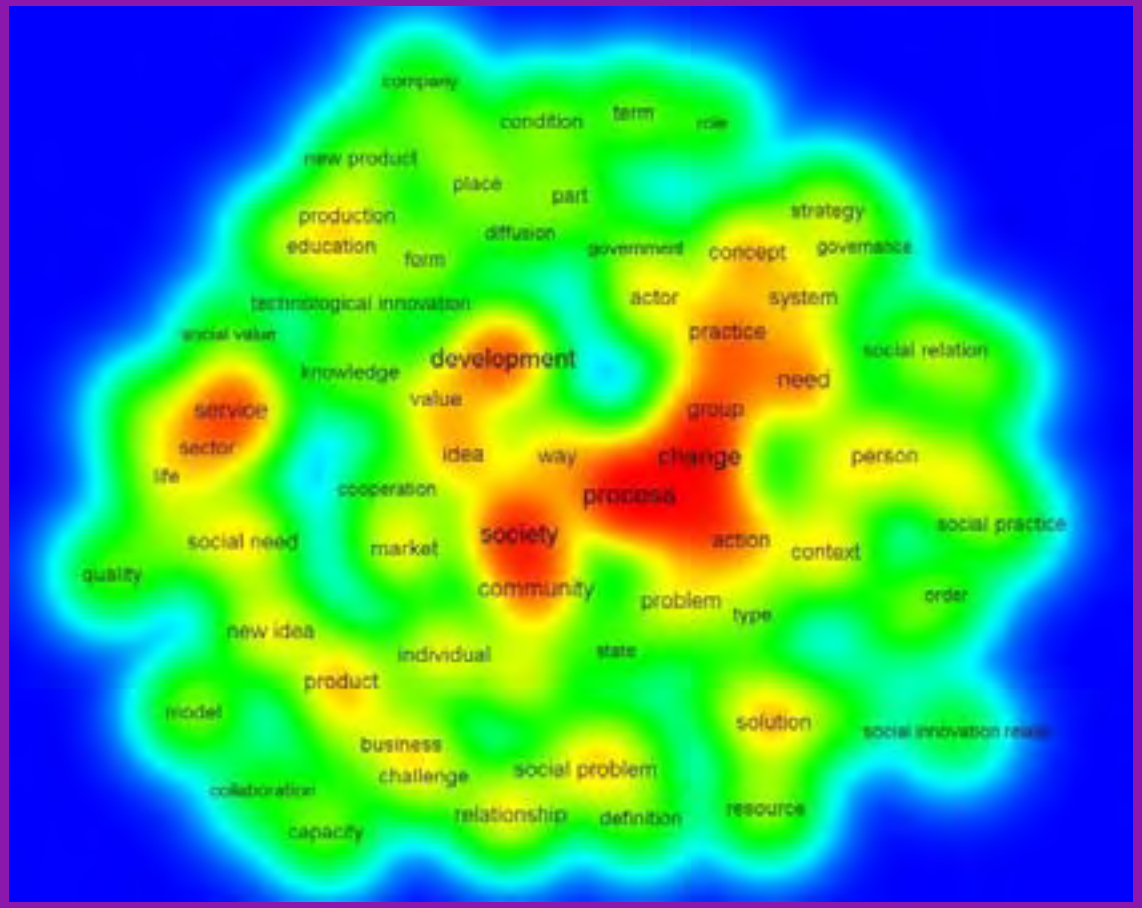
3b. From a provisional definition of SI



Mapping co-occurrence of main terms found in narratives of SI (N=252 definitions of SI from 1950 to 2014)

2,339 documents, retrieved from Web of Science, SCOPUS & Google scholar

Content analysis (combined methodology)
A. Aims/ends and generation of values in SI processes
B. The 'outputs/outcomes' of SI processes
C. The organization of SI processes: Sources, actors and interrelationships
D. Institutions and power in SI processes
E. SI processes in complex macro-systems



Map: Matthew L. Wallace (VoSViewer software)

Revisiting six decades of social innovation definitions

General results: Two intertwinted views of SI

Transformative

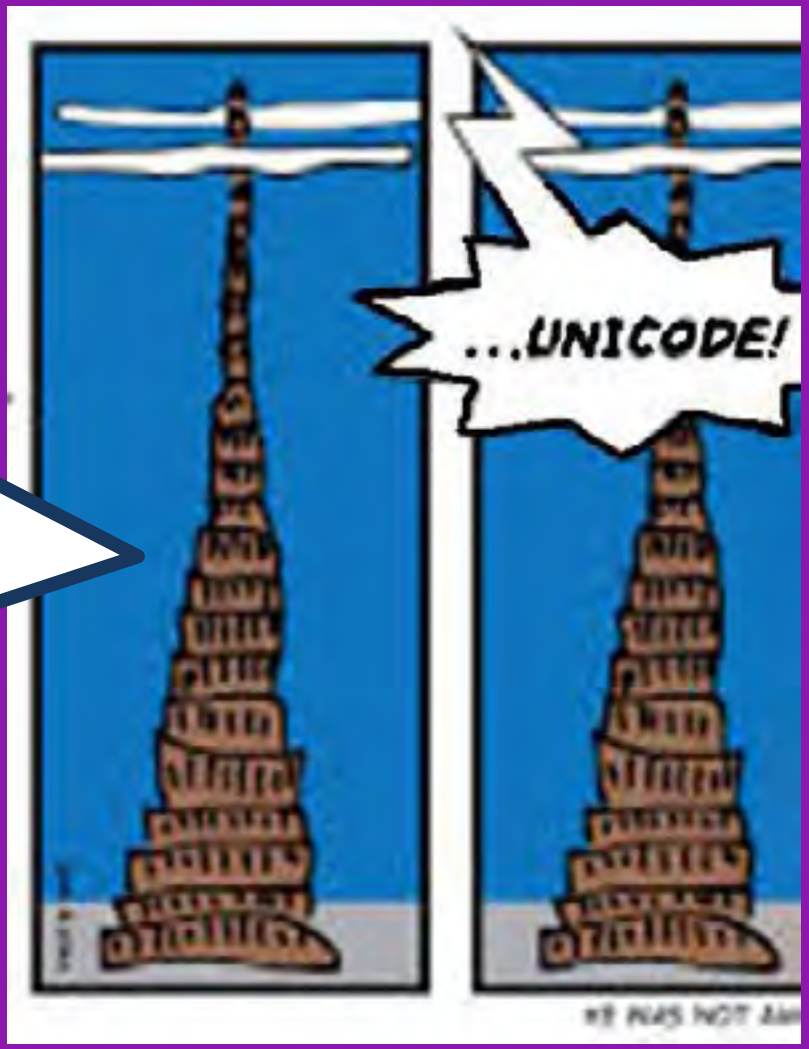
‘new combination or configuration of social practices/change in social practices’

Instrumental & Normative

‘new or improved product’, ‘new service’ ‘new organisation method’, ‘social inventions’ (law, norm, rule)

…babelisation of **innovation**

Base of Pyramid (BoP) innovation
inclusive innovation
Below-the-Radar Innovation (BRI)
grass-root innovation
frugal innovation
Jugaad innovation
open social innovation
SOCIAL INNOVATION
Gandhian innovation
responsible innovation
social technologies
eco-innovation
sustainable innovation
environmental innovation



Examples of ‘pure’ and hybrid social innovations

4. Backing to *any* innovation process

Outcomes of innovation process?...

normative and transformative in 'T', 'S' & 'C'

Governance
(innovation)

Technology
(innovation)

Culture
(innovation)

Society
(innovation)

Institutions & Institutional change
(innovation)

Institutions are created through learning processes where *'learning not only includes behavioural learning (learning-by-doing which evolutionary theories operationalize through search and performance feed-back), but also cognitive learning (which emphasizes action, reflection and sense-making)'*

(Geels, 2010, p. 499)

Any Innovation process involves social action (agency)

(Hellström, 2004)

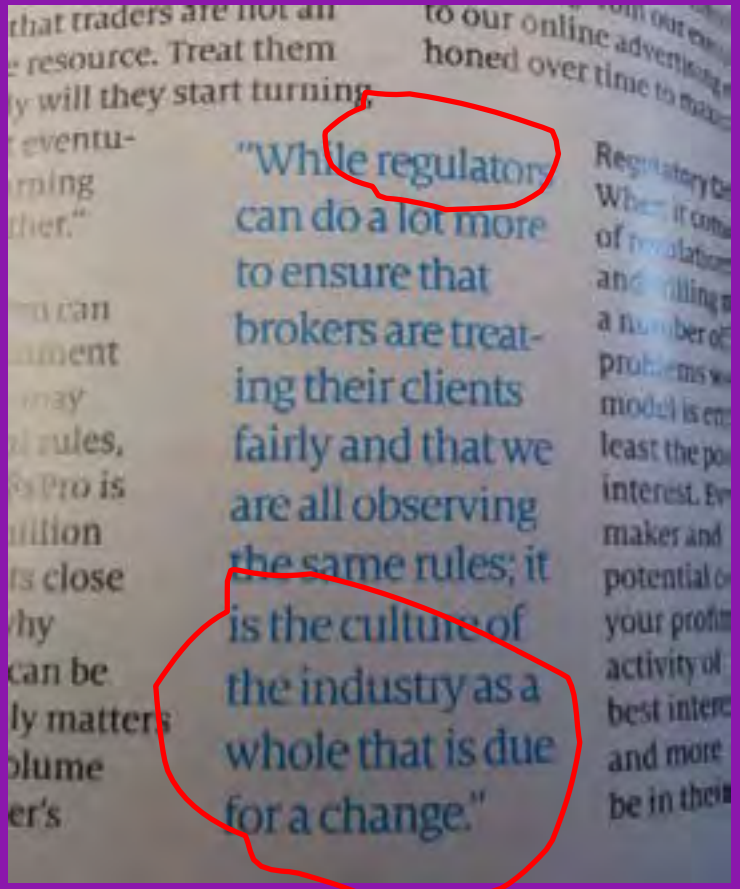
Changing beliefs and mind-sets imply ‘struggles’ against inertia & power interactions

Creating a Culture Change

The CEO of FxPro, one of the largest players in the online FX industry, pushes for a change of industry practices. Spurred by the Swiss Franc shock, Charalambos Psimolophitis believes that it is time to come up with new rules and models to rebuild the reputation of the global FX industry.

As CEOs go, FxPro's Charalambos Psimolophitis cuts an intriguing figure. The outspoken industry critic is to be found in the office at all hours, often sporting a

act as relationship managers r
being bonus driven. This is be
clients do not need to be sold



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"While regulatory can do a lot more to ensure that brokers are treating their clients fairly and that we are all observing the same rules; it is the culture of the industry as a whole that is due for a change."

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5. Conclusion

All innovation is a social process ‘constructed/enacted’ by evolving shared (repertoires) of social practices involving multiple actors (academy, industry, society…and government)

(repertoires) of social practices are not independent of the creative transformation of (different types) of knowledge

(Deleuzan, cited by Moulaert et al., 2005; Edwards-Schachter & Tams, 2013)

In all innovation process institutions are created and transformed through interactive & collective learning process & social action

5. Conclusion

Many questions to ask about institutions in the Innovation & STS fields…backing to the basis of *any innovation process*

Open debates on the role of institutions and institutional innovation integrating Management & Sociology!

Innovation Futures

Thank you for your attention!

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The missing links.
Demand based policy making and instruments in the context of mission orientation

Wouter Boon and Jakob Edler

EU SPRI Annual Conference

Helsinki 2015

Structure

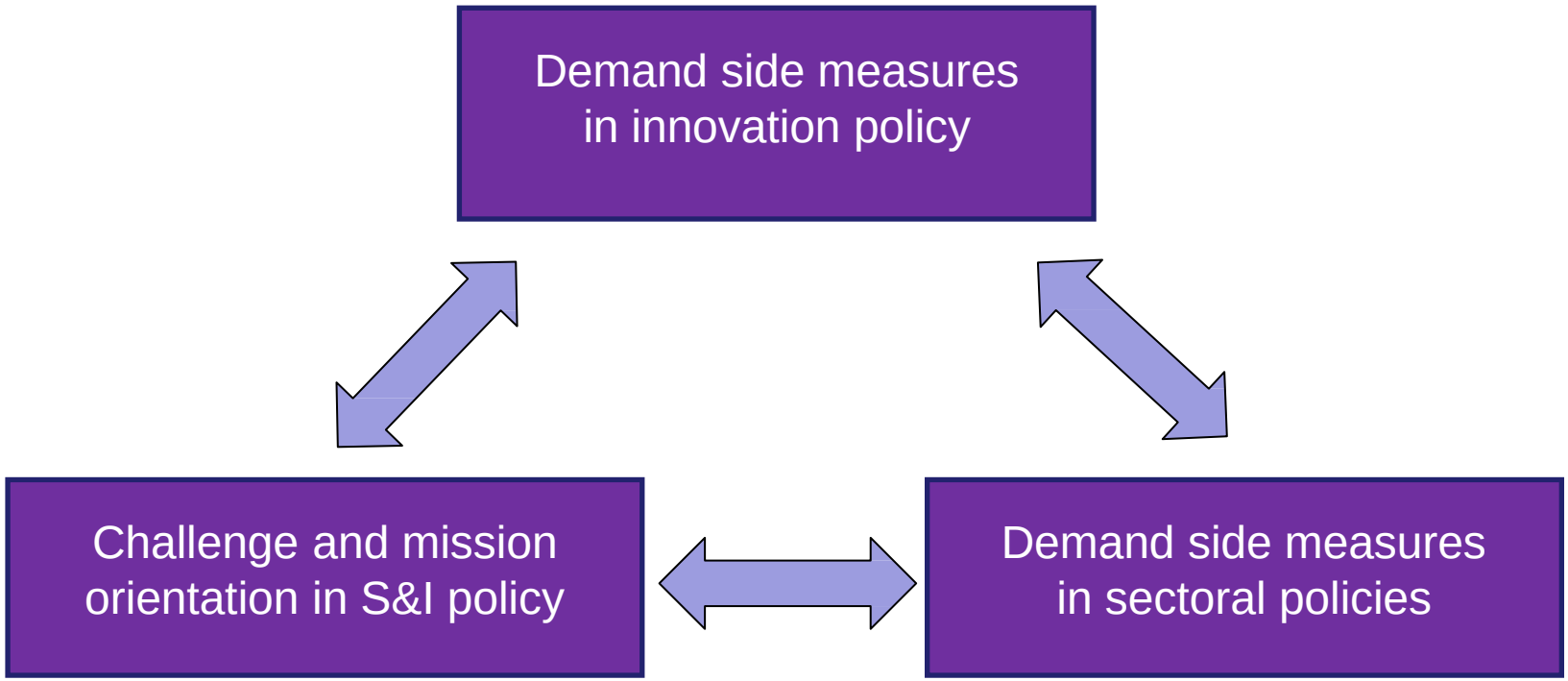
1. Main idea

2. Three pillars
   - Rationales
   - Tensions and shortcomings

3. Benefits of linkages and integration

4. Conclusions

Main Idea

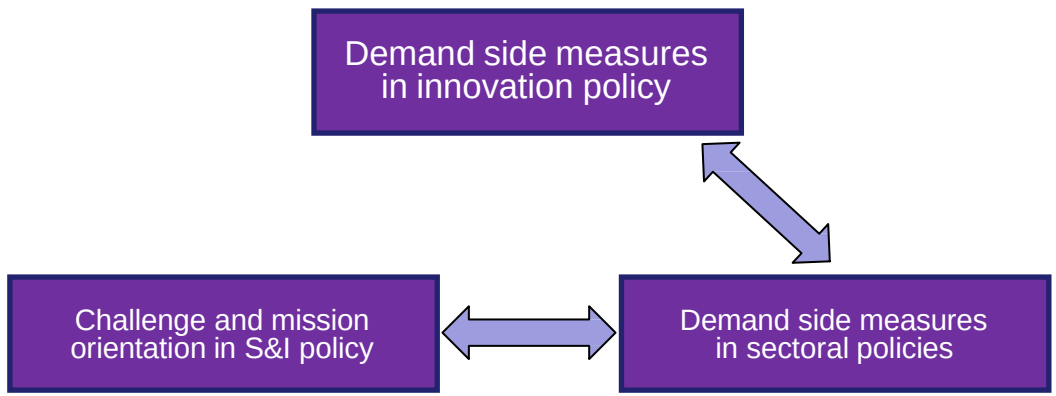

Demand side measures in innovation policy
Challenge and mission orientation in S&I policy
Demand side measures in sectoral policies

Main Idea

- **Better understanding** role of DSP in each pillar: intervention rationales, issues of policy design, governance, implementation and use of strategic intelligence?

- What to win by an **integrated perspective**, no matter from which corner you enter?

- What would policy gain (effectiveness, responsiveness) by **addressing the arrows** to the other pillars?



Challenge and mission orientation in S&I policy Rationale

- Public STI policy discourse concerned with a strong, proactive "entrepreneurial" role of the state to
  - support generation of knowledge and innovation for
  - clearly defined missions and challenges (e.g. Gassler et al, 2008; Mazzucato, 2011; Foray et al, 2012)
  - moving away from archetype of Manhattan and Apollo projects (Nelson, 1977; 2011)
- State: risk-taking, pre-commercial opportunity creation
- Genuine task of state to prioritise S&T with a view to (likely!) societal and economic contribution

Challenge and mission orientation in S&I policy Instruments and tensions

- Policy approaches
  - large-scale programmes, concerted supply side effort, but: wicked problems, multi-faceted, systemic
  - co-creation of ideas and solution, involving users (on every level)
  - traditional top-down science programmes
  - mission oriented science organisations (public labs, PSREs, etc.)

- Strongly supply side driven

- Demand side measures? Demand conditions?
  - demand articulation difficult and multi-level exercise

Demand side measures in **innovation** policy Rationales

Market & system failures hamper market entry and diffusion

- Information asymmetries between producers and (potential) users
- Adoption externalities
- Lack of interaction between users and producers
- Lack of capabilities and willingness (switching costs) to use new technologies
- High entry costs (high potential for network effects)
- Technological path dependencies
- Poor awareness/articulation of need

Support industry, growth and location

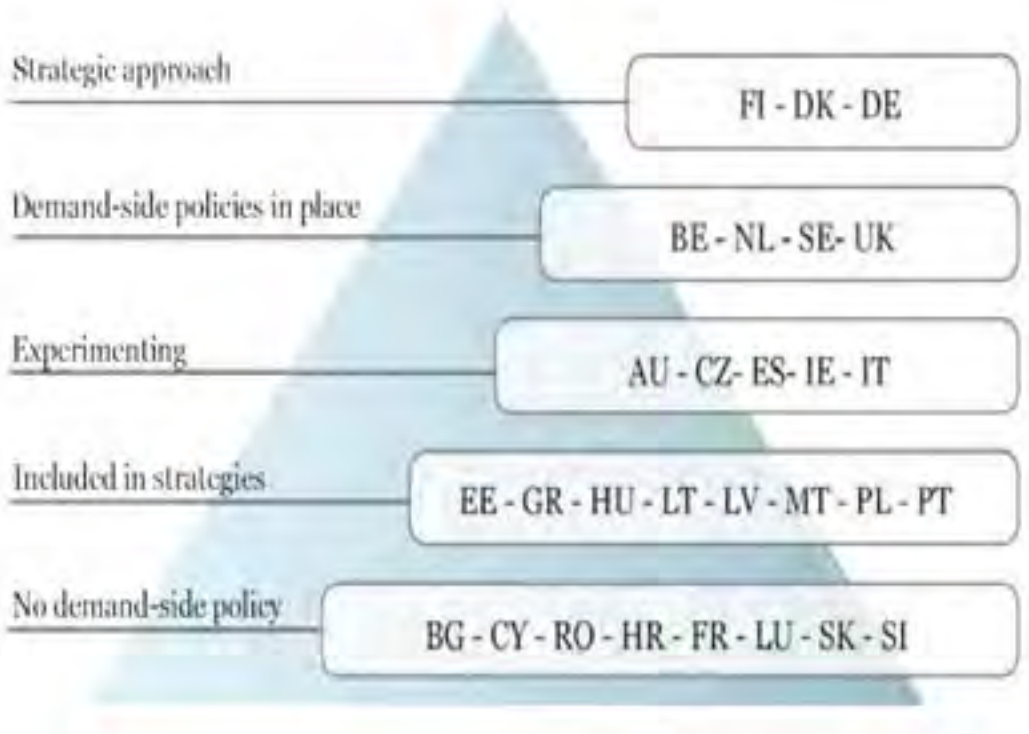
- Support local producers, service providers
- Indirect: Triggering something bigger, market creation
  - Dominant designs, demonstration effects
  - Scale/scope advantages
  - Learning / upgrading for buyer and provider
  - Keep up innovation pressure in system
  - Investments close to forefront demand

Public intervention to overcome various kinds of bottlenecks, and create and capture multiple opportunities

Edler, 2013

Demand side measures in **innovation** policy
Policy approaches

- Strong policy debate and declaratory strategies
- Driven by “innovation” and economics ministries
- 75% of EU member states have demand-side policies on their policy agendas
- However in concrete terms, few countries are taking further action?



Source (Izsak and Griniece, 2012)

Demand side measures in **innovation** policy
Instruments and tensions

- Broad portfolio of instruments
  - public demand, private demand
  - financial and non-financial (information, training, demonstration)

- But, strong limitation currently:
  - shift towards need-driven supply policy: pre-commercial procurement as substitute for genuine demand side approaches
  - developing into risk financing and demonstration funding
  - poor combination of public and private demand
  - strong ambition to mobilise demand for economic growth,
    - potential tension with social effects of innovation (sectoral policy)
    - opportunity to link ‘lead market approach’ with challenges declared – but not followed up

Demand side measures in **innovation** policy
Instruments and tensions

- Performativity challenge as justification challenge: societal *and* innovation effect of demand measures take time to realise
- Attribution economic effects to one country: more difficult for demand side than supply side measures
- Poor connection between supply and demand policy actors
- Substance knowledge gap and poor connection to those actors that define and own challenges (also Edler/Nowotny); lack of absorptive capacity, risk of backing wrong options and capture

Demand measures in sectoral policies Rationales

- Strong intervention rationale: sectoral policy makers as “entrepreneurs” in creating and enlarging markets for politically desirable innovations to tackle defined policy problems

- Strong engagement with and knowledge of stakeholder’s preferences and substance knowledge, enabling
  - numerous targeted approaches to pull through the diffusion of next generation of technologies (currently mainly eco-innovations)
  - very targeted measures
  - support for user – producer interaction
  - public actors are users of knowledge and innovations themselves

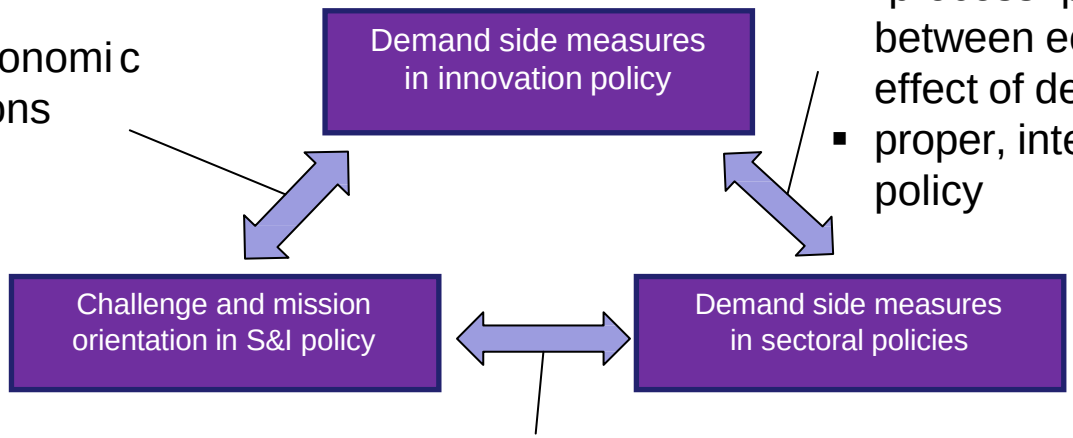
Demand measures in sectoral policies
Tensions

- Limited awareness and knowledge of STI supply side policies for related technologies (in European systems of STI ministries in charge)
- Coordination between different geographical scales
- Very high strategic intelligence challenge
  - bottleneck and opportunities analysis on demand *and* supply side
  - conceptual justification of demand side measures (disturbing ‘level playing field’ versus using local demands)
  - policy impact: spill-over effects on economy: anticipate / assess

Benefits of linkages and integration

- orchestration of supply and demand capabilities
- supply conditions underpinned by economi c framework conditions

- innovation policy as support policy
- increased effectiveness of demand measures (substance knowledge)
- “process” potential tension between economic and social effect of demand measures
- proper, integrated lead market policy



- co-ordinated challenge policy taking advantage of sector specific expertise and access
- emerging technologies linked with specific demand conditions and regulations / standardisation
- mutually supporting in need articulation, prioritisation and definition of directions

Conclusions

- Demand based policy instruments underused and not as effective as they could be because of
  - lack of integrated thinking and
  - subsequent lack of proper design and implementation
- Various thematic / challenge oriented policies do exist that de facto link 2 of the 3 pillars
- Conceptually linking the three pillars is beneficial
- Integration of all three as systemic problem driven innovation policy
- No general turn towards integration, but
  - deliberate attempts in areas of high societal concern and sufficient supply capabilities
  - structural provisions across government to integrate where needed
  - governance challenges mainly across government as moderator

NIFU

Nordic Institute for Studies in Innovation, Research and Education

Markus M. Bugge

10.06.2015

A co-evolutionary approach to transformative change in health care – The case of active ageing

Markus M. Bugge, Lars Coenen and Are Branstad

The 2015 Annual Conference of the EU-SPRI Forum

Innovation policies for economic and social transitions: Developing strategies for knowledge, practices and organizations.
The Missing links - Demand based policy making and instruments in the context of mission orientation. Concepts, impacts, governance challenges

NIFU

Background: Need for innovation in health care

- Demographic ageing - People live longer and healthier
- From acute to chronic diseases
- Expectations for increasing quality of public health care services
- Pressures on public budgets

Conceptual framework

- Socio-technical transitions / Multi-level perspective (Geels)
  - Regime: “the whole complex of scientific knowledge, engineering practices, production process technologies, product characteristics, skills and procedures, established user needs, institutions and infrastructures” (Hoogma et al., 2002)
  - Niche: Radical change is seen to take place in and emerge in niches. ‘incubation spaces’ for radical new technologies
  - Landscape: Deeper structural trends and external context

- Governance of change
  - Mission-oriented innovation policies / Governance of change (Borras & Edler 2014)
  - Autonomous vs Embedded state (Rodrik 2004)
  - Policy mix (complexity in societal challenges, multiple scales, learning agent) (Laranja, Uyarra, and Flanagan 2008)
  - Transitional policy failures (Directionality failure, Demand articulation failure, Policy coordination failure, Reflexivity failure) (Weber and Rohracher 2012)

Research questions

- To what extent and how can a multi-level perspective be applied onto the current transformation in the health care regime?
  - What are the roles of landscape and niches in bridging the old and the new regime?
- What is the role of governance in this transition process?
  - To what extent and how does the state take a (pro-)active role in the development of a new health care regime?
  - To what extent and how does the identified typology of policy failures in transformative change apply?

Method

- Case study: National policy program for welfare technologies
  - Pilot study within policy program
- Desk-top and document studies
  - Policy reports
- Interviews
  - 15 interviews with subcontractors of AAL solutions
  - 15 interviews with key informants from policy apparatus, research and innovation policy programs, interest organizations and municipalities
- Participation in seminars
  - 20 policy / industry seminars, workshops, dialogue conferences, product presentations and conferences
  - 2011 – 2015

National context for health care services

- Public health services have a strong position in Norway (Nordic model),
  >> natural for public sector to take lead role in health care innovation
- Fragmented and autonomous local government structure
  >> may imply coordination challenges
- Division between primary health care and specialist health care
  >> may imply coordination challenges

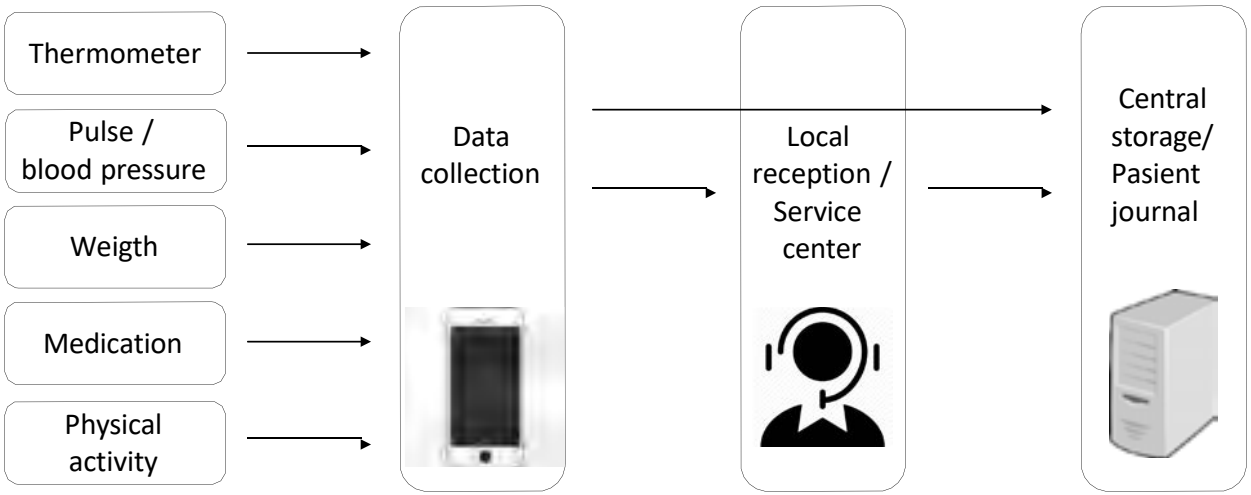
Policy program for welfare technologies 2013-2020

- Launched in 2013 by the Norwegian Directorate of Health - executive agency subordinate to Norwegian Ministry of Health and Care Services
- The program aims to ensure that welfare technologies shall be an integrated part of public health care services by 2020
- The activities in the national program seek to develop and implement new standards, services and solutions
- Focuses primarily on digitizing, developing and upscaling safety alarms
- Continua framework pointing at international standards to ensure interoperability and coordination in the emergence of new regime
- The program has funded 10 pilot projects involving 32 municipalities (of a total of 429 municipalities nationally
- The pilot projects are joint collaboration projects involving practitioners, subcontractors, users and researchers

Four phases of the policy program

- Establishment & preparations 2013-2014
- Testing 2014-2016: 10 pilot projects involving 32 municipalities
- Upscaling 2015-2020 to involve 320 municipalities by 2019
- Consolidation 2020. Ensure usage by the end of the program period

User generated data / health care 2.0 / ecology enabled by digital safety alarms



Source: Based on The Norwegian Health Directorate

Findings 1: An MLP perspective on active ageing

- Policy program initiated as a response to landscape pressures
  (Demographic projections, Pressures on public budgets, Expectations for increasing quality, Need for innovation)
- Policy program and piloting seen as a niche arising from the regime
- Legitimizing referring to ‘regime shift’ / An emerging regime
  - From a centralized to a distributed health care system
  - From re-active to pro-active health care services
  - From analogue, uni-functional and home based safety alarms to mobile, multi-functional and digital safety alarms allowing for eco-system of health 2.0 services and solutions
  - Mentality change from nursing / care to “everyday rehabilitation” / individual autonomy
- Barriers to regime shift
  - Currently small-scale test phase / lack of test users
  - Lacking / insufficient coordination across multiple stakeholders and sectors
  - Requirement of reconfiguration of organizational apparatus / alarm centrals
  - Instability in mobile networks
  - Legislation associated with data sharing
  - Public funding of health care services (administration vs innovation)

Findings 2: The role of governance

- Policy program on active ageing an example of an entrepreneurial and pro-active state
  - Government has set the goal for the socio-technical transition
  - Government has been influential in defining the technologies, arranging for standardization through the Continua framework, Initiated the pilot projects and acted as coordinator of municipal procurement
  - Balancing between roles: Dirigiste/ Autonomous/ Accountable) vs Embedded/ Experimenting) state / Commanding vs Heterarchical
  - The public sector (municipalities) acts as gatekeeper between subcontractors and users

- Transitional policy failures related to coordination and reflexivity
  - Reason to question the coordination of knowledge development and innovation a) across the different practice-oriented pilot projects on the one hand, b) across practice-oriented (DUI) and science-driven (STI) approaches, c) across levels of governance, and d) across research activities following the ten pilot projects and the Health Directorate and the Organization of Local Governments (KS)

Conclusions

- MLP perspective common in studies of transport and low-carbon industries but also suitable as framework for understanding innovation in public (health care) services
  - The goal of a regime shift set by the government
  - Structural barriers towards this shift
- Pro-active state
  - Setting the goals, setting the agenda, defining the technologies
  - Establishing a market through providing technological standards
  - By coordinating and managing the overall knowledge development and innovation
- Challenges for governance
  - Balancing between contrasting roles (Accountability/Innovation and Commander/Collaborator)
  - Coordination across multiple stakeholders
  - Continuous reflexivity of overall knowledge development

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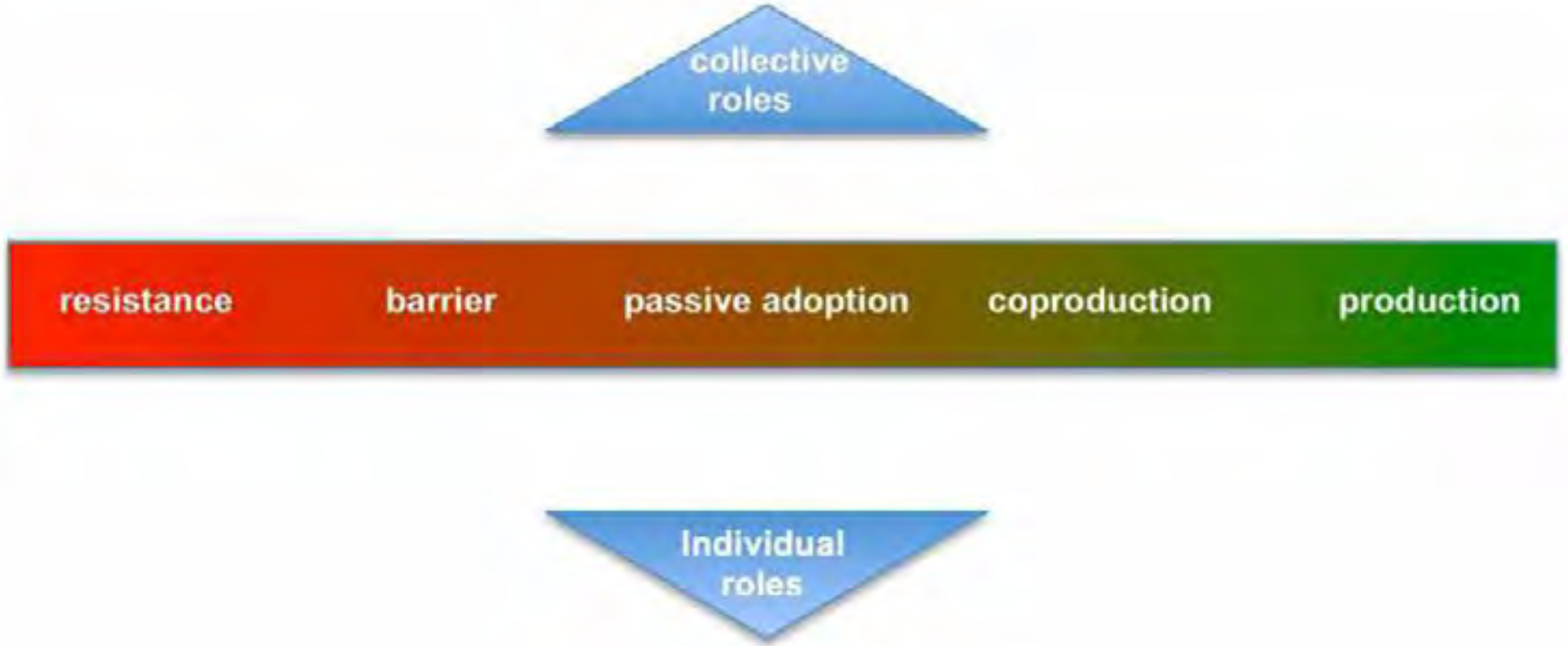
NIFU

Conceptualizing the Active Role of Users in Shaping Transitions

Johan Schot, SPRU, University of Sussex, UK
Laur Kanger, University of Tartu, Estonia

21.06.15

Users in transitions literature



Source: Verhees (2014), N = 349

Main research questions

RQ1: What kind of roles are attributed to users in transitions literature?

RQ2: How are different user roles implicated in the process of starting up, accelerating and stabilizing socio-technical transitions?

Typology of user roles

1. User-producers
2. User-legitimators
3. User-intermediaries
4. User-citizens
5. User-consumers

Branches of literature reviewed: Strategic Niche Management, Multi-Level Perspective, Grassroots Innovations, Social Practice Theory

User-producers

User-producers invent experiment and tinker with radical technologies, creating new technical and organizational solutions, and articulating new user preferences. They perform second-order learning processes

Source:
Schot et al. (2002)

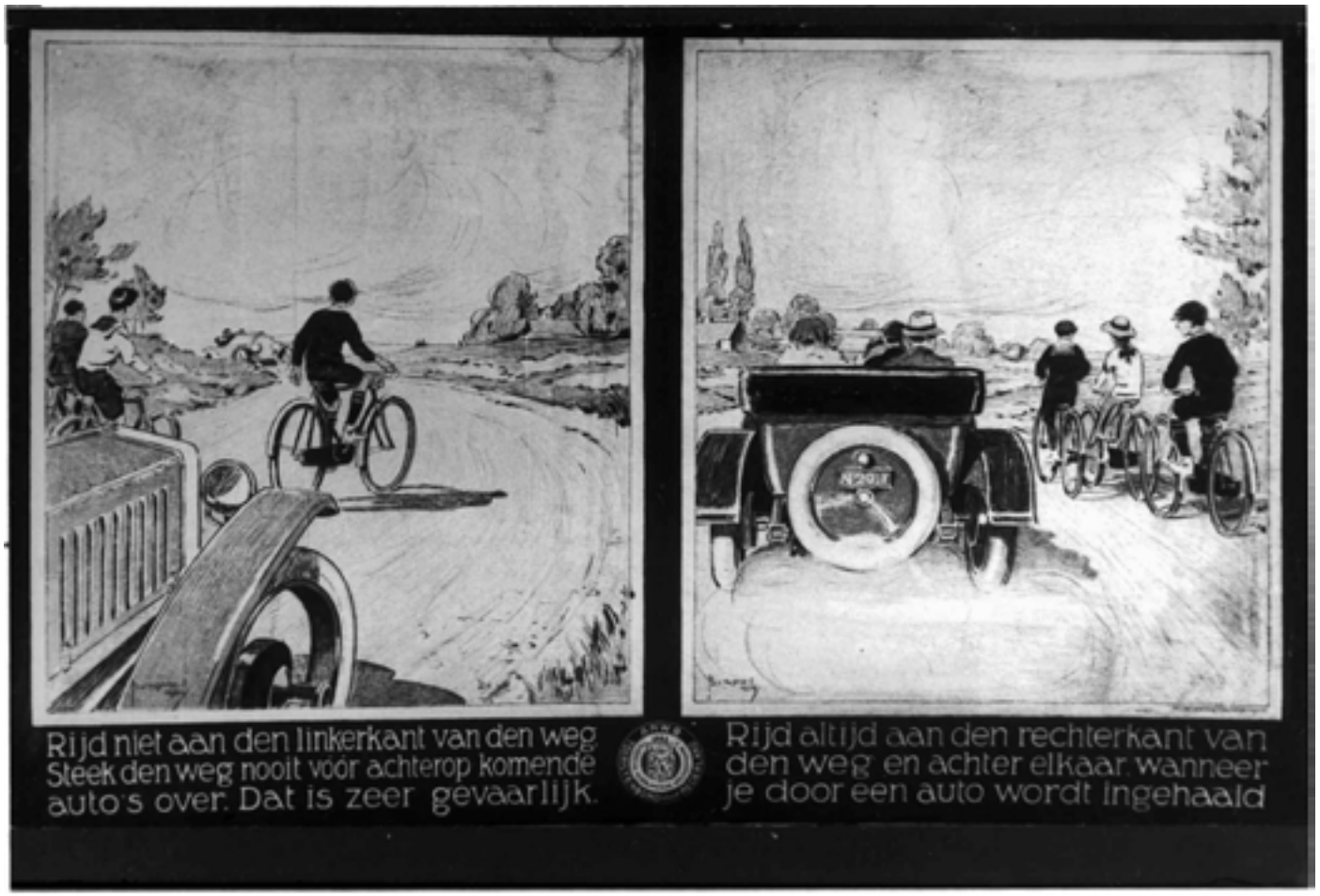
User-legitimators

User-legitimators shape the values and worldview of niche actors giving meaning, purpose and rationale for their activities. They provide interpretations of developments at the landscape level. They provide a cultural 'glue' which helps to ensure a sense of belonging, identity and social cohesion

Source:
Schot et al. (2002)

User-intermediaries

User-intermediaries are involved with niche cumulation: they enrol new actors and broker contacts between them, they help to create a space for producers, users and regulators to meet and attempt to achieve the alignment of technologies, actors and rules



Source:
Schot et al. (2002)

User-citizens

User-citizens engage in politics of regime shift lobbying for a particular niche and against the regime (or other niches)

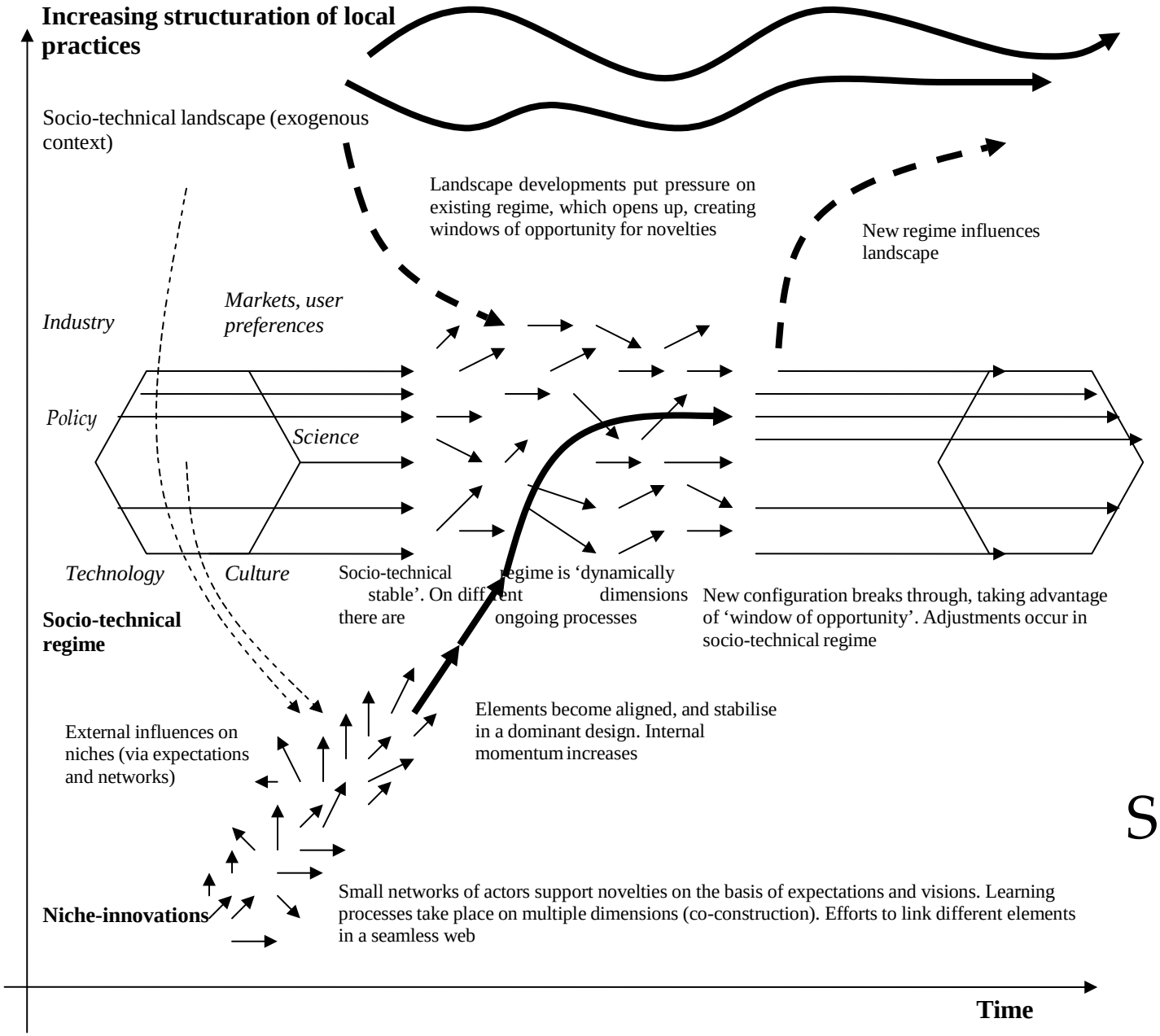
Source:
Schot et al. (2002)

User-consumers

User-consumers mainly use their power to buy products. They define their lifestyle through a variety of consumption practices. They may also be involved with maintenance and repair work and perform first-order learning processes. They will have fixed preferences which denotes the stabilization of the regime

Source:
Schot et al. (2002)

Transitions as multi-level processes

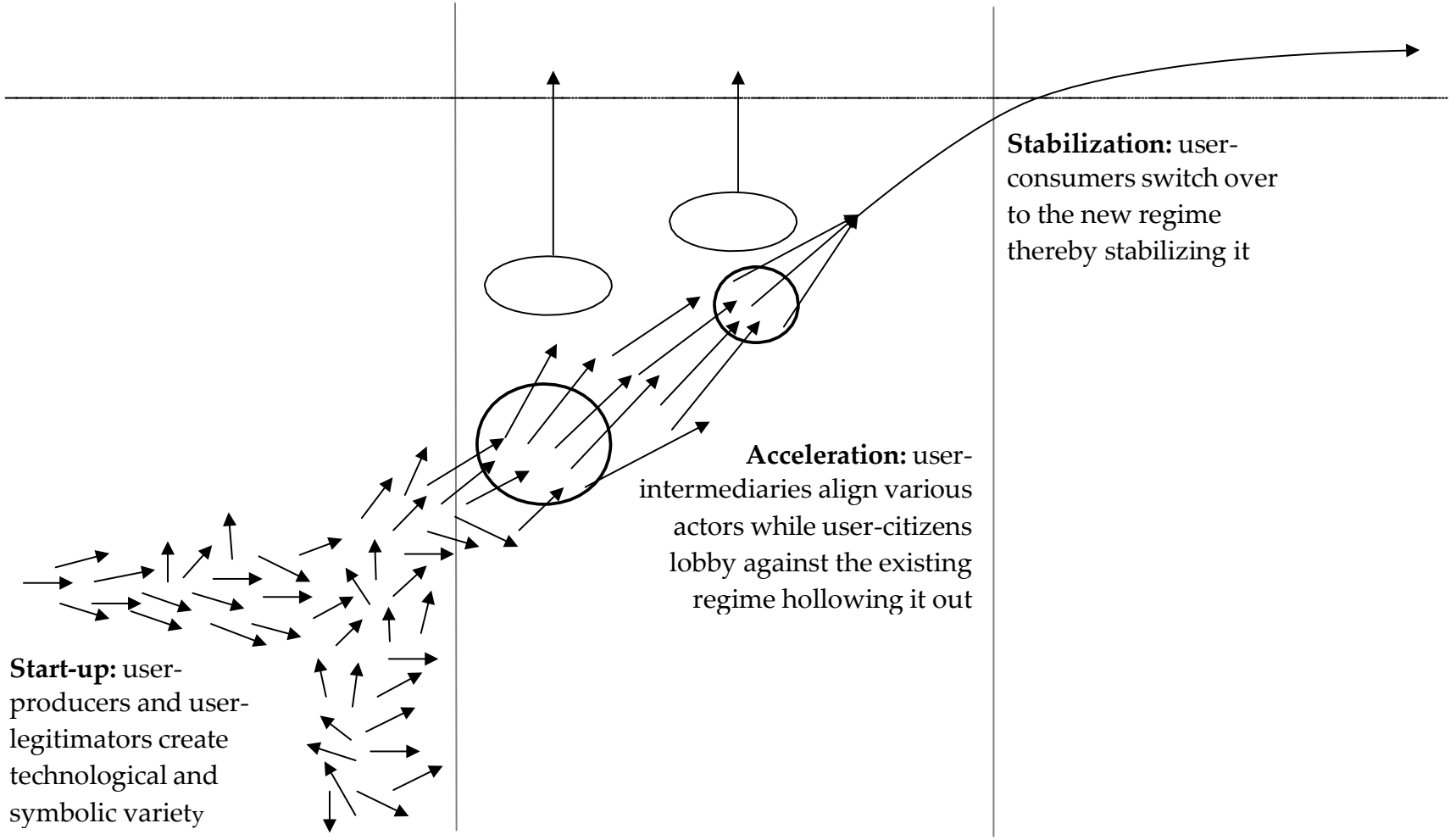


Source: Geels and Schot (2007)

User roles and transition dynamics I

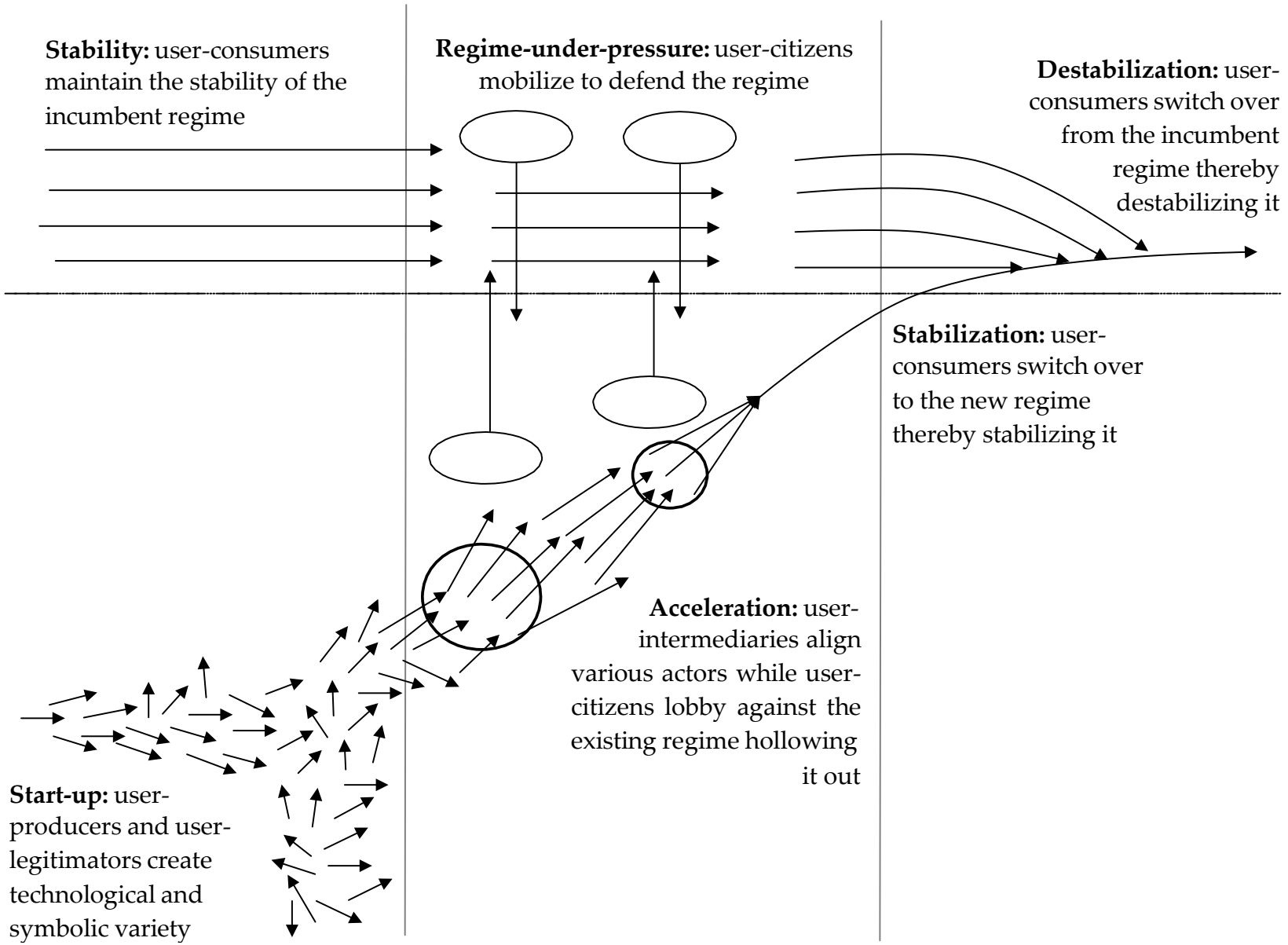
Many user roles can be encountered in all phases but:

- Different roles are salient in different phases
- The activities associated with each role are qualitatively different in each phase



User roles and transition dynamics II

User activities on the regime level are affected by user activities on the niche level



Implications for innovation policy

- Different policy actions are required for different levels and transition phases:
  - **Start-up:** stimulate technical and symbolic variety (niche), prepare for hollowing-out (regime)
  - **Acceleration:** enhance intermediation (niche), decrease and cut support (regime), moderate conflict (niche and regime)
  - **Stabilization:** anticipate and manage the potentially harmful effects of consumer positioning, step back but also keep probing for market/system failures

SHIFTING PARADIGMS FOR EU

FROM FOSTERING TRANS-NATIONAL COOPERATION PROJECTS IN R&D TO BUILDING PAN-EUROPEAN ENTREPRENEURIAL ECO-SYSTEMS

A PROPOSAL FOR A RESEARCH PROGRAMME

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INSIGHT FORESIGHT
INSTITUTE

EU-SPRI Helsinki 2015 Conference,
10-12 June, 2015

16/06/2015

BACKGROUND

Advanced European Higher Education Area (EHEA) through voluntary coordination (Elken and Vukasovic, 2014)

Less progress with the European Research Area (ERA) where '*knowledge can move freely across European borders*'

Europe lacks a EU-level Innovation Policy beyond traditional rhetoric of knowledge transfer and this, at European level, integrating all three pillars of the Knowledge Triangle.

NEED FOR A NEW PARADIGM

moving innovation 'beyond rationales about competitiveness and growth'

still much based on an old supply driven innovation model

Frascati manual measuring R&D in 1963

Oslo manual in 1997

'linear model' pervasive in governmental policies

a new paradigm and a new generation of innovation policy instruments (Borras and Edquist, 2013)

ADVICE FOR REFORMS IN MEMBER STATES

In Europe most of the public R&D is still managed at national level

the policies that EU institutions support foster (cross-border) collaboration in R&D

'European Research Council' (ERC), stronger cooperation and coordination with National Research Organisations and Councils

the European Commission, commitments to make its role evolve to policy advice supporting reforms in member States (EC, 2014).

LONG WAY TO TRUE EUROPEAN INNOVATION POLICY

policy mix	*problem-oriented*	*systemic*
studies on the specific facets	Evaluations (Eureka, Cost and FPs)	Still the paradigm kept intact; exceptions (ERC, EIT, FETs)

TOWARDS EUROPEAN INNOVATION POLICY

comprehensive scholarly' works are scarce (Peterson and Sharp, 1998; Borras, 2003)

Clearer division of labour in the multi-level governance system (Granieri and Renda, 2012)

CURRENT PARADIGM

Extensive 'policy experimentation' has taken place with the 6th FP intensified with the 7th FP, characterised as cooperative R&D projects

The current paradigm in European innovation policy (Muldur et al. 2006) can be characterised by:

Member states principally responsible for capacity building (including Structural Funds);

EU and inter-governmental cooperation fostering connections across borders;

Increasing emphasis on large firms and easing access for SMEs firms;

Collaboration principally framed by disciplines and business sectors.

NEW PARADIGM

A new paradigm is proposed with the shift from project collaboration to long term partnerships for enabling ecosystems meaning:

Capitalising on existing capabilities and alignment of public support available in Europe;

Bottom-up community-driven partnerships for co-creation and multilevel synergies;

Focus on emergence and growth of young dynamic firms ('yollies');

Acceleration, the exploitation of tacit knowledge and addressing societal challenges.

WHY A RESEARCH PROGRAMME?

"without a radical change […] Europe in 2020 will be only slightly different, in terms of goals achieved, from Europe in 2011, but it will cost more." E&Y and CEPS (2011)

Notwithstanding the novelty of EIT, the report favourably positioned EIT and its KICs amongst

the most promising innovation platforms in the world:

- EIT
- the UK Technology Strategy Board´s Innovation Platforms
- US Department of Energy´s Innovation Hubs (E&Y and CEPS, 2011)

EIT - pan-European perspective (E&Y and CEPS (2011)

KNOWLEDGE TRIANGLE

Fig.: The Knowledge Triangle as seen by the 'European Institute of Innovation and Technology' (EIT), emphasises the partnership side in building up its knowledge triangle operations (so called 'Knowledge and Innovation Communities' or KICs) thereby refering to business instead of innovation (Source: www.eit.europa.eu).

CAPTURING LESSONS LEARNED

KICs shaping new, co-created, more effective, efficient and adaptable innovation models

'disruptive collaborative spaces' (WEF)

'strategic public private partnerships' (OCDE)

Also regulation, standardisation, intellectual capital, etc.

As a starting point to delineate such spaces

- the US (e.g. DARPA and ARPA-E) and
- Europe (Tekes, NHO, TSB, FFG, etc), new policy experiments (like EIT KICs)

entrepreneurial ecosystems and enabling frameworks within, across and beyond national innovation systems and borders.

'intelligent innovation institutions' and 'learning innovation agencies'

THE RESEARCH PROGRAMME

to examine and define new forms of innovation policy in Europe.

to answer what European innovation policy should mean.

to tackle European innovation 'gap' and 'fragmented' landscap

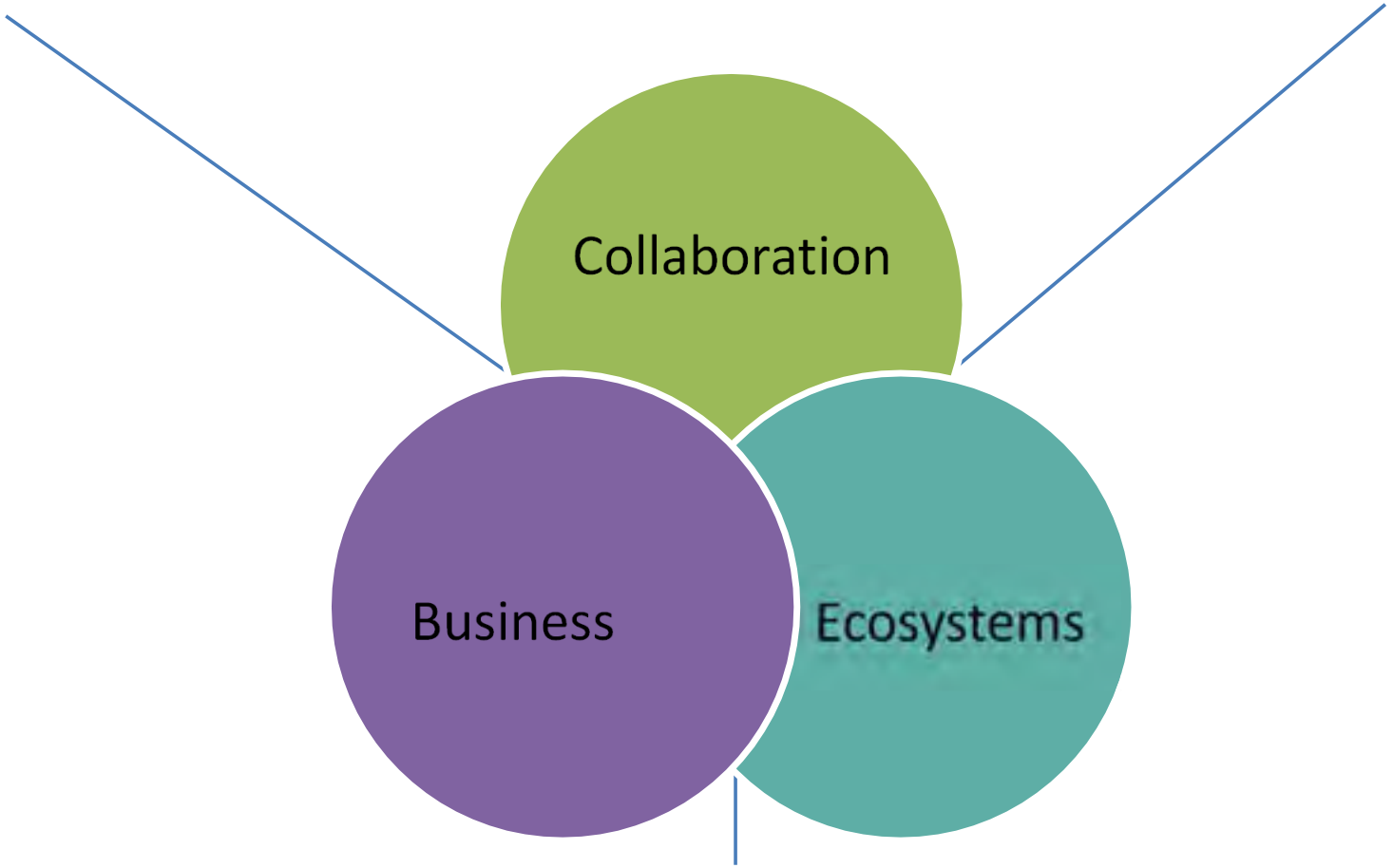
to focus on ecosystems and young, dynamic and innovative firms (Schot, 2014)

To generate renewed dynamism in Europe and more generally in the West (Phelps, 2013)

POSSIBLE CONTENT AND WORK STREAMS FOR THE RESEARCH PROGRAMME

Work stream I : Business R&D (EXISTING FIRMS)

Work stream II: EIT & KICs(NEW FIRMS)



Workstream III : High Growth Firms (REMOVING BARRIERS)

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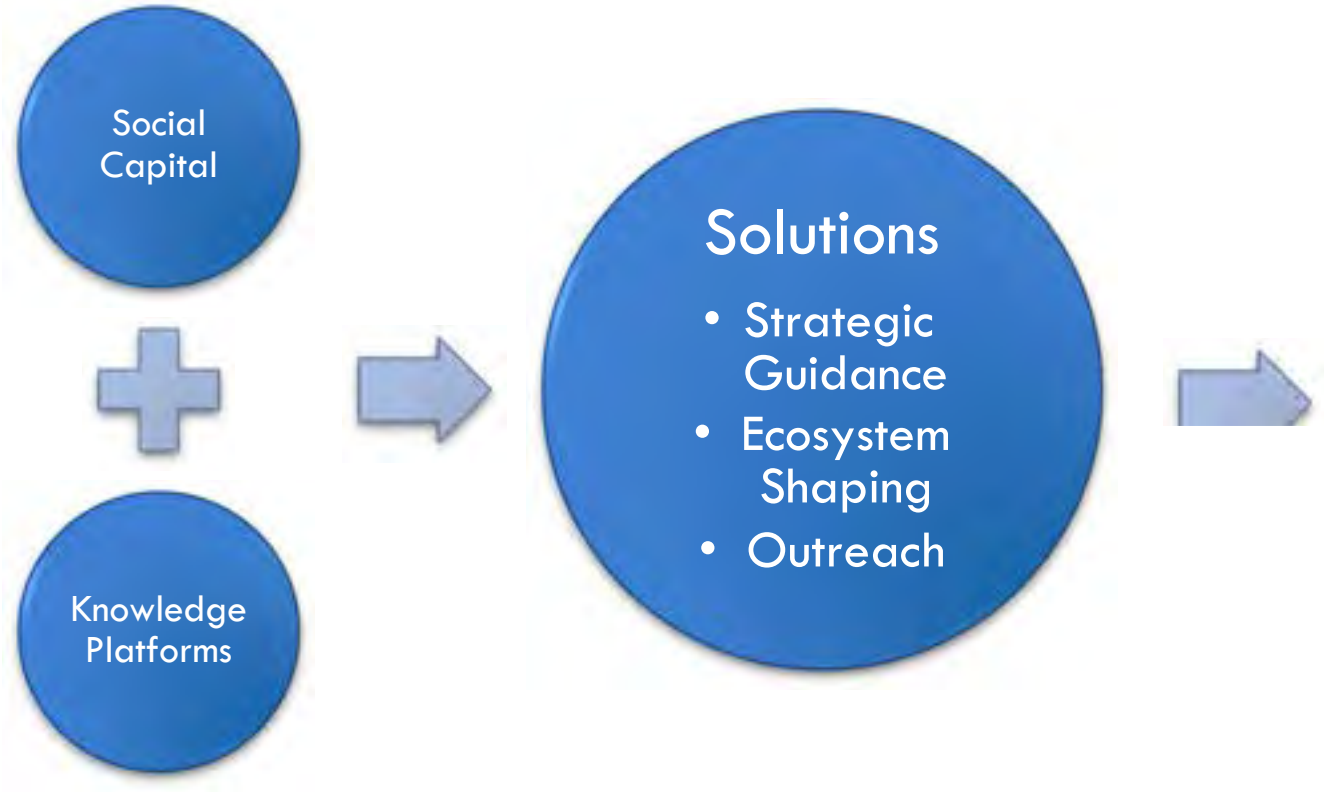
INSIGHT FORESIGHT INSTITUTE (IFI)

We work with business, policy and other decision-makers to foster insight and foresight that transform innovation ecosystems with lasting impact on society.

High Level Advisory Board
Innovation Council
Challenges Committee



Transforming

Innovation Ecosystems

Benchmarking
Horizon Scanning
Online Collaboration

SOCIAL CAPITAL

Co-founders

CHAIRMAN
José Manuel Leceta (MSc)
--
Director - EIT
Internatonal Director, *Head of Space Programmes Department*– CDTI
Representative/ Board Member - ERAC-CREST, EUREKA, TAFTIE
Spanish Delegate to ESA Satellite Programme Boards

Institutional area

MANAGING DIRECTOR
Totti Könnölä (Dr)
--
Ass. Professor – UP Comillas, IE Business School
CEO/Chairman – Impetu Solutions
Policy Officer – EIT
Scientific Officer – JRC-IPTS
Senior Research Scientiest – VTT

Knowledge area

STRATEGY DIRECTOR
Mario Mahr (MSc)
--
Director EU Affairs – UIIN
Manager - Asesoría I+D+I
Senior manager – Econet Consultants/PNO Consultants
Strategic advisor - RETI Spain
Project manager - SOLUZIONA IT

Strategy area

High Level Advisory Board

Recognised global leaders in innovation management and policy

Innovation Council

Experts and mentors:
- Research and innovation
- Education and talent
- Foresight and intelligence

Challenges Committee

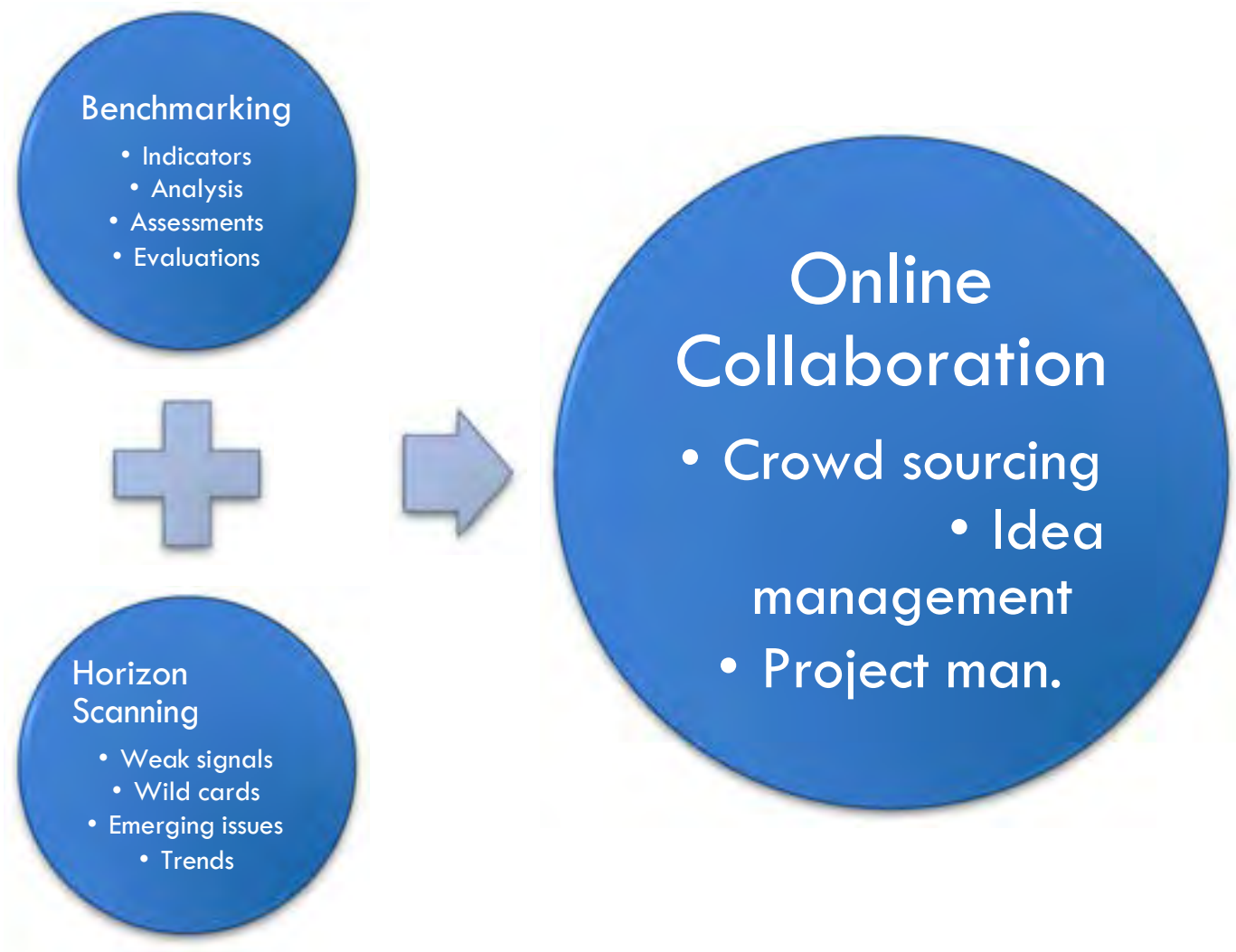
Representatives:
- Civil society
- Business associations
- Public adminstration

Strategic Alliances

KNOWLEDGE PLATFORMS

INSIGHT

FORESIGHT



SOLUTIONS

Strategic Guidance

- Visionary Guidance
- Foresight and Strategic Studies
- Evaluation and Policy Learning

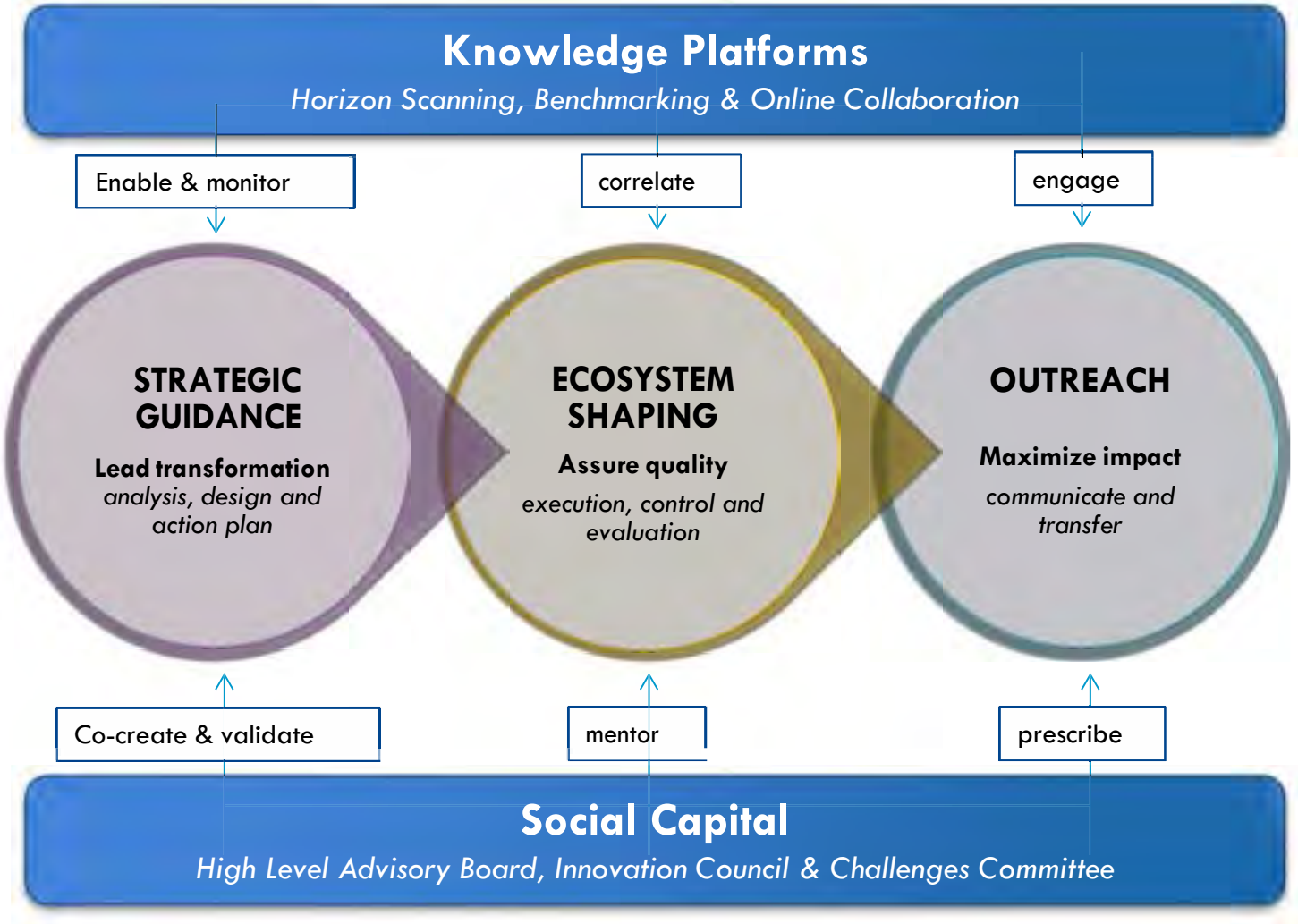
Ecosystem Shaping

- Co-Creation Spaces
- Incubation and Acceleration
- Personalised Mentoring

Outreach

- Networking and community formation
- Dissemination and communication
- Knowledge transfer

HOW WE DO IT


Knowledge Platforms
Horizon Scanning, Benchmarking & Online Collaboration
Enable & monitor
correlate
engage
STRATEGIC GUIDANCE
Lead transformation
analysis, design and action plan
ECOSYSTEM SHAPING
Assure quality
execution, control and evaluation
OUTREACH
Maximize impact
communicate and transfer
Co-create & validate
mentor
prescribe
Social Capital
High Level Advisory Board, Innovation Council & Challenges Committee

THEMES

Innovation Systems
Foresight
Transition management
Mission-oriented Innovation Policy
Demand-driven Innovation Policy
Open Innovation Institutions
Innovation Ecosystems
Knowledge Triangle
Co-creation
Acceleration
Living Labs
Innovations
Incremental
Radical
Disruptive
Systemic
Lean
Social
Eco

A PLACE-BASED APPROACH TO THE GOVERNANCE OF TRANSFORMATIVE INNOVATION POLICY

Dr. Marja-Liisa Niinikoski, CEO
Helsinki Business Hub, Finland

Dr. Kaisa Lähteenmäki-Smith, Science Specialist
Prime Minister's Office, Finland

PRESENTATION

- Introduction: context and framework
- Theoretical foundations
- Methods and materials
- Cases: Smart & clean, Health
- Comparison
- Preliminary results and conclusions

INTRODUCTION

- **Objective:** to develop an analytical framework for the governance of transformative innovation policy, which is challenge-driven and demand-oriented, aiming to system-wide changes.

- **Tentative research question**: Does the place-based approach help to overcome the over-reliance on sector-specific policies and tools in multi-level innovation policy?

THEORETICAL FOUNDATIONS

- **S*ense-making*** (Borrás et al 2014 and 2015) as an inherent part of the policy-making, seeking to solve governance challenges.

- ***Governance*** understood as the process of interpreting and defining problems in such a way that coordination and cooperation are simulated in a desired manner (Stegmaier, et al., 2014). Perspectives of governance are multiple and ***place-based (3 main levels)***.

- Place-based approach, which is **socio-technical** in its nature (Fox 1995).

Methods and materials

Methods	Materials / data
Narratives Cases Comparative analysis	Documents ('official agenda' – programme documents, strategies etc.) vs. 'sense-making agenda' (e.g. memos of the preparative bodies at their different stages) Interviews with key actors / stakeholders
Authors as reflective practitioners (or *pracademics* = both an academic and an active practitioner in the subject area)	Reflective memos Mind maps

Empirical case: Helsinki Metropolitan Area

- Smart & Clean
- Health

Population 1st January 2015	
Helsinki	620,715
Espoo	265,543
Hyvinkää	46,366
Järvenpää	40,390
Kauniainen	9,357
Kerava	35,317
Kirkkonummi	38,220
Mäntsälä	20,621
Nurmijärvi	41,577
Pornainen	5,148
Sipoo	19,034
Tuusula	38,198
Vantaa	210,803
Vihti	28,995
Total	**1,420,284**

Smart & clean:
to build an internationally significant reference area for smart and clean tech solutions

Case # 1

Basis for the narrative:

Finland's performance in different global cleantech and environmental policy rankings varies from poor to great

Index	The Global Cleantech Innovation Index 2014	The Global Green Economy Index 2014	Environmental Performance Index	The Climate Change Performance Index 2015	EY Renewable energy country attractiveness index (9/2014)
Index provider	Cleantech Group, WWF, Tillväxtverket	Dual Citizen LLC	Yale University	Germanwatch & Climate Action Network Europe	EY
Index description	Assessment of countries' potential and conditions for developing cleantech innovations.	Assessment of countries' performance in Green Economy.	Country assessment based on 20 national environmental indicators.	Assessment of countries' climate policy and success in tackling climate issues.	Assessment of the attractiveness of countries' renewable energy investment and deployment opportunities.
Finland's ranking	**2.**/40	**8.**/60	18./178	**32.**/61* (Grade: Poor)	**37.**/40
Top3 – countries	1. Israel 2. Finland 3. USA	1. Sweden 2. Norway 3. Costa Rica	1. Switzerland 2. Luxembourg 3. Australia	1. Denmark (4.) 2. Sweden (5.) 3. UK (6.)*	1. China 2. USA 3. Germany
Countries ranked next to Finland	Sweden (4.), Denmark (5.), UK (6.), Canada (7.), Switzerland (8.), Germany (9.)	Switzerland (6.), Austria (7.), Iceland (9.), Spain (10.), Ireland (11.), New Zealand (12.)	New Zealand (16.) Portugal (17.) Ireland (19.) Estonia (20.) Slovakia (21.) Italy (22.)	Ukraine (30.), India (31.), Latvia (33.), Croatia(34.), Greece (35.), Austria (36.)	Philippines (34.), Saudi Arabia (35.), Kenya (36.), Russia (38.), Indonesia (39.), Ukraine (40.)

**None of the countries achieved positions one to three.*

Smart & clean tech (1/2)

Theme	Key elements
Key initiators and actors	Sitra, Climate Leadership Council The cities in the metropolitan region and three ministries and the Regional Council Regional environmental and transportation authorities
Organizing concept and the key narrative	**Metropolitan Region Smart & Clean:** to create a world class reference area for smart and clean tech solutions **World Smart & Clean Capital:** to achieve international recognition and to build regional identity
Alignment of strategies	**Smart and clean metropolitan area with economic prosperity**: to align strategies between climate strategies and the economic development strategies – fragmentation of strategies at different governance levels – to build an integrative implementation plan. National pilots introduced in the new government programme "Everyone wins"

Smart & clean tech (2/2)

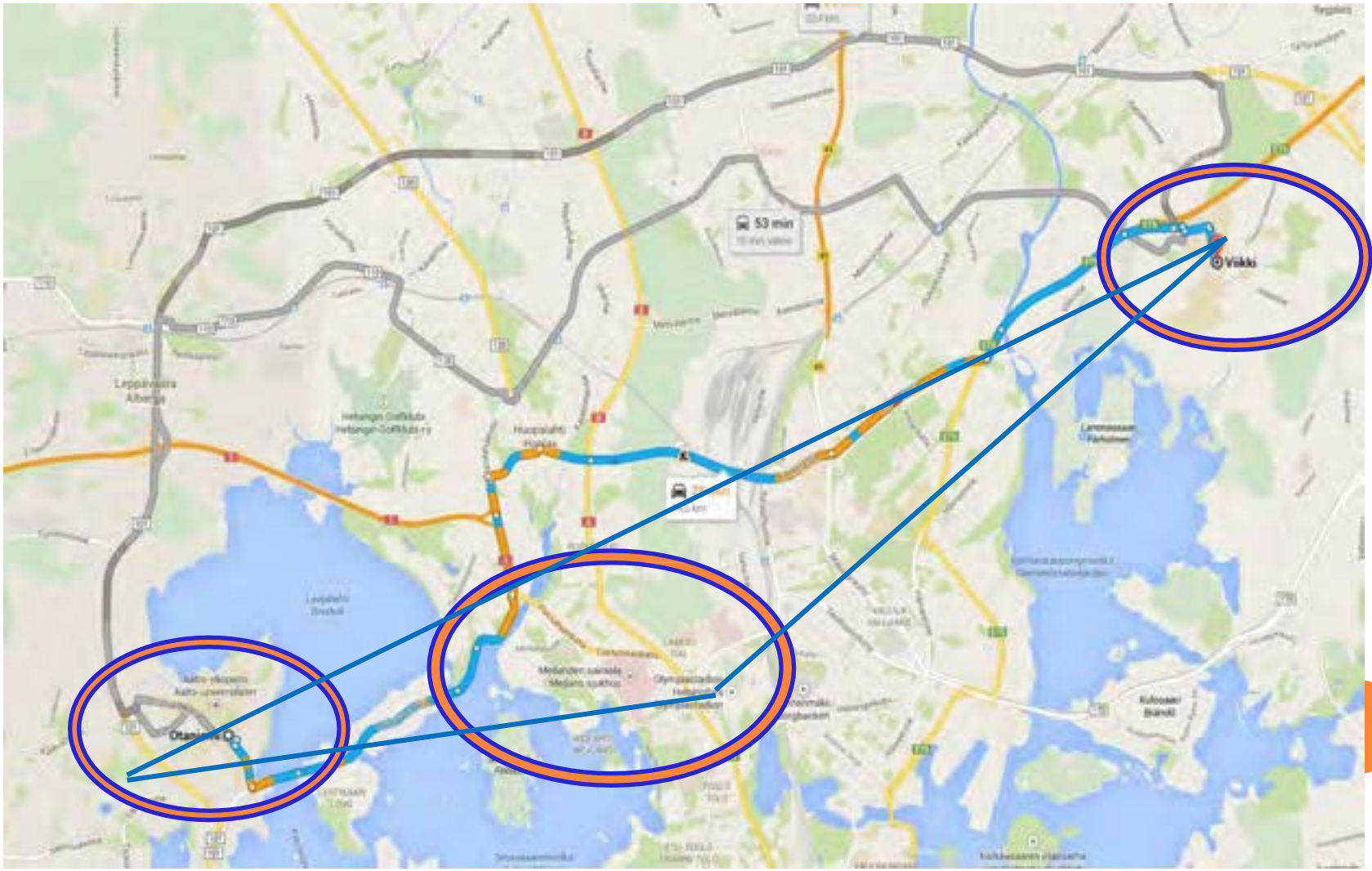
Theme	Key elements
Governance mechanisms	• In the metropolitan area: 1) Balancing between the cities through financial contributions with the help of the Regional Council 2) New structures for the place-based cooperation between the state, the cities and businesses • Within the cities: 1) Cross-sectoral policy programmes (Espoo) 2) Extra resources and capabilities (Helsinki) • In relation to the transnational level: 1) Peer groups (C40 Cities) 2) Financial resources, policy frameworks, promotion (EU) 3) Knowledge and networks (UN)
Key enablers of transformation	• Powerful tools at the disposal of the cities: monopoly of urban planning, local infrastructure, building permits
Pilots, experiments and cultural change	• Identification of existing cases (Helsinki) • Integration of ongoing cases (Helsinki, Espoo, Vantaa, the regional authorities) • Initiating new ones: clean tech procurement network between cities (the roadmap) • Piloting culture and concrete cases in the new government programme

HEALTH:
TO BUILD THE BEST LIFE SCIENCE RESEARCH, INNOVATION AND BUSINESS REGION IN NORTHERN EUROPE

Case # 2

Basis for the narrative:

There exist significant life science competence centers close to each other



Health (1/2)

Theme	Key elements
Key initiators and actors	The University of Helsinki The City of Helsinki Aalto University The district and university hospital for special health care The regional development agency
Organizing concept and the key narrative	**Health Capital Helsinki**: to build a leading hub for life science research, innovation and business hub – more emphasis on the traditional R&D&I than in the structural reorganization of public social and health care
Alignment of strategies	National HE and research policy (profiling universities and building partnerships between universities in the metropolitan area and nationally) National Growth Strategy for Health (horizontal) Universities' strategies: UH (Life Science Centre), AU (Health Factory) The City of Helsinki: selected key industries (health) "Highly politicized and contested"

Health (2/2)

Theme	Key elements
Governance mechanisms	• In the metropolitan area: 1) The integration of other cities open (only with financial contributions) • Within the city: 1) Horizontal activities 2) Extra resources • Between the metropolitan area and the state 1) The government programme: internationally competitive hubs • In relation to the transnational level: 1) Benchmarking peer regions in Europe and in the U.S.
Key enablers of transformation	• Leadership at universities (medical faculty) and at the hospital • Horizontal activities within and across governance levels
Pilots, experiments and cultural change	• From the medical doctor/professor based approach towards the organizational innovation approach in the district and university hospital • Clinical trials (pharma industries) at basic health care units of the city • The innovation and experimentation programme for the new health and wellbeing center of the city (Kalasatama, Helsinki)

COMPARISON

THEME	KEY RESULTS
Key initiators and actors	Initiative-takers largely determine the agenda and substance, possibly leading to closing off alternatives paths and choices
Organizing concept and the key narrative	Organising concepts necessary for community-creation and ownership at various governance levels. Degree of commitment based on the organising concepts.
Alignment of strategies	Tensions between sector-specific policy aims, particularly health sector Tensions between national vs. local
Governance mechanisms	Through working groups, co-financing and public-private dialogue → commitment and shared ownership (Smart&Clean) Acknowledgement of complementaries and building governance practices
Key enablers of transformation	Providing extra resources for change makers Horizontal programmes and initiatives
Pilots, experiments and cultural change	Openness, degree of participation, involvement of public-private partnerships and international investment

Tentative findings: emergent governance

- **Creating narratives** to align fragmented strategies and strengthening preconditions for successful implementation
- **Creating mechanisms** to improve competences and promoting integration within and between institutions horizontally and vertically (through implementation plans)
- **Implementing pilots and experiments focusing on impact**: important to show progress immediately (creating a sense of urgency and responding to the challenges identified)

CHANGES: PARTICULAR AND GENERAL CHARACTERISTICS

RATIONALES

- Strategic alignment
- Silo-busting
- Identifying reform paths
- Implementation

ROLES OF THE GOVERNANCE LEVELS

- Innovator city
- Enabler state
- Regulator / Resource-provider / Agenda promoter EU

PROCESSES, TENSIONS

GOVERNANCE LEVELS: EMERGENT ROLES AND CHANGE DRIVERS WITHIN THE PLACE-BASED APPROACH

	LOCAL / REGIONAL	NATIONAL	TRANS-NATIONAL
Entity / actors	City / Metropolitan area	Central government and agencies	European Commission, UN, WP etc.
Traditional role	Enabler	Regulator, normative, resource-provider	Regulator, planner, resource-provider
New roles	Innovator, Responsive actor	Enabler, facilitator, broker	Benchmark, peer group

Discussion and conclusions

- There is an **on-going systemic change**: it involves re-thinking and re-designing the interfaces between infrastructure, innovation and services. Tentative governance requires new skills. It also allows for the re-designing of governance (and ***government***!).
- **Narratives and impacts** (including numeric ones) are required to "sell the case" to partners.
- The emergent governance elements (narratives, mechanisms, pilots and experiments) and their significance seem to **vary according to the constellation of actors** at various governance levels.
- A place-based approach does not automatically overcome silos in the various domains in the same way, but it does have **potential** for doing so, given the right **support and political will**.

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and Energy

Modelling the diffusion and effect of behavior changing feedback devices

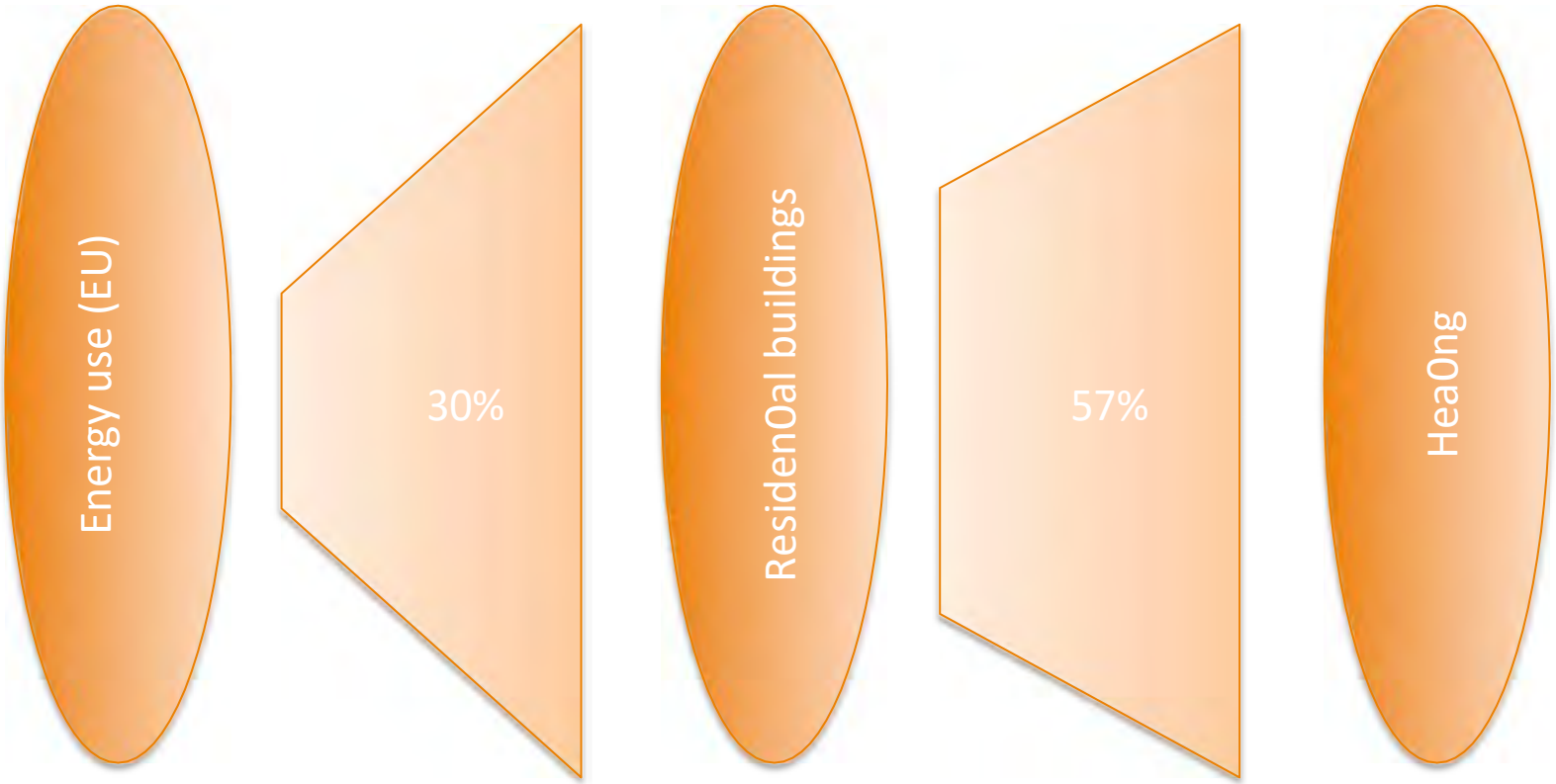
Thorben Jensen (Wuppertal Institute)
Georg Holtz (Wuppertal Institute)
Emile Chappin (Delft University of Technology)

Context of presented model
The Project EnerTransRuhr

The German "Energiewende" - Development of an Integrative and Transformative Research Design in the Case of the Energy Transition of the Ruhr Area and North Rhine-Westphalia (funded by BMBF)

- Goals of project: To provides a conceptual and methodical framework by which the “Energiewende” can be analysed and scientifically accompanied in an integrative way.
- Methods:
  - Integrative system analysis (energy and resource use) (WI)
  - Qualitative analysis of change agents (KWI)
  - Concrete real-world experiments („living labs“) (WI)
  - Developing strategies for the diffusion of successful approaches (WI)
  - Agent-based modelling (WI)
- Non-scientific Partners:
  - Federal State North Rhine-Westphalia
  - InnovationCity GmbH Bottrop
  - Cities of Dortmund and Oberhausen

Context of presented model
The „Energiewende“



Context of presented model

Behavior changing feedback devices

Purpose of model

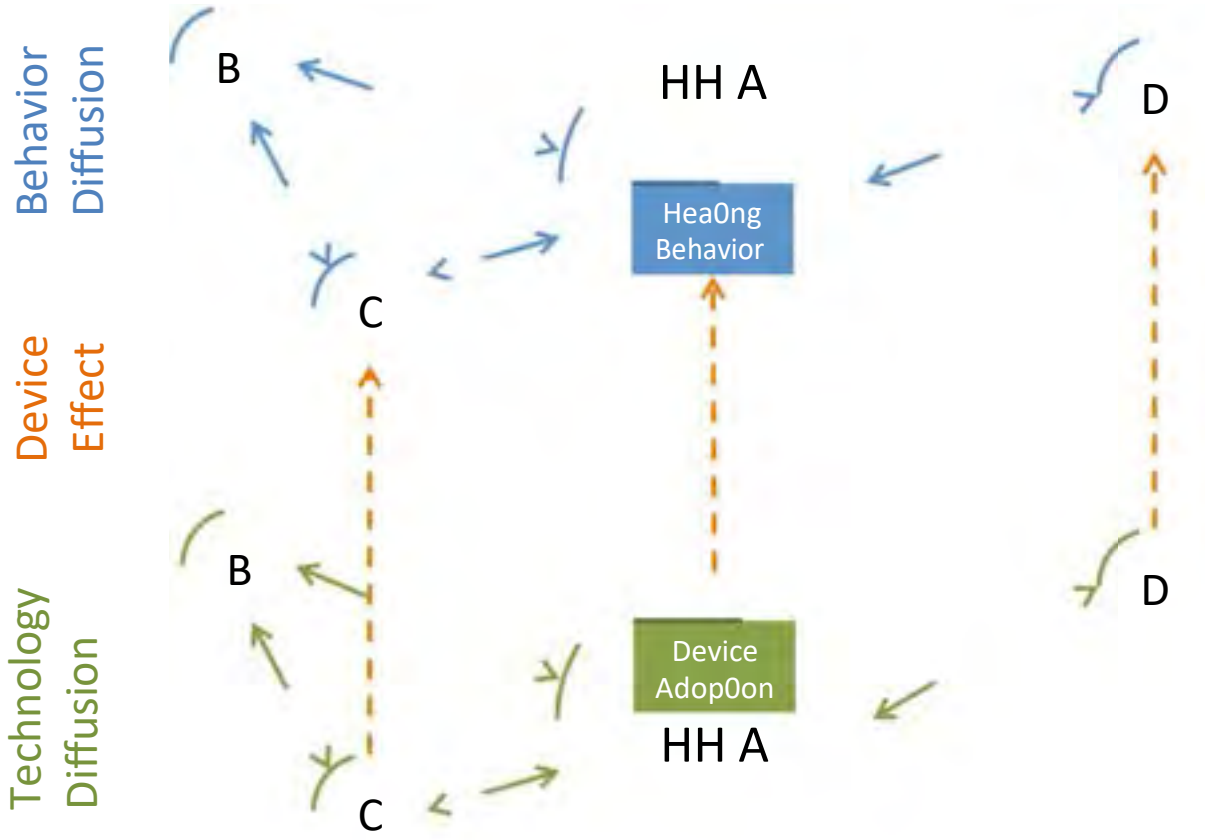
Assess contribution to energy savings

Effect =

effect within household x number of adopters + effect on behavioral norms

Conceptual model

Co-Diffusion of Devices and Behaviour

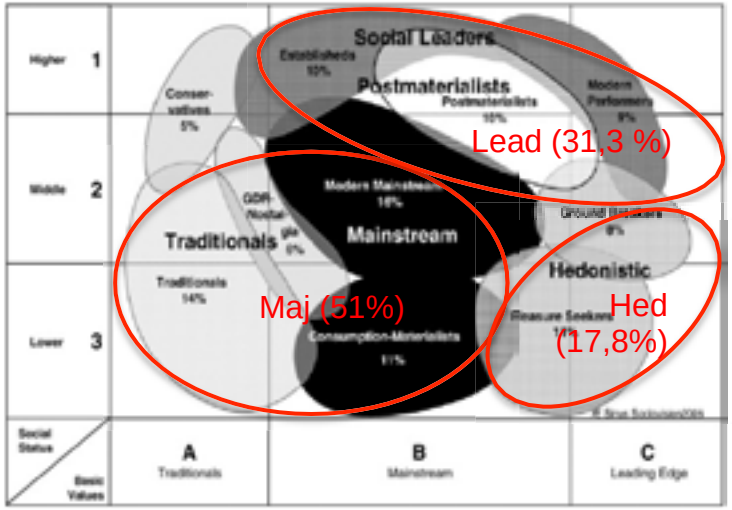


Model description
Overall approach

- Conceptual study to test relevance of ideas (effect of co-diffusion?)
- Agent-based modeling (Netlogo)
  - Interactions between households drive co-diffusion
  - Capture networks (socio-spatial effects), heterogeneity, bounded rationality
- Use two existing models:
  - Technology diffusion: Schwartz & Ernst 2009
  - Behavior diffusion: Anderson et al. 2014
- Device effect:
  - Asymptotic change of behavior towards incentivized target
- Network:
  - Literature (Watts & Strogatz 1998, Holzhauer et al. 2013)
  - Empirical information on ego-networks of heating behavior
  - Higher probability for links: spatially close, similar agents

Model description
Sub-models

- Technology diffusion
  - Lead: adopt device
  - Maj: adopt device (*p=0.5*), imitate (*p=0.5*)
  - Hed: imitate majority of peers
  - $p_{decision}$ = 0.004



- Behavior diffusion

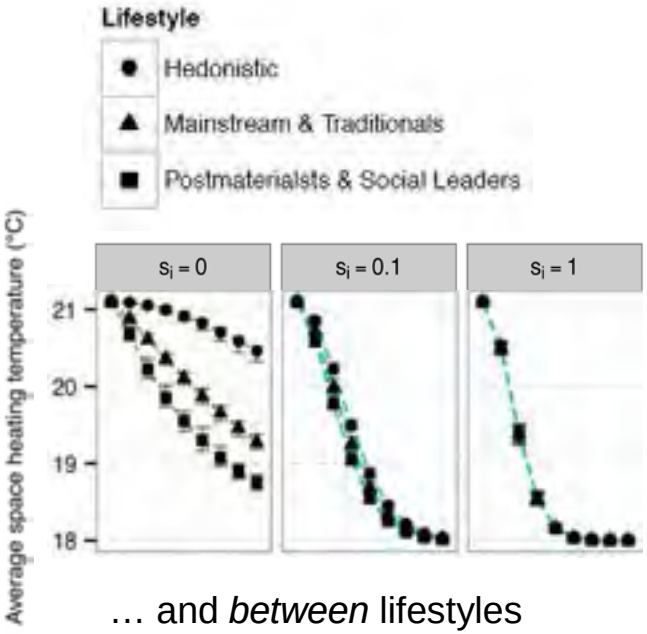
$$\beta_{i,t} = \beta_{i,t-1} + s_i \cdot \left(\frac{\sum_{j=1}^{N} w_{ij} \cdot \beta_{j,t-1}}{\sum_{j=1}^{N} w_{ij}} - \beta_{i,t-1} \right)$$

- Device effect

$$\beta_t = \beta_{t-1} + (\beta^*_\infty - \beta_{t-1}) \cdot \Delta_\beta$$

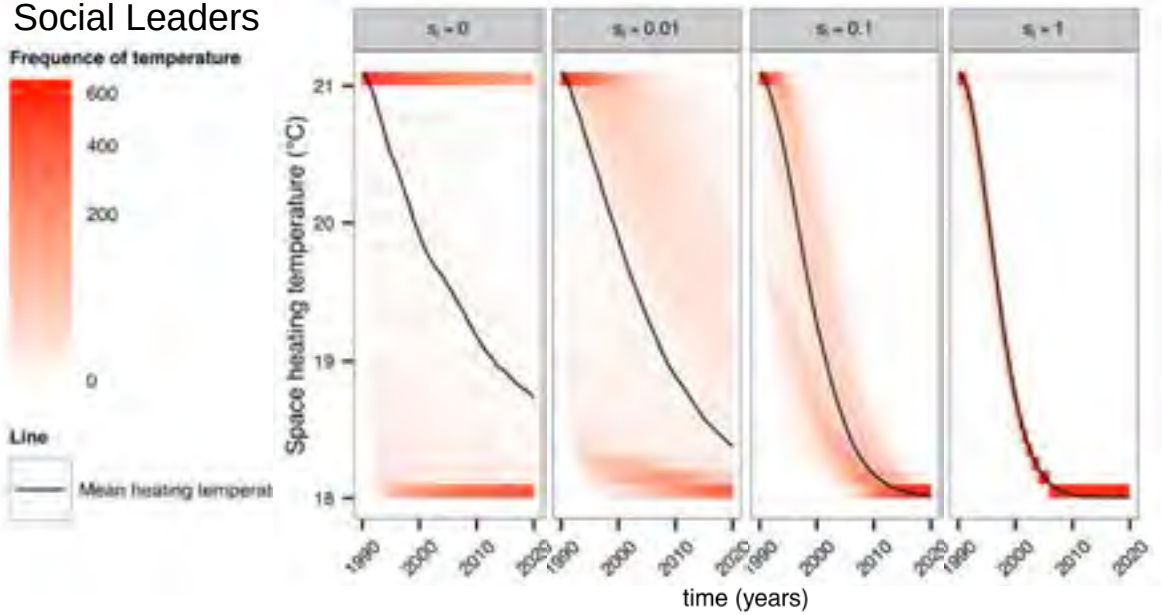
Simulation results

- Simulated case: heating behavior
  - Initial heating behavior $\beta_{i,t=0}$ = 21.1 °C
  - Incentivized behavior β^*_{∞}= 18 °C
- Simulation time: 1990 – 2020
- Time step: 1 month
- 3000 Households



… and *between* lifestyles

Social Leaders



Behavior diffusion decreases heterogeneity *within* lifestyles

Model results
Mechanism

- Co-diffusion of devices and behavior amplifies the effect of behavior changing feedback devices because:

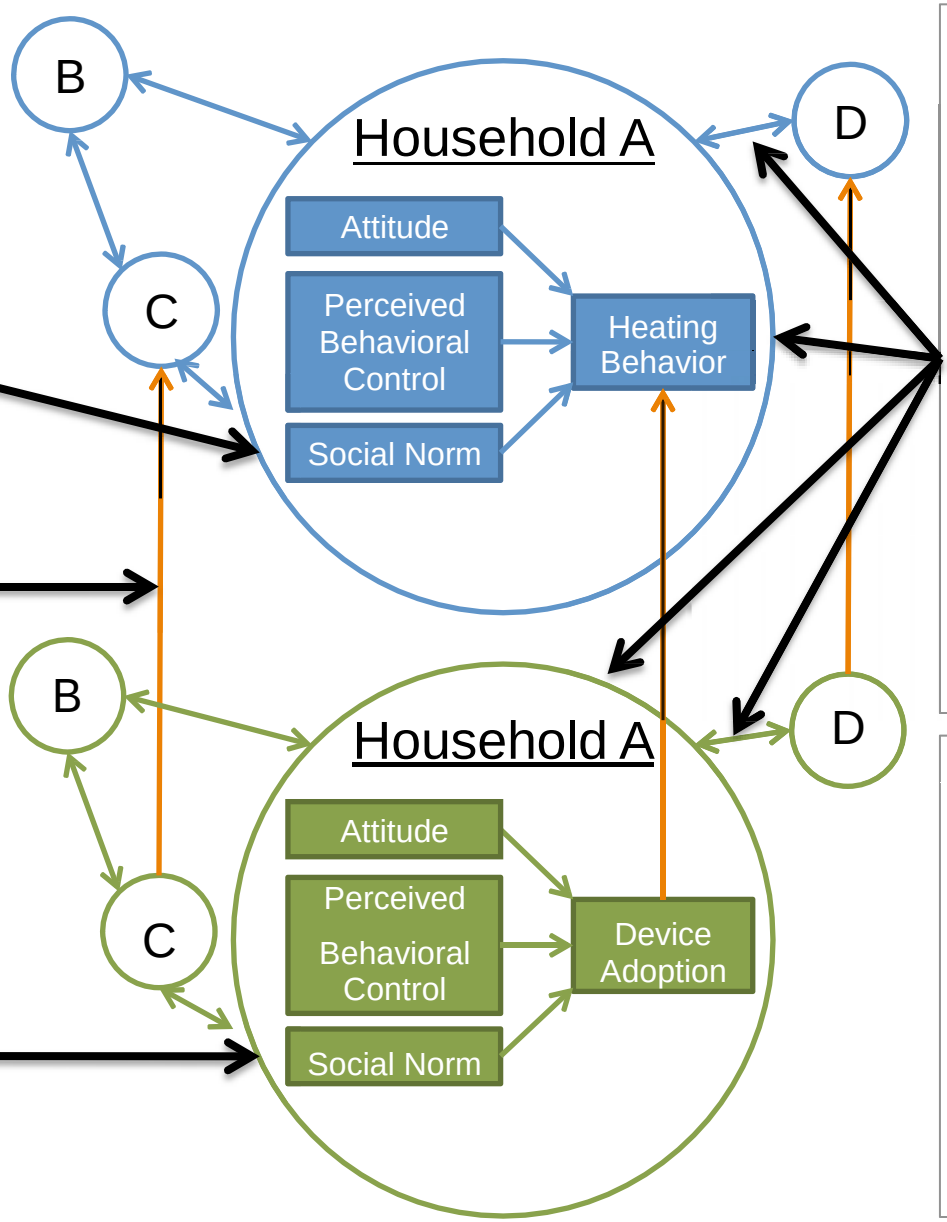
1. Behavior diffusion →→ convergence of behavior
2. Device adopters‘ change is slowed down →→ stronger and prolongend effect of devices
3. This additional effect is re-distributed to non-adopters

Outlook – Model extension

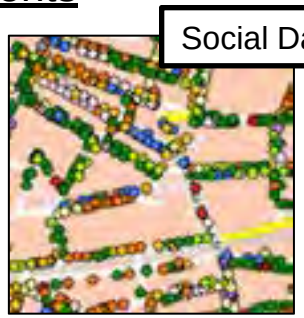
- **Survey** on heating behavior change
  +
- ***'Pattern oriented modeling'*** with empirical data

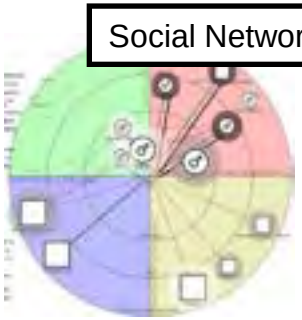
- Trial **testing the effect** of devices in Living Labs

- Adapt empirical-based **choice model** to specific feedback device(s)



Agents





Policy Support

- **Scenarios** for device introduction
- **Indicators**
  (C02 mitigation, resource balance)

Discussion

Relation to transitions thinking and modeling

- “Simple” case:
  - “Only” behavioral change / diffusion
  - Only demand side
  - No regime structure

- Captured core aspects of transitions thinking and modeling:
  - endogenous dynamics
  - co-evolution / co-diffusion
  - networks, heterogeneity, bounded rationality

- “Amplification of behavioral change” - effect may also prevail in other settings where technology induces change in behavior
- Addition to toolbox for mechanistic understanding of transitions

References

1. Schwarz & Ernst (2009): Agent-based modeling of the diffusion of environmental innovations - An empirical approach
2. Anderson et al. (2014): Impact of Social Network Type and Structure on Modeling Normative Energy Use Behavior Interventions
3. Watts & Strogatz (1998): Collective Dynamics of ‘small-world‘ Networks. Nature 393(19)
4. Holzhauer et al. 2013: Considering Baseline Homophily- When Generating Spatial Social Networks for Agent-Based Modelling. Computational and Mathematical Organization Theory 19(3)

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Thank you for your aHen0on!

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What makes the difference?

Analysing how university structural configuration influences its regional innovation contribution.

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EU-SPRI 2015 ANNUAL CONFERENCE. Helsinki, 10th -12th June 2015

Background

- HEIs drivers of **regional development** through **third mission**
  - Knowledge spillovers
  - Knowledge production function

- Tensions:
  - Balance with teaching and research → excellence
  - Making engagement fit within the 'business of science'
  - Engaging to complement scarce public resources vs heterogeneity
    - Governments promote **university-industry collaboration**
    - **Diversity** of initiatives and mechanisms
    - Pressures towards '**institutionalisation**'

- Our claim:
  - More attention how different internal structures may be associated with delivering different kinds of societal-regional benefits

- Research question:
  - How do universities' structural configuration affect the university's production of regional outputs?

University models

- Make simple distinction of 2 kinds of ‘ university orientations towards third mission outputs’ :
  - **Entrepreneurial University** (EU): Knowledge commercialization
  - **Regional Innovation Systems University** (RISU): knowledge production and shaping regional innovation systems

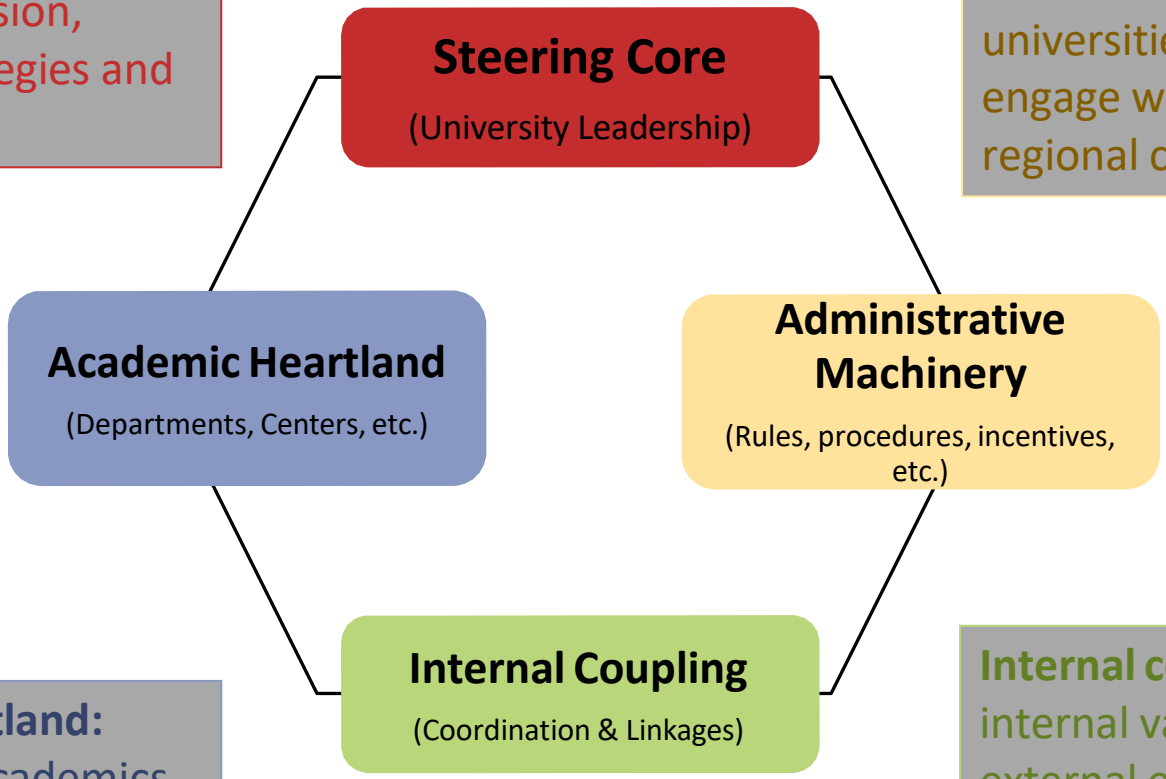
University model	
Entrepreneurial university	Regional Innovation Systems University
Commercialization activities: Patents, licensing, spin-offs	+ collaborative & contract research, consulting, ad hoc advice, networking with practitioners

Source: Adapted from Trippl *et al.* (2014)

Internal configuration components

Steering Core: Leaders and senior managers articulated by policy documents mission, vision and strategies and aims.

Administrative machinery: decision-making apparatuses and extent to which universities are able to engage with their regional contexts



Academic heartland: core group of academics actively engaged

Internal coupling: internal validity of external engagement and mechanisms couple them to 'core' activities

Source: Benneworth *et al.* (2014)

Objectives

1. Which **components** of universities' internal **structural university** affect university regional engagement **performance**?

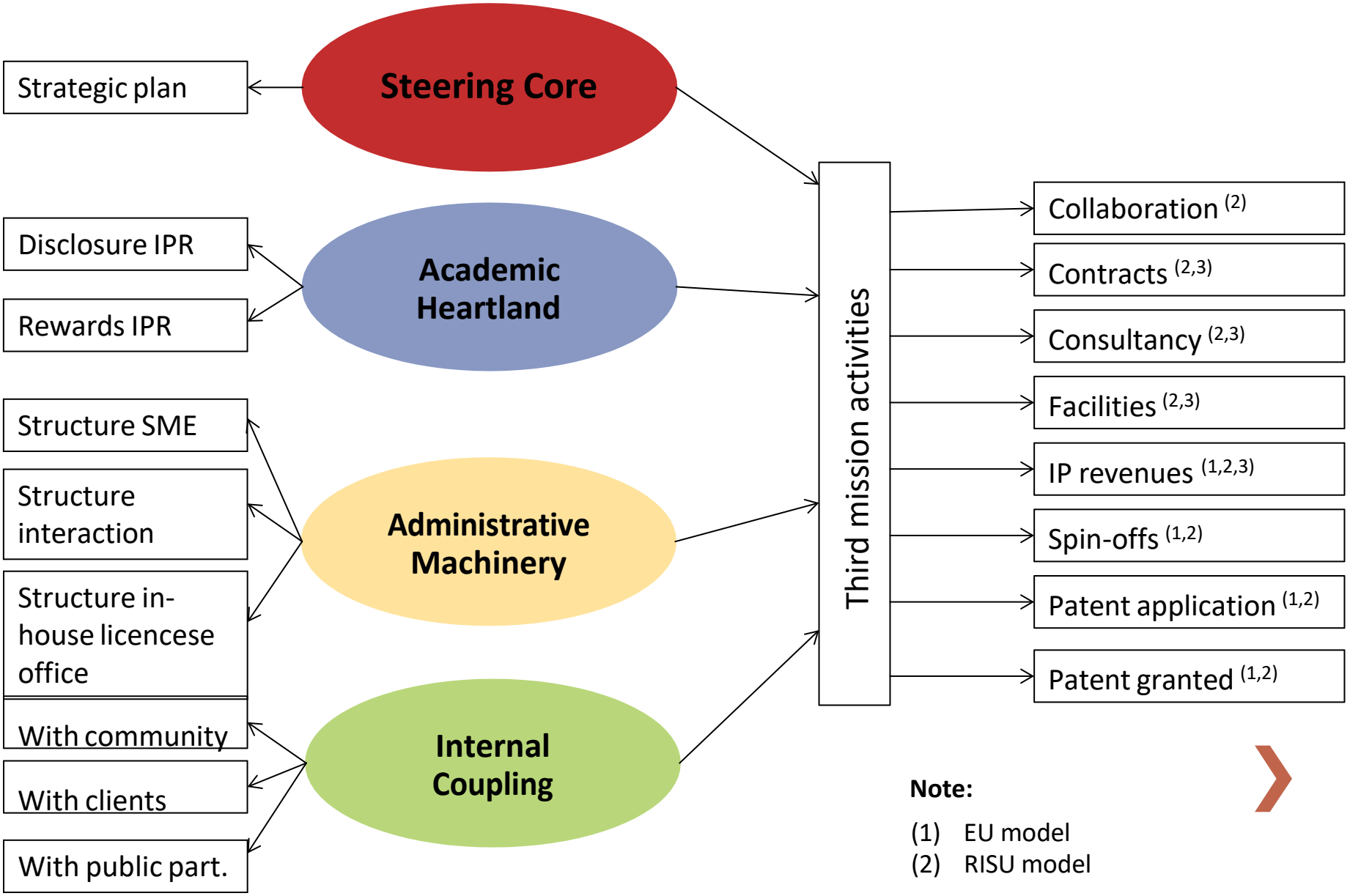
2. Do **EU** and **RISU** models **differ**? And

3. How does university **internal strategic** structure specifically **affect third mission** delivery in terms of the regional development?

Context and data

- **Context:** UK Higher education sector
- **Period:** Academic year 2011-2012
- Higher Education Business and Community Interaction Survey (**HEBCI**)
  - **Part A:** strategy and infraestructure indicators → Internal structure
  - **Part B:** Commercializacion and knowledge exchange activities → Third mission performance
- 135 out of 161 universities and HEIs included
  - 80% England, 11.9% Scotland, 6.7% in Wales 1,4% Northern Ireland.
- Main methodology: Structural Equation Modelling (SEM)

Operationalisation of theoretical model

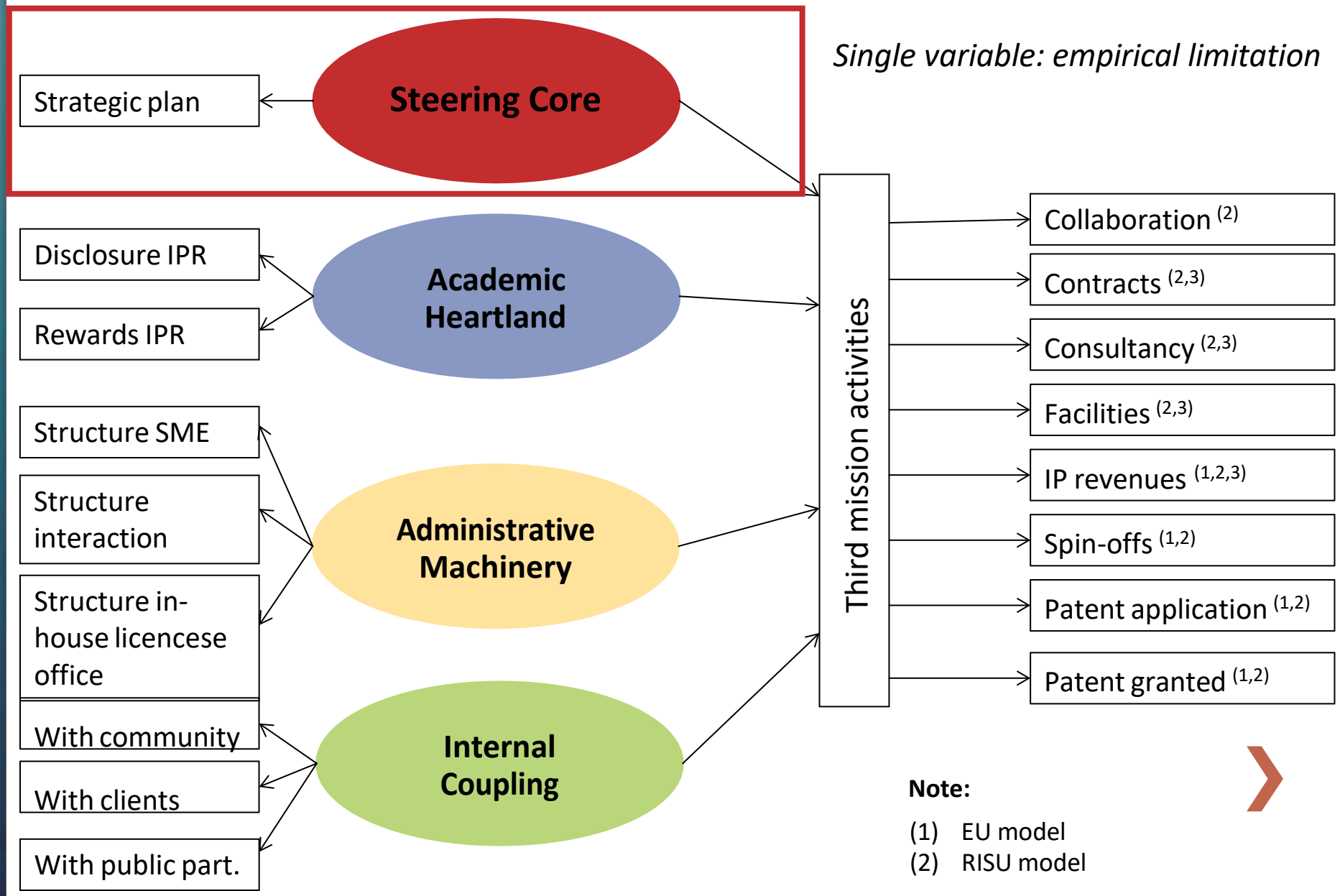


Note:

(1) EU model
(2) RISU model

(3) RISU model with regional outputs

Operationalisation of theoretical model



(3) RISU model with regional outputs

Part A. Structural configuration			
Internal conf.	**Variable**	**Definition (Question number in HE-BCI)**	**Type of variable**
Steering core	Strategic plan	University has a strategic plan totally developed and partially or totally implemented for business support (Q7a).	Dummy variable with value 1 if university answered values 4 or 5 and 0 otherwise.
Administrative machinery	Disclosure IPR	There are requirements within the HEI to report or disclose (internally) the creation of IPR (inventions, software, copyright, design, trademarks, plant/animal varieties) to the disclosure company or department (Q18)	Dummy variable with value 1 if university answered 'always' in at least one of the IPR categories and 0 otherwise.
	Rewards IPR	University has rewards for staff related to the IPR that they generate (Q19)	Dummy variable with value 1 if university answered 'yes' and 0 otherwise.
Internal coupling	Structure SMEs	University has a central dedicated unit that act as an enquiry point for SMEs or assistance to SMEs in specifying their needs (Q11)	Dummy variable with value 1 if university answered 'yes' to the availability of 'An enquiry point for SMEs' or 'Assistance to SMEs in specifying their needs' in Q11 and 0 otherwise.
	Structure interaction	University has an internal department responsible for business and community interactions (Q12)	Dummy variable with value 1 if university answered 'yes, internal department' and 0 otherwise.
	Structure in-house licence office/department	University has, at least, in-house capability to seek out licensing opportunities for IPR (patents, copyrights, designs & trademarks) (Q10)	Dummy variable with value 1 if university answered 'yes, in-house capability' or 'yes, in-house capability & external agency' and 0 otherwise.
Academic heartland	Staff involved with community	Percentage of academic staff providing service to social, community and cultural partners between 1 August 2011 & 31 July 2012 (Q15a)	Continuous variable.
	Staff involved with clients	Percentage of academic staff providing service to commercial partners/clients between 1 August 2011 & 31 July 2012 (Q15b)	Continuous variable.
	Staff involved with public partners	Percentage of academic staff providing service to public sector partners/clients between 1 August 2011 & 31 July 2012 (Q15c)	Continuous variable.

Part B. Third mission activities				
Name	**Definition**	**University model**		
		Model 1: EU	**Model 2:** RISU	**Model 3:** RISU (simplified) with regional outputs
Collaboration Research	Total income from collaborative research involving public funding in current year (£000s)		X	
Contracts	Total income of contract research (excluding collaborative research) in current year (£000s)		X	X
Consultancy	Total income in consultancy contracts in current year (£000s)		X	X
Facilities	Total income in facilities & equipment in current year (£000s)		X	X
IP Revenues	Total income in IP revenues in current year (£000s)	X	X	X
Spinoffs	Number of spin-offs with some HEI ownership in current year	X	X	
Applied patents	Number of new patent applications filed in current year	X	X	
Granted Patents	Number of patents granted in current year	X	X	

Two kinds of results

- Is the model a good fit?
  - Does it make sense to use 4 (not 3/5 structural variables)?
  - Is there difference between EU & RISU models (can we use it to classify different output types)?
- (How) does structure affect regional impact?
  - What structures do EU and RISU universities have?

Results I: Measuring structural configuration

- For variable model is Optimum to explain university's internal structural configuration
  - Variables group in four dimensions of structural configuration
  - Total variance explained: 68.88%.

		Communalities	Item Score
Steering core	Strategic plan	0.694	0.750
	Explained variance	9.27	
	Eigenvalue	0.834	
	Chronbach's alpha	-	
Administrative machinery	Disclosure IPR	0.656	0.879
	Rewards IPR	0.777	0.572
	Explained variance	13.67	
	Eigenvalue	1.231	
	Chronbach's alpha	0.473	
Internal coupling	Structure SMEs	0.623	0.747
	Structure interaction	0.566	0.618
	Structure inhouse licensce office/department	0.570	0.606
	Explained variance	26.53	
	Eigenvalue	2.387	
	Chronbach's alpha	0.542	
Academic heartland	Staff involved with community	0.794	0.878
	Staff involved with clients	0.784	0.399[a]
	Staff involved with public partners	0.734	0.827
	Explained variance	19.41	
	Eigenvalue	1.747	
	Chronbach's alpha	0.402	

Method: Factor analysis

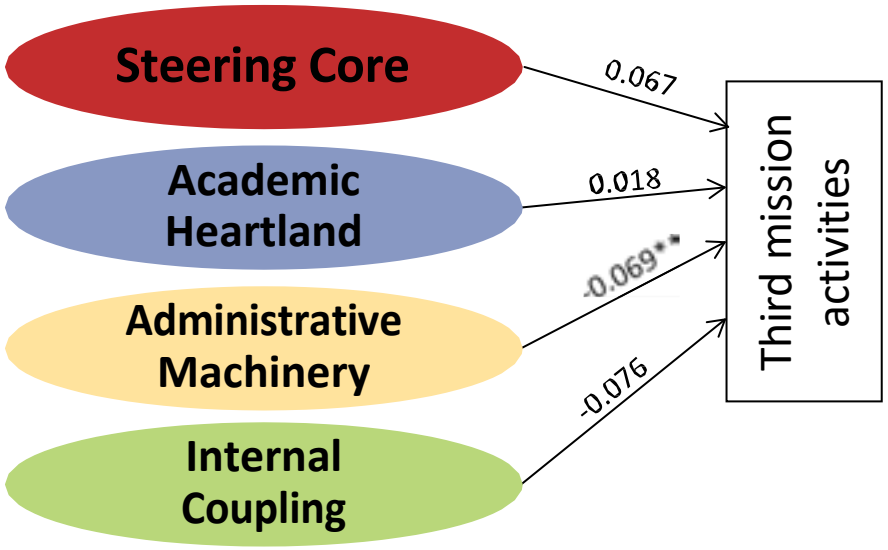
Results II: Measuring structural configuration in EU and RISU model

			EU	RISU	RISU simpl.
Components of each construct					
Steering core	λ_{11}	Strategic plan	0.348** (0.021)	0.348**(0.021)	0.348** (0.021)
Administrative machinery	λ_{21}	Disclosure IPR	0.422** (0.026)	0.422** (0.026)	0.155** (0.035)
	λ_{22}	Rewards IPR	0.116** (0.026)	0.116** (0.026)	0.315** (0.019)
Internal coupling	λ_{31}	Structure SMEs	0.013 (0.021)	0.097** (0.027)	0.100** (0.027)
	λ_{32}	Structure interaction	0.032 (0.031)	0.200** (0.045)	0.216** (0.048)
	λ_{33}	Structure inhouse licensce office/department	0.105** (0.037)	0.264** (0.057)	0.243** (0.056)
Academic heartland	λ_{41}	Staff involved with community	3.128** (0.442)	3.128** (0.442)	3.128** (0.442)
	λ_{42}	Staff involved with clients	1.054** (0.212)	1.054** (0.212)	1.054** (0.212)
	λ_{43}	Staff involved with public partners	1.003** (0.061)	1.003** (0.061)	1.003** (0.061)

- All variables selected to measure structural dimensions +/ve**
- Adequacy and robustness of items to capture internal structure
- EU model captures the inadequacy of structure SMEs and interactions (RISU related)

Results IIIa: Structural configuration on TM

(1) EU model

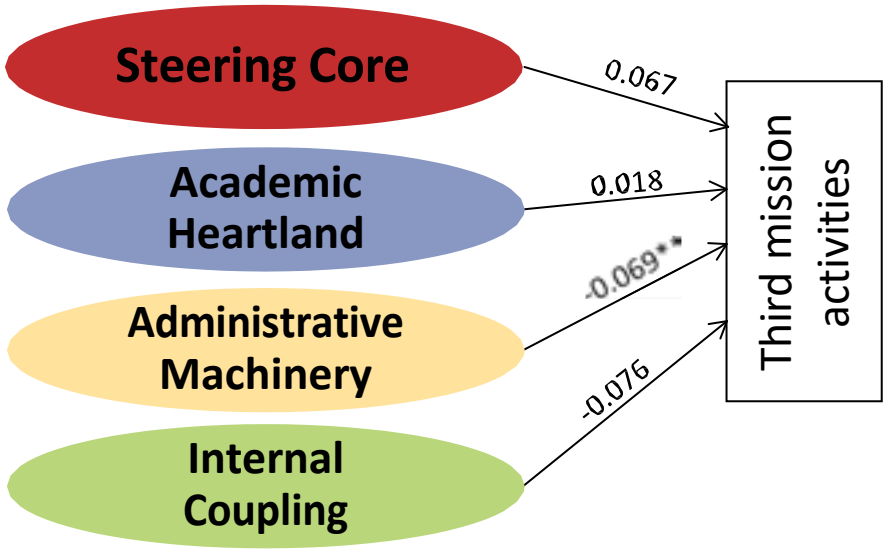


- Steering core and administrative machinery positive influence
- Internal coupling the highest negative effect

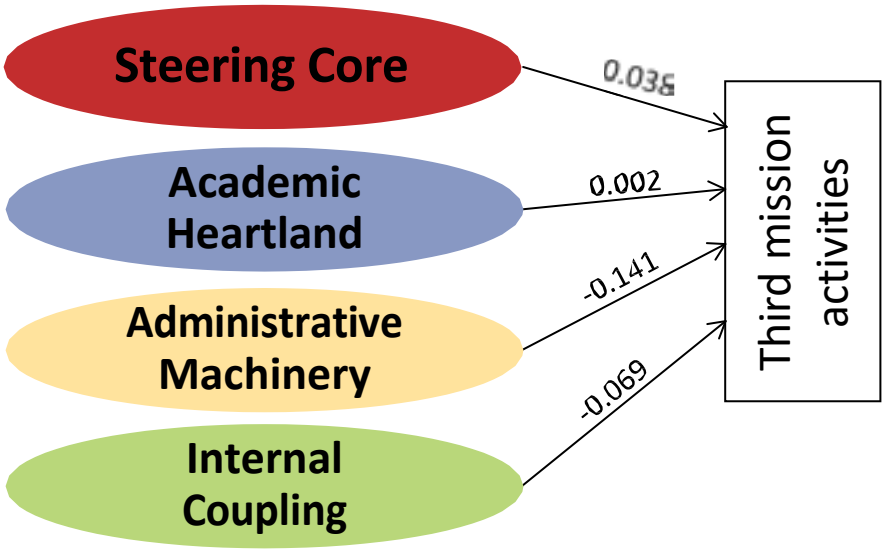
Method: Structural Equation Modelling

Results IIIb: Structural configuration on TM

(1) EU model



(2) **RISU model**

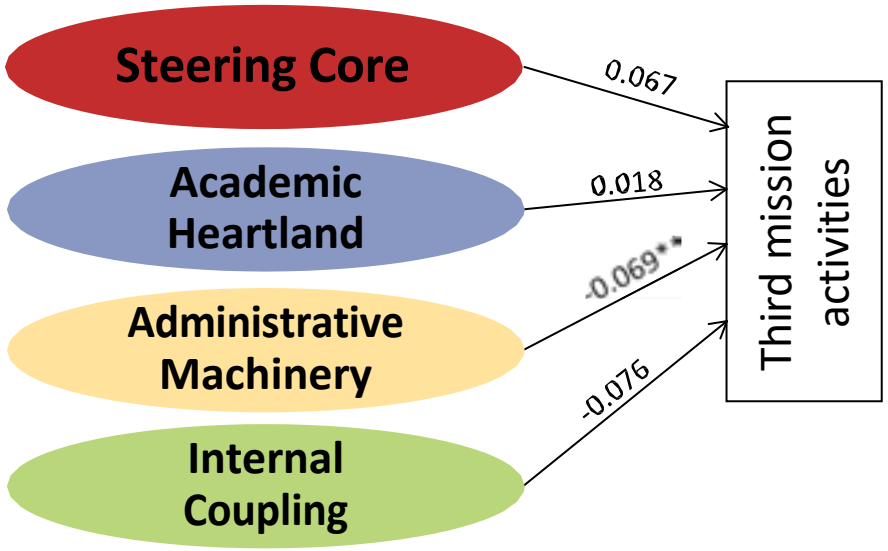


- Shares the sign of the coefficients with EU
- Differences in variables measuring structural configuration

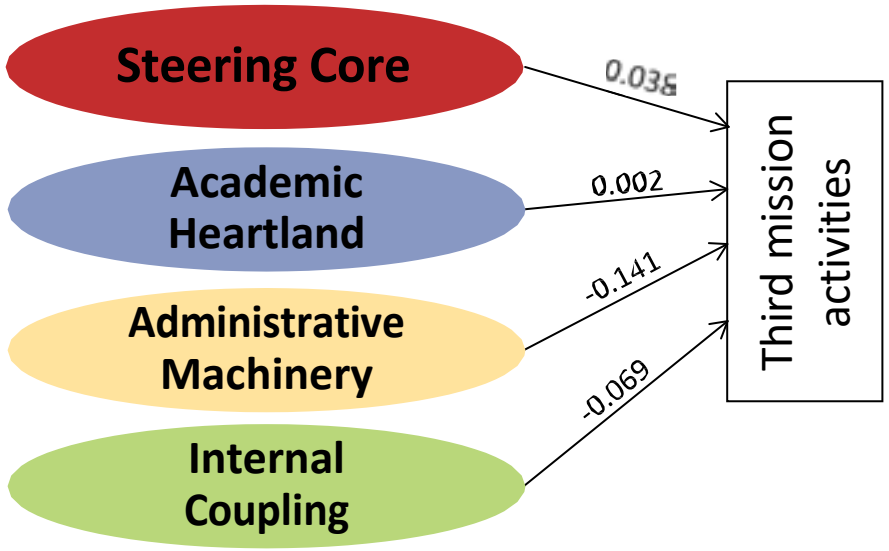
Method: Structural Equation Modelling

Results IIIc: Structural configuration on TM

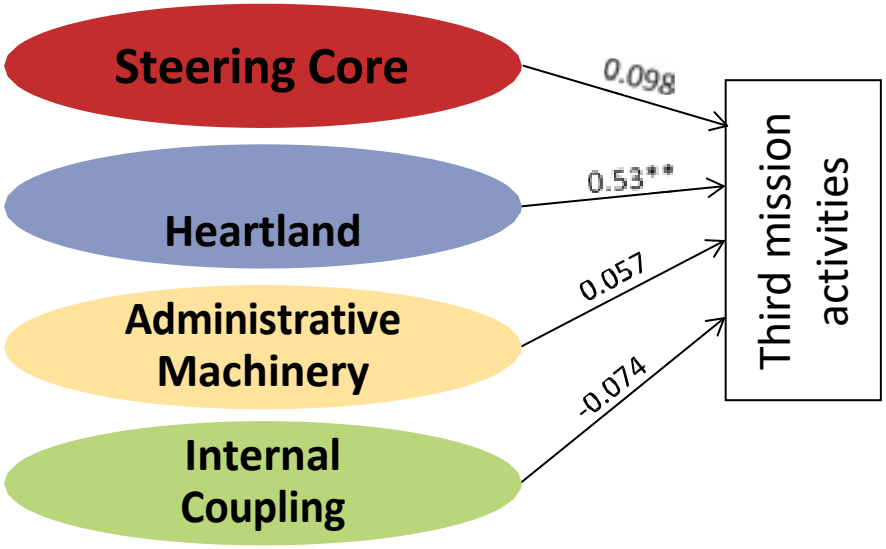
(1) **EU model**



(2) **RISU model**



(3) **RISU model with regional outputs**



- Academic heartland negative value
- Steering core, administrative machinery and internal coupling tend to increase regional outputs.

Method: Structural Equation Modelling

Conclusions

- Role played by internal university structure shaping university performance through third mission activities

- Institutional structure is most amenable to managerial input and control

- EU model:
  - Third mission (TM) based on patents, IP and licensing
  - Internal coupling (in-house license office/department) negatively influencing TM → importance of intermediary mechanisms (e.g. TTOs)?

- RISU model:
  - TM based on 'soft activities'
  - Internal coupling add other intermediary structures

- RISU model with regional activities:
  - 'Soft' activities present a regional behaviour
  - Internal coupling positively influence third mission → proximity

- Policy implications: institutional structure makes a difference generating impacts

SOCIAL AND CULTURAL INNOVATIONS AS PILLARS OF FUTURE-MINDED CREATIVE CITY DEVELOPMENT SYSTEMS

EU-SPRI

Helsinki 2015 Conference

Innovation policies for economic and social transitions

Special Track:

Social Innovation futures: Beyond Policy Panacea and Conceptual Ambiguity

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Introduction

- Focus of our research is twofold: on the one hand we try to clarify the term of social innovation extended to the field of cultural innovation relying on a thorough literature review with a special attention to sustainable urban development, creative culture and creative cities.
- While on the other hand, we try to operationalize – "translate to down to earth, every day life" – these notions by the help of qualitative empirical research based on document analysis, field research and structured interviews.
- The recently started empirical research is in the preparatory-exploratory phase, having done already some case studies to back our argumentation.

Creative cities, human development, social and cultural innovation

- Cities and the development of human civilizations are intertwined, past, present and future. Cities have been the cradles of great civilizations and cultures for thousands years.
- Cities are complex systems in their physical-material and metaphysical-immaterial meaning.
- Cities have been "markets", meeting points and places of various material and immaterial transactions, from commodities through services to the exchange of ideas and knowledge.
- „The city provides a critical mass. It is an accelerator of opportunities and a generator of problems. It is a laboratory for what is good and bad about living together" (Landry, 2012:126).

Cities as laboratories of innovations

- We consider cities as permanent laboratories of innovations, especially important for us, social and cultural innovations.
- We assume that without them, cities would not exist – at all – and survive, since their generated – multi-faceted – problems would overrun the living (surviving) opportunities.
- Moreover, we also assume that culture and cultural innovations are quintessential elements, basis of a creative city, present and future.
- In principle, every individual and each city can be creative if they are exploratory and open, opportunity seeking, supportive and deliberative enough (Landry, 2012).

Innovation, technology and social innovation

- Despite the growing number of empirical research programs and theoretical overviews of the last decade (Cameron et al., 2004; Deakin and Allwinkle, 2007, Mumford, 2002; Moulaert and Ailenei, 2005) the author – personally – still can witness a "technological bias" both in the interpretation and application of innovation among university scholars and professional experts generally, and in the field of urban development particularly.

- Social innovation – and additionally, as a new term – cultural innovation unfortunately have received less attention, despite their essential role in integrated and sustainable urban development, rehabilitation and regeneration programs.

- Narrowly technology minded and driven technocratic approach in urban development policies and regeneration programs can lead to ambiguous, in extreme cases to counter effective results.
- While in the last decades after transition in Central-Eastern Europe and in Hungary, there have been mushrooming original, grass root, bottom-up and spontaneous social and cultural innovations having serious impact on local development processes, most importantly on the life and well being of local communities either on micro (and) or macro level.
- Since these initiatives and their role in sustainable urban development are rather under investigated in Hungary and Budapest, in this paper we take some steps to fulfil this gap.

Defining social innovation?

- Despite its widespread use in contemporary social science literature, the scientific conceptualization and – operational – definition of social innovation is still very rare and is in its initial phase yet (Mumford, 2002; Moulaert *et.al*, 2005).To explain this shortcoming, Mumford identifies some - essentially methodological - factors:
  - social innovations are quite rare,
  - they are typically diffuse involving multiple partners over rather long period of time,
  - therefore hard to identify a creative certain act in the end as an outcome.
- Moreover analysing the role of individuals' peculiar ideas impact on the society has been rather neglected as compared to the organizations or normative expectations of groups in the creativity (social innovation) literature (Mumford, 2002).

Common features, characteristics in the social innovation literature

- The appearance of social innovation in the society (and economy) related
  - to unsatisfied needs,
  - dissatisfaction with the present state of the art of the social (political and economic) relations, institutions and ideas,
  - which often happen in times of crisis in a historic perspective.
- In many interpretation it is related to the question of social justice, social integration, fostering (local) development and combating social exclusion, especially in the field of economic production and allocation systems.

Social innovation and social economy

- Therefore social innovation is often a concomitant phenomenon of social economy, as they treat social innovation a re-introduction of social justice values, like solidarity into the economy.
- Not by chance that social economy has many other similar terms, like solidarity economy or third sector.
- Social innovation plays an important role in the social economy as it means innovation in social relations as well as new methods in satisfying needs (Moulaert et.al, 2005).

Micro-level, practice oriented social innovation types

- From another - little bit more general – perspective, social innovation refers to the generation and implementation of new ideas about how people should organize their interpersonal activities in order to meet their common goals.
- On the other end of the continuum, however, we can find such micro-level social innovations as creation of new processes and procedures for structuring collaborative work, introduction of new social practices in groups or development of new business practices (Mumford, 2002).
- This interpretation is more useful for us, since we also try to focus on the micro-level, rather practice oriented social innovation types in our Hungarian case study example.

Social and cultural innovation, creativity, sustainable urban development and the role of civil organizations

- Social innovation is an important element of social economy and both are strongly related to the third sector or civil society through the aim of better social integration and strengthening social-economic solidarity.
- Many cities today suffer from various socio-economic problems due to the crisis of welfare state and the post-Fordist transformation processes. Changes in governance structure – an important realization of social innovation in the process dimension – and increasing the socio-political capability and access to resources (empowerment dimension) by the help of civil initiatives and organizations can help to overcome these problems (Gerometta *et.al*, 2005).
- Some authors treat civil initiatives, local communities and networks as primary elements of alternative or sustainable local and/or urban development (Moulaert *et.al*, 2005) with a special emphasis on innovation and creativity in urban regeneration programs (Deakin and Allwinkle, 2007).

Cultural innovation and creativity

- We consider creative and innovative new ideas, practices, processes and/or changes in the vast field of culture which make the life and "well-being" of social communities – like city inhabitants – better, moreover give them the opportunity to enjoy, explore, discover and have "an adventure feeling" in their own city or locality.
- On the other hand, creativity and innovation are strongly interrelated but are not the same.Creativity is a complex psychological phenomenon of intuition and reason, the earlier coming when our rational mind stops "chattering" and is open to experiences, bravely welcoming whatever may occur (Richards, 2010).

C's and P's of creativity

- We have to make a difference between a creative product and a creative experience, which latter is more subjective, not so easy to control and assess, however it would be a partial understanding if we focused on the product side only, just let us mention the well known "flow" experience of Csikszentmihalyi (Csikszentmihalyi, 1990, 1996).
- There are various categories of creativity, the "C's and P's" of creativity as experts call it, ranging from the "Big C", eminent and unambiguous creativity of well known artists, scientists to the "little C", everyday creativity of ordinary people (Kozbelt *et al*., 2010).

- „Everyday creativity” is not only universal but necessary to our very survival as individuals and as a species, since using our everyday creativity day by day we adapt, innovate and improvise flexibly from making a breakfast to solving a major conflict with our boss (Richards, 2010).
- Based on the emphasized aspect of creativity we can speak about the “four or six P’s” of the theoretical approaches, whether focusing on the *process, product, person (or personality)* or the *place*, - extended by *persuasion* and *potential* - aspects of creativity (Kozbelt *et al*., 2010).
- The *place* perspective leads us toward the creative community and city phenomenon, which can occur either on micro or macro level, ranging from a building through a garden to a ~~w~~hole ~~city~~.

Living laboratory of creative place, people and products

- A creative place is distinct, "you can feel and sense the buzz" has a sense of comfort and familiarity, a good blending of the old and new, receptive to influence and change, absorbing new ideas which in turn evolve and develop its distinctiveness and culture (Landry, 2012:123).
- As we have mentioned already we assume that culture and cultural innovations are quintessential elements, basis of a creative city, present and future.
- So next in our second case study based on qualitative empirical research we will combine social innovation with creative people, products and place, a living laboratory of on-going cultural innovation.

Political-economic regime change and transition in Central-Eastern Europe

- Unavoidable to extend the historical scope, geographic space and time dimension by including the 1989-90 political-economic regime change in Central-Eastern Europe with all its additional problems.
- The “re-appearance” of civil society and foundation of various non-governmental organizations in the late 1980s in Central-Eastern European had an essential role in the political-economic regime change and democratization process of the region’s countries, including Hungary too.
- Without exaggeration we can say that some of them became historical as - directly or indirectly - had enormous, “triggering” political impact on the regime change process.

NGO's social and cultural innovation for the well-being of families with kids*

- One of them is the Hungarian Charity Service of the Order of Malta, or shortly, the **Hungarian Maltese Charity Service (HMCS).** Foundation and early activities of this civil organization are strongly interrelated with the political-economic changes of the late 1980s in Hungary. As just in the year of their foundation, in 1989, Hungary became the scene of unprecedented political events, called the "Pan-European Picnic" which later led to the regime change itself.
- Demolishing the Iron Curtain and opening of the border barriers for the several thousand East German refugees then staying in Hungary triggered a domino political effect, including the fall of the Berlin Wall, collapse of the German Democratic Republic and other communist regimes of Central Eastern Europe.
- During and after the Pan-European Picnic, the HMCS took care of 50.000 East German refugees between August and November 1989, relying both on their own organizational experiences and the financial, moral strength of the German Malteser Hilfsdienst in the background.

- HMCS' activities then have concentrated on various social and healthcare programs due to the transitory "state failure", lack of financial, administrative and institutional resources to solve the increasing number of social, healthcare and mental problems of the society.
- They established institutions for the ill, left-alone elderly as well as for families or family fragments living in constant, hopeless situations, a homeless-care network, initiated programs to improve the living conditions of people living with physical and mental disabilities, founded homes and offered services for the raising, care and education of the abandoned, orphan, and severely endangered children and the youth.
- Today nearly 8000 volunteers work actively in 7 regional organizations and 150 local groups.

Case study 1: "Maltese" Playgrounds

- One of their programs, however, represent a social and cultural innovation, which is an important empirical verification of our hypothesis, since it satisfies a social need, foster social integration and part of sustainable local/urban development
- Still in 1998, the HMSC initiated their program called "Prevention with playing" and opened their first "Maltese Playgrounds" in the high rise, block of flat ready-made, concrete "panel" apartment building estates of Óbuda-Békásmegyer (third) district of Budapest.
- In the framework of this program, they established new, innovative type of playgrounds, where professional social pedagogue colleagues offer free of charge cultural-educational day care programs both for families with small children and "hanging around" elder teenagers.

- They are rather large, in about 100 m^2,fenced, open every day – but closed for nights - with a covered playhouse shelter, where programs can be held even in rainy days.
- Those, who left their toys at home or would like to play with various board games can rent from these play houses for symbolic „pledges” to bring back.
- Also they are equipped by other service facilities, like toilet with changing table, first aid parcel or telephone for emergency purposes.

- Various youth cohorts have separate places to play peacefully within the ground but everybody has to keep the ethical norms, behavioural – formal and informal - rules of the Maltese playground, which serve their own interest.
- Therefore these Maltese playgrounds have very good reputation in the district,
- a meeting and orientation point of families, mothers and children, „they like and come, because there are rules”.

- Socially the most helpful for the families and sustainable for the whole panel estate community these Maltese playgrounds are during holidays.
- Especially in the long summer vacation time, when schools are “closed” and many children wander “unattended” in the streets, as their parents are working and can not afford paid vacation camps or programs.
- Many earlier „Maltese kids” help the social pedagogue workers as young volunteers with their own innovative programs, like folk dance teaching.

Other social and educational innovatory programs, like „Playground library stop" with free exchange of second hand kids' books or „Puppy adoption market"

- Beyond the physical existence of these Maltese playgrounds,
- primarily their professional expertise and free cultural-educational and community building programs help both the prevention of youth crime and vandalism,
- and also contribute to the well being of the people living in these huge high rise panel building housing estates.

Case study 2: Creative urban regeneration, reuse and "cultural creatives"**

- Real mixture of social and cultural innovation, "little C" creativity, cultural creatives, urban regeneration, reuse and community building at the same time.
- The phenomenon under investigation is already a "Hungaricum", among the top five destinations of the foreign visitors, especially young people from all over the word coming to Hungary, Budapest.
- These are the ruin pubs and the intertwined alternative "ruin pub culture" having developed for almost 15 years.

The success story of the Budapest ruin pub culture

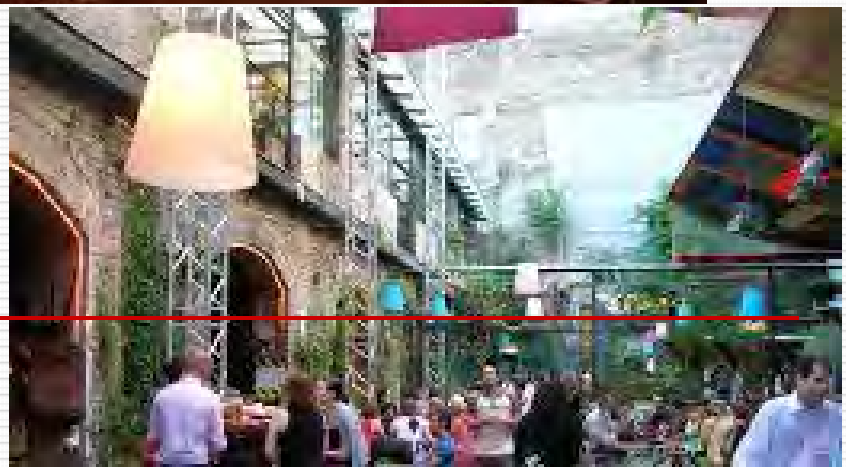
- There are many of them around the city, rather concentrated in the Pest side, especially in the quite run down, full of decaying old apartment houses and courtyards 7th district of Budapest, called Elisabeth town, the original "birth place" of this innovative cultural and entertaining place
- We have selected and focused on the analysis of the very first, "flag ship" ruin pub, the "Szimpla Kert" (Simple Garden), which has started its carrier in 2001, still existing and performing as a real success story, standing as a model for many other cultural innovators and an initiator of this new sub-cultural trend.

The "Szimpla Kert" (Simple Garden) Story

- Some friends of university students of early 2000s, who wanted to found an alternative – non-consumer – type of underground entertaining place where young people can meet, talk and have a community feeling too.
- The first creative insight of starting such a business of the "Szimpla founding fathers" was partly spontaneous and partly planned in a very good time, because in 2001 there was a temporary vacuum in the underground night life by the shut down of two popular youth clubs in the city.

More than a „szimpla/simple”pub

- At the very beginning it was only “let’s see-one time-spontaneous adventure” of the founder friends,
- but very soon they realized that they created something unique, attractive – where “you can feel and sense the buzz” - , which first became their financial source of survival, then turned to be later a “golden mine” from a business point of view.
- Nonetheless it was always more than a “simple” pub, they wanted to build a cultural and community centre with various cultural and community building programs.



Creative re-use design

This vision could be realized right after moving to their second place, the first "Szimpla Kert" in Kazinczy Street opened seasonally in an abandoned locksmith workshop decorated with low cost, second hand, re-use furniture and various objects – like a Trabant "Made in GDR" or old fashioned hair driers, computers, lamps, gardening tools and living plants - in a very creative, unusual and unique way, smartly ~~balanced between art and~~ rubbish.

The ever-growing Szimpla network

- Since 2004 - moving to their second place, today's "Szimpla Kert", another abandoned and decaying hundred year old house in Kazinczy street destined to be ruined but now under heritage protection -
- they have continuously built their "empire", extended the Szimpla network of various businesses and initiatives with a clear mission and vision of alternative and eco culture, urban sustainable way of living
- ranging from the "Szimpla Bringa (Simple Bike) Flea Market" of second hand bikes and gadgets, through a Design Shop to street festivals and local small producers' "Szimpla Háztáji piac" (Farmers' market) connected to the "Szimpla Háztáji" Slow Food restaurant.

Meeting the sustainable rural with urban living: Szimpla farmers' market

- The court yard full of foreign visitors in the nights is unbelievably different on Sundays offering an urban market place of bio vegetables and fruits, farm fresh meat, sausages, salamis, home made fruit jams and syrups coming from local family farms and small entrepreneurs in the countryside.
- Usually 35-45 local farmers, some of them are very enthusiastic and come only to this market to sell their home made products because there is a fantastic atmosphere here.
- Became very popular both among the environmentally conscious young citizens coming from distant quarters of the city and the local neighbourhood elderly people who enjoy the reasonably cheap and fresh products.

The not so bright side of the story: the „crowding out" effect

- The quarter has been very quiet for almost 50 years, but the recent changes came so quickly that some people could not get used to it.
- As it very quickly became one of the most popular and visited places of Budapest, between 10,000 and 20,000 people using the Kazinczy street and the nearby city block on a crowded summer night
- And there is permanent conflict of the ruin pub owners with the local residents complaining about the unbearable late night noise, littering and sometimes misbehave of the foreign tourists.

Positive and negative externalities

- On one hand, this spontaneous re-generation development of the quarter has a positive externality effect, bringing money for the ever growing local entertainment businesses, work to many young people working in the pubs, shops and quickly opening hostels, tax for the local government, raises the property prices of the local residents.
- On the other hand, the over crowdedness with noise and littering has a negative externality effect, diminishing the well being of the neighbourhood residents, who can choose between the options of "go-away-quit" or "stay and bear the consequences".

Policy solutions until now

- Mayor of the district while acknowledging that they have quite slowly realised the seriousness and extent of the problem, ruled out closing the bars, instead suggesting stricter policy and enforcement to be introduced for the entertainment quarter.
- Partial solutions that those who pay an extra fee for the municipality, which then is used for cleaning up and policing in the quarter, can be opened longer in the night after the official closing hour at midnight, coupled with the voluntary offer of extra cleaning and public toilets of the ruin bar owners.
- This spontaneous re-structuring of the urban functions now has reached its limits in our view, without a long-term, strategic cooperative formal agreement and policy further conflicts are unavoidable.

Conclusion

- As we mentioned before, such cities as Budapest - including her districts, like Erzsébetváros (Elizabethtown) are very complex systems, full of individuals and organizations with different views and interests, even about planning and developing "sustainable and creative cities".
- Therefore it is very important what kind of negotiation and mediation takes place in the urban development policy process to meet the "bottom-up", spontaneous and decentralized social and cultural innovation initiatives with the "top-down", centralized – and presumably coherent – urban development planning and policy.
- Nonetheless we can say - based on the document analyses and interviews – that until now there is no institutionalized negotiation forum, a mediation and meeting place for the interested parties where problems could be discussed, conflicts solved and agreement made neither on quarter/district nor on city level.

Social innovation for conflict resolution

Therefore our suggestion would be

- 1. to introduce a permanent negotiation opportunity, an institutionalized forum of discussion about sustainable and creative urban life of the district
- 2. and to found a consultancy group under the supervision of the Mayor or the Vice Mayor with all important parties represented, who could negotiate, mediate, what is more prepare district level policy advices to be discussed – and preferably – accepted by the highest level democratic decision making forum, the local government assembly.

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* Sources of the first case study: official website documents of the Hungarian Maltese Charity Service (accessed at: http://www.maltai.hu/, 19 September 2014) and a personal communication with László Nagy, program coordinator of the Maltese Playgrounds in Óbuda-Békásmegyer (III) District of Budapest (May 2015)

** Sources of the second case study: official website documents of "Szimpla Kert" (accessed at: http://szimpla.hu/, 30 April 2015) and "Budapest Erzsébetváros Municipality" (accessed at: http://erzsebetvaros.hu, 30 April 2015) and other Internet based news and resources (accessed at http://7.kerulet.ittlakunk.hu/arcok/130524/abel-aki-nem-szimpla, Romkocsma történelem: 10 éves a Szimpla - születésnapi interjú ; http://romkocsmak.hu/index.php?id=blog&cikk=23; http://index.hu/kultur/2012/11/24/szimplapiac/, 30 April 2015) and a personal communication with Ábel Zsendovits, one of the founders and owners of "Szimpla" (May 2015)

EU-SPRI HELSINKI 2015

European Forum for Studies of Policies for Research and Innovation

CrESSI

Creating Economic Space for Social Innovation

Analysing, Understanding and Shaping Social Innovation

The example of 100 years social housing in the city of Vienna

Presentation for EU-SPRI 2015: Innovation policies for economic and social transitions: Developing strategies for knowledge, practices and institutions
Helsinki, June 10-12

Dr. Susanne Giesecke
Austrian Institute of Technology – Thematic Area „FORESIGHT“

Outline of Talk

Cr | E | S | S | I

Creating Economic Space for Social Innovation

- Creating Economic Space….
- Demand for Social Innovation
- Phases of 100 year social housing in Vienna
- Beckert‘s „Social Grid“
- Applying the Social Grid approach to the social housing case
- The Red Vienna social housing development:
  - Institutions/Laws
  - Resources
  - Social Networks
  - Cognitive Frames
  - Social & Organisational Innovation
  - Technological Innovation
- What can we learn?
- What is missing?

Cr|E|S|S|I

Creating Economic Space for Social Innovation

Creating Economic Space for Social Innovation

- explore the economic underpinnings of social innovation with a particular focus on how policy and practice can enhance the lives of the most marginalized and disempowered citizens in society
- Theoretical approaches: Beckert, Sen, Mann
- Case studies: social housing, micro finance, fresh water wells

Social Problems Call for Actions

Cr | E | S | S | I

Creating Economic Space for Social Innovation

- Poverty, starvation and homelessness before and after 1919
- Bassena housing, bed lodgers, no direct day light, no running water, overcrowded quarters, contagious diseases
- Urbanization, need for homes
- Loss of agrarian land after WWI, need for food
- Geneva Treaty, inflation, poverty, starvation
- Shortage of homes, rising costs of rents
- New centers of power emerged giving more room than usual for action to individuals and interest groups.
- Market failure

Historic phases of development of the SI

Cr|E|S|S|I
Creating Economic Space for Social Innovation

- **Settler's movement - Grass-roots movement gains momentum in a political vacuum.**The inter-war period: Rise of the Red Vienna
- **Superblocks** - Community housing during the Red Vienna period.
- **Stagnation -** Disruption during the period of Austro-fascism and the Nazi regime
- **Reconstruction era and corporatist housing policies after WWII.**
- **From post-corporatist welfare state to neo-liberal economization**

The Social Grid of Institutions, Networks, and Cognitive Frames

accord. to J. Beckert 2010

Cr | E | S | S | I

Creating Economic Space for Social Innovation

- **Institutions**, **networks,** and **cognitive frames** form conditions and restraints on each other for their reproduction and change
- Understanding of the reproduction of market fields and their dynamics is only possible if **all three** types of social structures are simultanously recognized.
- These processes of reproduction and change of social structures are understood as the result of agency processes that are themselves anchored in social contexts.
- Looking at all three structures, makes it possible to understand the mechanisms of which social structures **reinforce** each other; and through which actors employ resources gained from one of the three structures to **reconfigure** other parts of the social structure in a way favorable to their goals.
- **Friction** between the three structures is a powerful source of change.

Change of the Social Grid

Cr | E | S | S | I

Creating Economic Space for Social Innovation

Change: to shape the network and to provoke change (some) actors have to engage in ‚control projects' and blocking the action of others. Networks are formable by strategic actors. Change can also be invoked by institutional change and changes in perception.

- Changes in the **cognitive** framework can lead to the de-legitimation of institutions and a different perception of the opportunities provided by existing institutions and network structures.
- **Institutional** changes can affect social networks and make other cognitive orientations socially relevant.
- The re-composition of **networks** provides new actors with the power to influence institutional structures and to influence cognitive frameworks prevalent in the field.

Relations between Institutions, Networks, and Cognitive Frames

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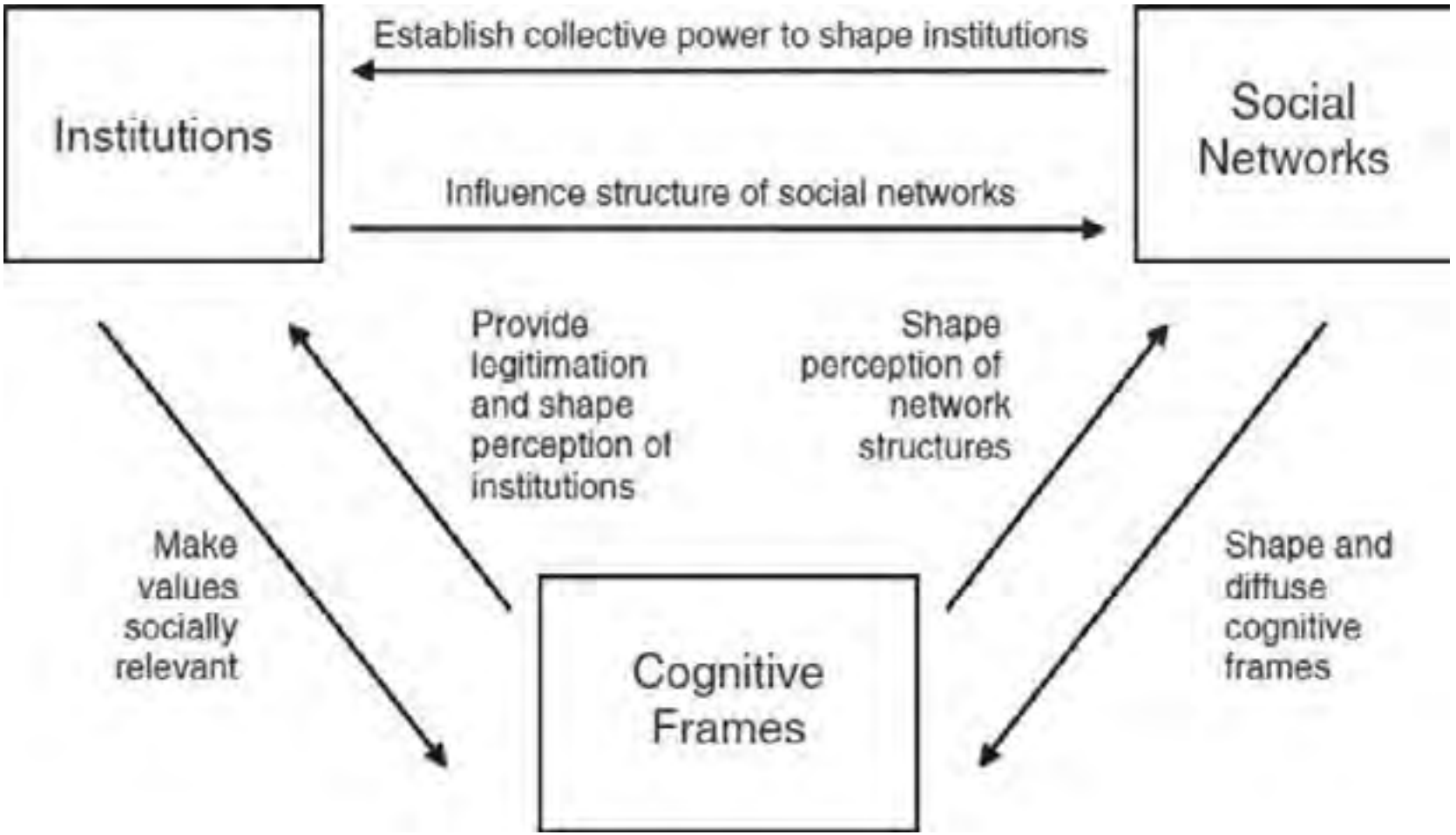
Creating Economic Space for Social Innovation



Source: J. Beckert 2010

Social Grid Reinforcing the Capitalist Housing Regime

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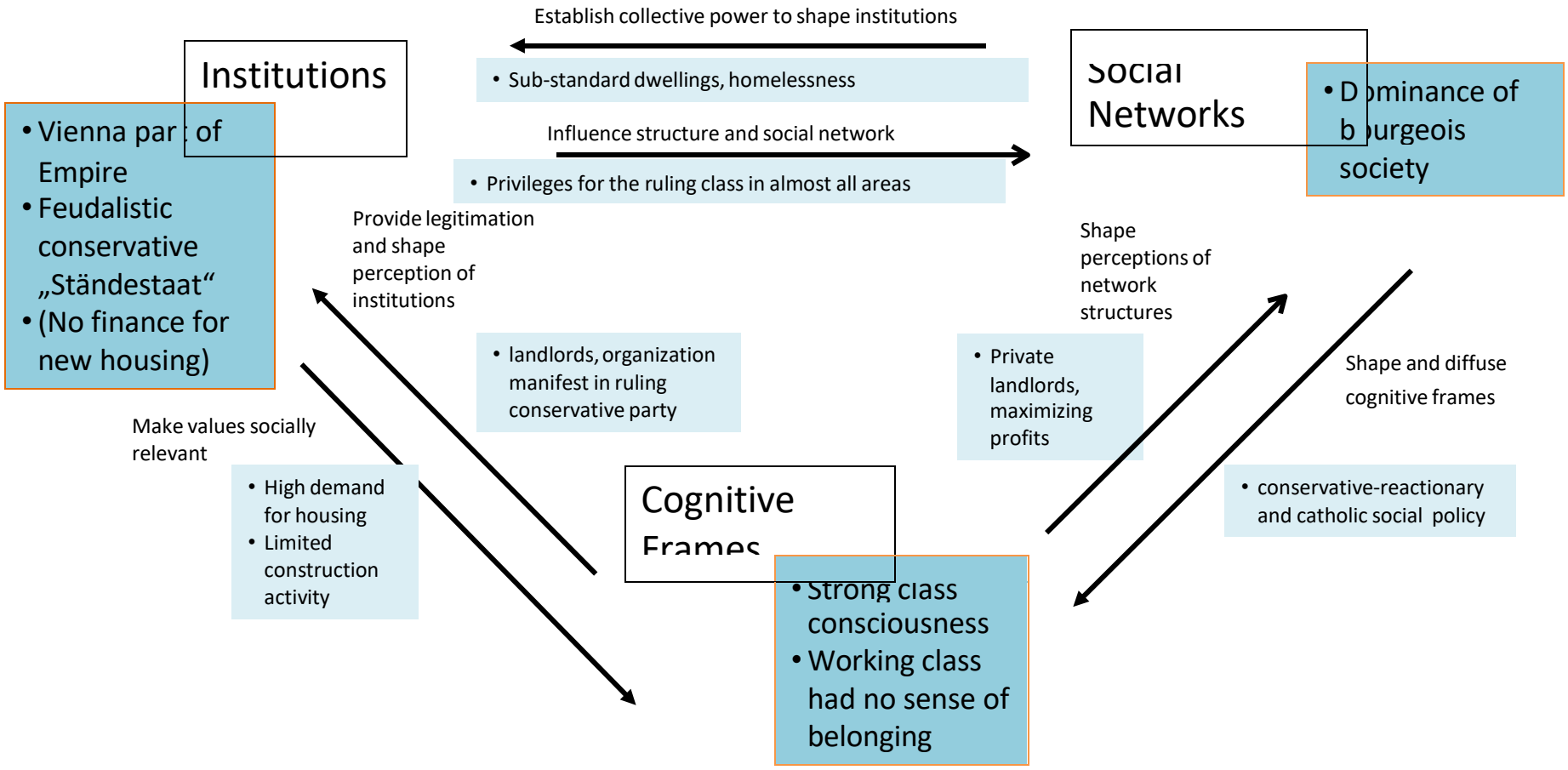
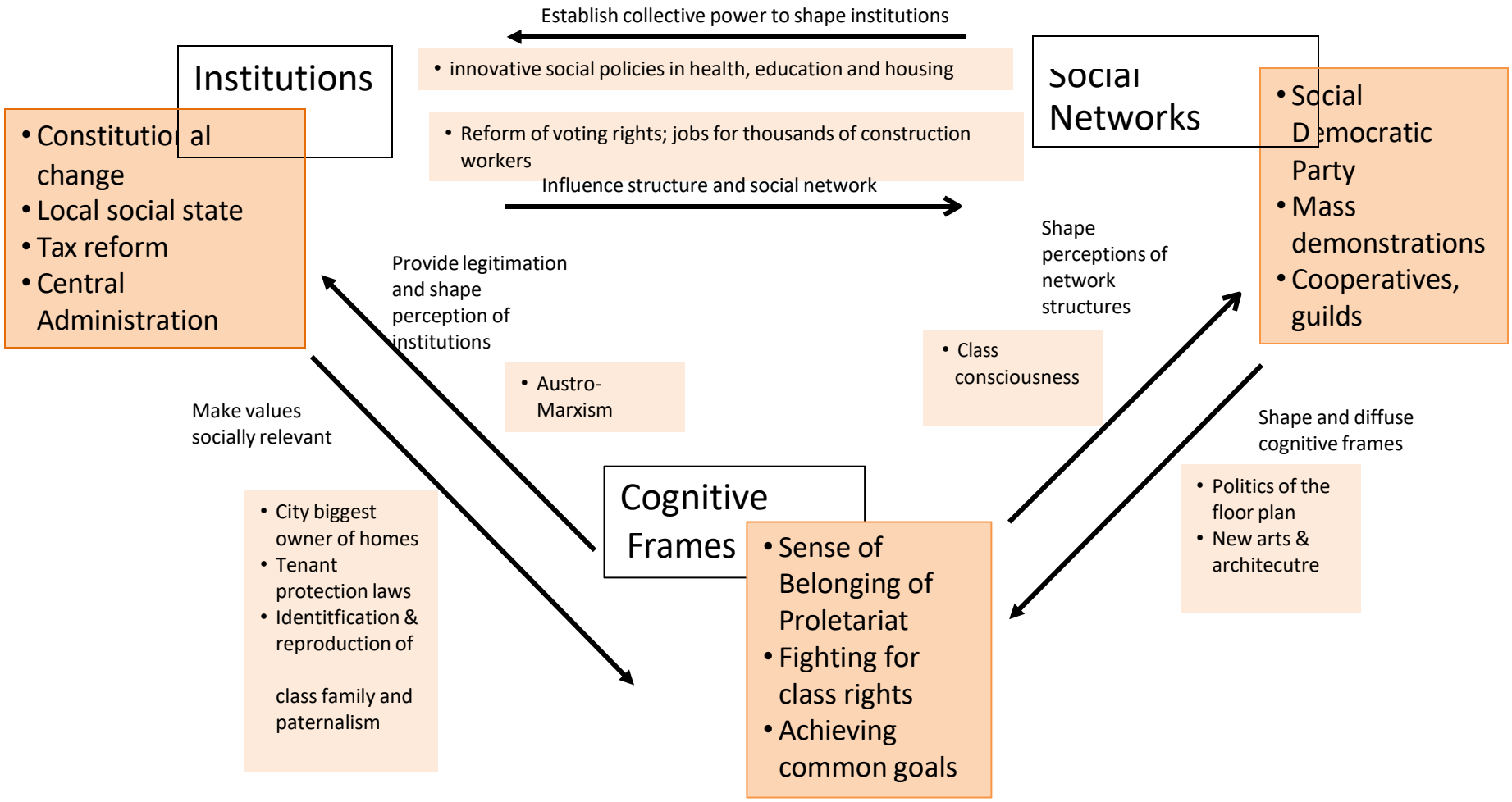
Creating Economic Space for Social Innovation



Red Vienna Housing Policy: Constitution of the Social Grid

Creating Economic Space for Social Innovation



Institutions/ Laws (general)

Cr | E | S | S | I

Creating Economic Space for Social Innovation

- Constitutional change, Independence of the city of Vienna
- Democratic voting rights
- Reform of tenant protection
- Reform of tax laws (especially housing tax, luxury tax)
- Degree of organisation, overcoming market forces

Institutions / Laws (specific)

Cr|E|S|S|I
Creating Economic Space for Social Innovation

- Master plan: 1920 general housing program and successor
- Innovation in construction, architecture, interior design
- Role of the municipality, land acquisition, management etc.
- Implementation of the Siedlungsamt (settlement office) and the Siedlungsfond (settlement fond).
- Implementation of GESIBA Gemeinwirtschaftliche Siedlungs- und Baustoffanstalt (public service of settlement and construction material) in September 1921

Institutions / Resources

Cr | E | S | S | I

Creating Economic Space for Social Innovation

- Between 1923 and 1926 the city could raise its income from 3.37 million Schilling to 38.47 million Schilling through the housing tax, reaching a stable level of 36 million Schilling in 1931.
- Between 1924 and 1927 the city received a net income of 117 million Schilling only though the housing tax, total expenditure for housing construction rose 372 million Schilling,
- property tax and capital gains tax

Social Networks

Cr|E|S|S|I
Creating Economic Space for Social Innovation

- Social democratic party
- Cooperatives emerging out of the settler movement
- Mass demonstrations 1920-22
- New movement of architects, city planners, landscaping, interior design
- Institutionalisation of social housing

Cognitive Frames

Cr|E|S|S|I
Creating Economic Space for Social Innovation

- Proletariat vs. Bourgeoisie, (soz. Wiener Stadtverwaltung vs. Hausherren)
- Settlements vs. superblocks
- Feminism vs. patriarchy
- Austro-Marxism vs. Austro-Fascism (civil war 1933/34)
- The three historic mass demonstrations between 1920 and 1922 had made clear that there is strong support in society for social reforms to improve the housing situation and sufficient political pressure to provoke reactions from the political side.

Cognitive Frames

Cr|E|S|S|I
Creating Economic Space for Social Innovation

- Several famous architects, among them Peter Behrens, Josef Frank, Josef Hoffmann, Adolf Loos and Oskar Strnad were assigned the task to design the master plan in more detail with an appropriate connection between high and flat buildings.
- Famous for their interior design are Adolf Loos, Grete Schütte-Lihotzky and Franz Schuster. Schütte-Lihotzky developed the first prototype of the built-in kitchen, a predecessor of the later famous Frankfurt kitchen which found international acclaim and distribution.
- For the bedrooms Adolf Loos designed closet walls that could be altered according to the users' needs.
- Politics of the floor plan ("palace for the proletariat")
- The goal of the majority of the settlers sharing social-democratic conviction was not only the creation of new spaces to live in but a **transformation of the social order**.

Cr|E|S|S|I

Creating Economic Space for Social Innovation

Social & Organizational innovation

- Some administrative offices of the housing management agency located inside the superblocks
- cooperative store (Konsumgenossenschaft)
- library
- restaurant/cafeteria
- Kindergarten, playgrounds, sports activities, theater and music groups etc.

Technological innovation

Cr | E | S | S | I

Creating Economic Space for Social Innovation

- Infrastructure of water and gas pipes
- Wood/coal stove; later gas stove
- Running water in the apartments
- Water toilets in the apartments
- scullery; later separate kitchen
- “Living kitchen”; later “working kitchen”
- Reform furniture: light, mobile pieces; walking closets adjusted to the limited dimensions of the homes

What can we learn?

Cr | E | S | S | I

Creating Economic Space for Social Innovation

- Understanding of social innovations that lead to societal change with effects on a market field are not the result of bottom up movements or top-down policies, ideas, discourses, institutions or networks alone.
- They are produced and reproduced by several types of social structures working simultaneously.
- The contradictory character of the different social structures highlights spaces for innovation, e.g. market failure to solve housing problem and increase of poverty.
- The social structures reinforce each other; e.g. change of tax laws, drop of property prices, institutionalization of housing administration, creation of jobs, increase in social dwellings, increase of living standards, satisfied clientele for social democratic municipal government…

What is missing?

CrESSI

Creating Economic Space for Social Innovation

- How innovations occur
- Role of artefacts/technology
- Role of power structures
- Dynamics of change

CrESSI

Creating Economic Space for Social Innovation

- For further information please contact:

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http://www.sbs.ox.ac.uk/ideas-impact/research-projects/cressi

New Value Spaces for Emerging Health Innovations

ELLEN MOORS & ALEXANDER PEINE

COPERNICUS INSTITUTE, UTRECHT UNIVERSITY

Universiteit Utrecht

Trends in healthcare landscape

Challenges

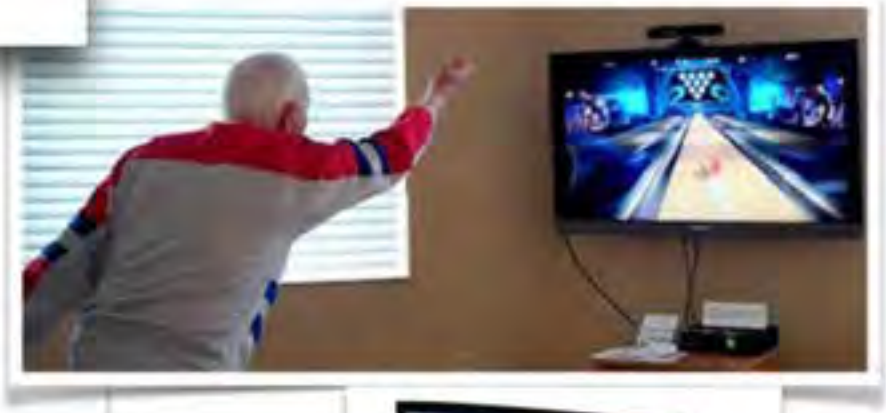
- Increased health awareness, monitoring, health information needs of citizens (appification of society)
- Health innovation becoming more smart, personalized and citizen-centred
- Health innovations increasingly incorporated in domestic life (quantified self, telecare, e-Health)
- Cost efficiency
- Patients / users / citizens more demanding, rising self-actualisation
- Institutionalisation

Personal Health Systems

- "Shift of health technology to homes and communities" (Dishman 2012)
- "The home as a health place"… and health technology as consumer goods
- Innovation Studies perspective on PHS innovation
- Case studies on service robot platforms and Point-of-Care diagnostics
- Implications for innovation policy and management

*"**Personal Health Systems** (PHS) assist in the provision of continuous, quality controlled, and personalised health services to empowered individuals regardless of location."*
(Codagnone 2009)

"We believe Apple's HealthKit will revolutionize how the health industry interacts with people. We are proud to be at the forefront of this innovative technology with the Mayo Clinic app."
Dr. John H. Noseworthy, CEO, Mayo Clinic



Dashboard
Calories Burned

Health technology challenges

- Prevention, lifestyle support, self-management, "quantified self"
- Health technology integrates closer with everyday life ("patient-consumers")
- Competing routes to upscaling and diffusion
  - 700 million spent by Ambient Assisted Living program alone
  - Apple, Google, Samsung, etc….
  - From "technology creep" to market driven innovation
- Older persons as "early adopters"

"Our life is a continuous function. We are not now consumer and then patient, going in and out of the system, and thereby creating costs… we should be in the system, and out of the system all our lives"
(Walter de Brouwer, CEO Scanadu)

Health technology challenges

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- Health technology integrates closer with everyday life ("patient-consumers")
- Competing routes to upscaling and diffusion
  - 700 million spent by Ambient Assisted Living program alone
  - Apple, Google, Samsung, etc….
  - From "technology creep" to market driven innovation
- Older persons as "early adopters"

Research questions

The nature and cumulativeness of the innovation process?

Health technology assessment for PHS?

What is the role of the users?

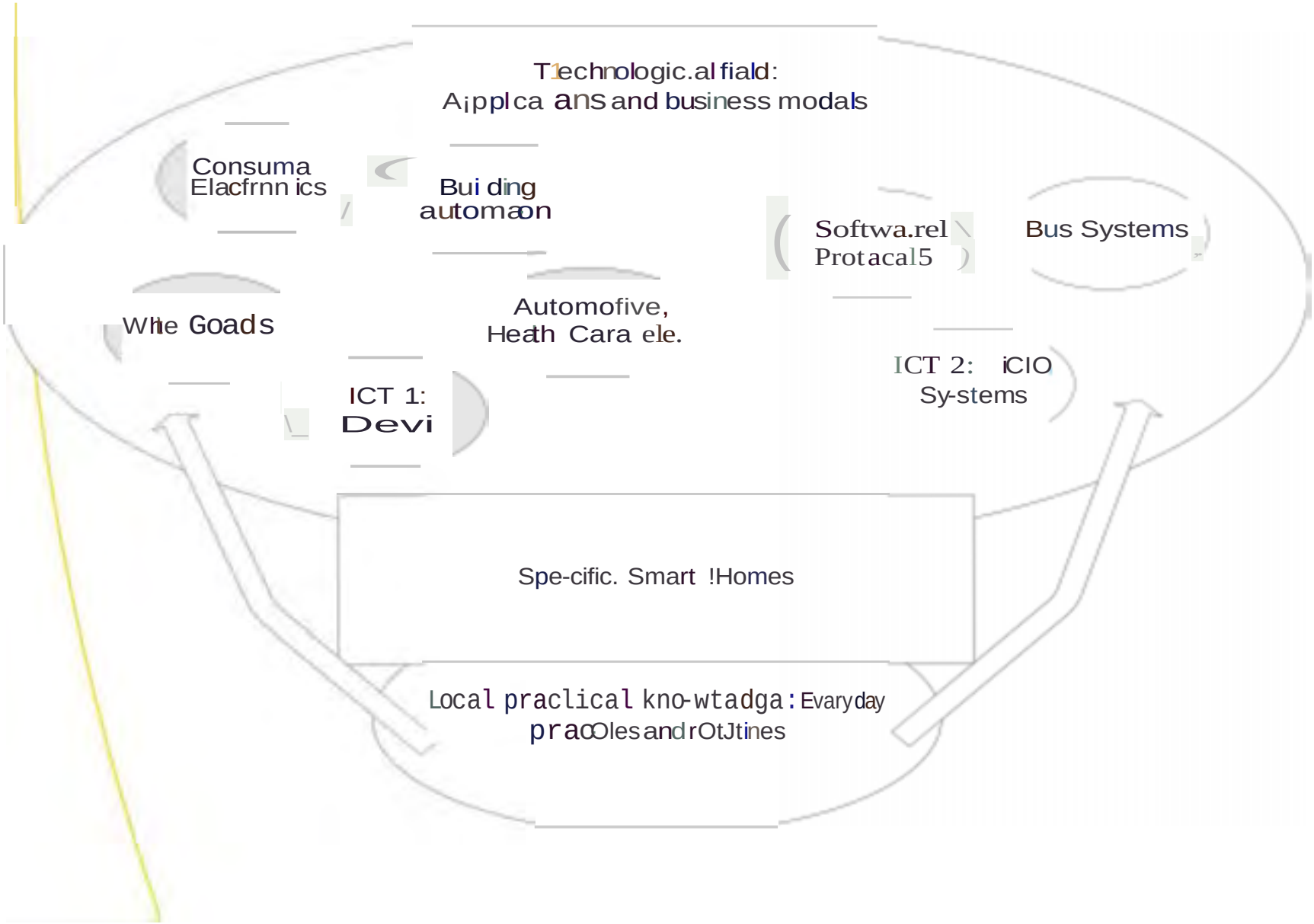
Who values PHS (and along what dimensions)?

Valuing health technology

- Health technology is complex, multiple settings/places are involved (clinic, hospital, lab, home)
- Conceptualizing PHS innovation and evaluation
- Projects on service robot platforms and POC diagnostics
  - Open platforms revealing typical PHS features
  - High degree of user involvement
- Qualitative interviews, observations and document analyses
- Qualitative-inductive approach, Grounded Theory

Innovation Studies Perspective

- Technological Configurations and Information Infrastructures
  (Fleck 1994; Pollock et al. 2007; Peine 2009; Peine et al. 2014; Peine & Moors 2015)
  - Technologies as infrastructures (innovation ecosystems)
  - Systems integration and innofusion
  - Localization work vs. generification work
- Design fallacy (Stewart et al. 2005): User involvement is not just a design input
- "Generification" strategies and role distribution: Who personalizes Personal Health Systems?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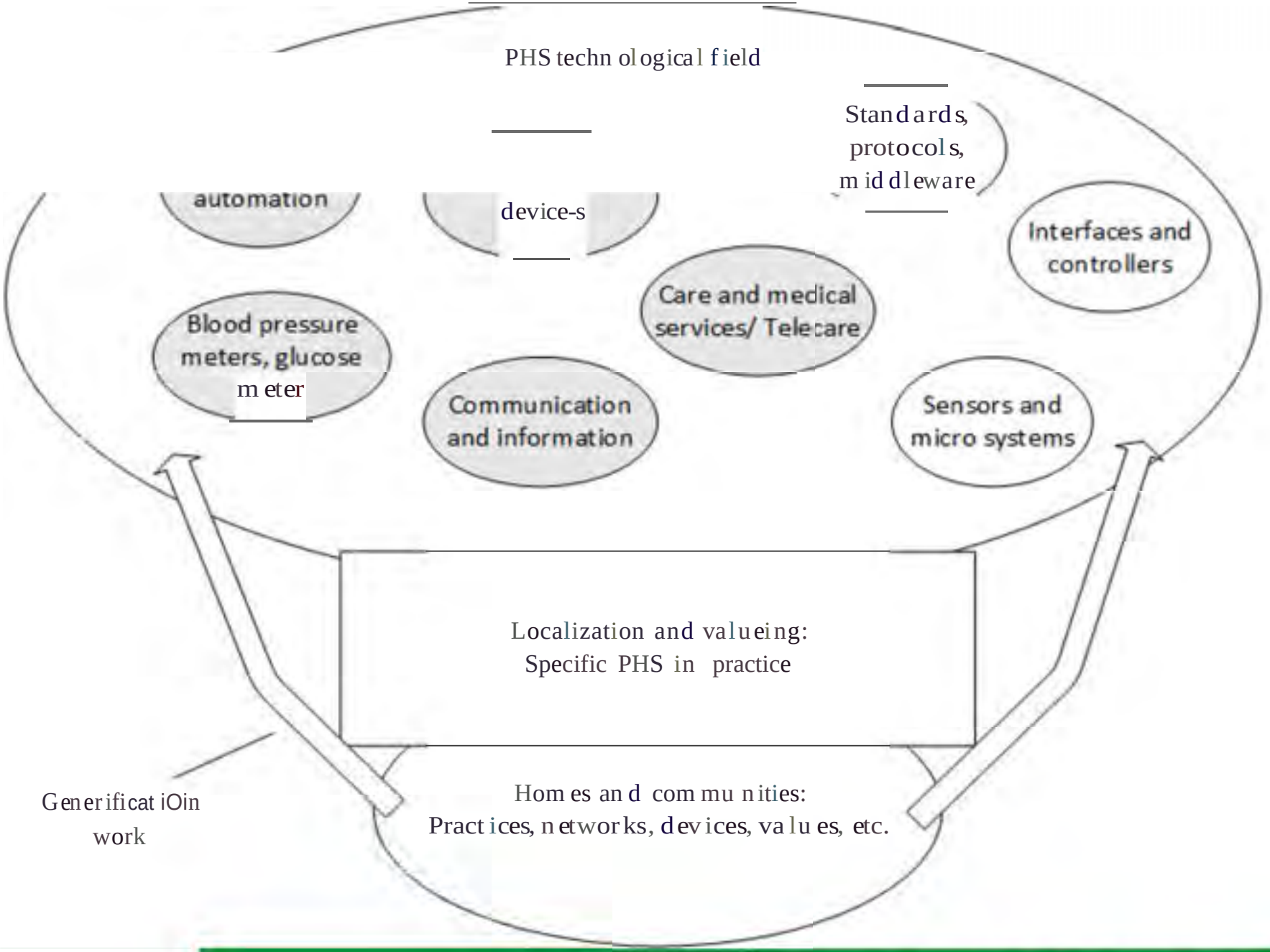
PHS techn ological field
Standards, protocols, middleware
automation
device-s
Interfaces and controllers
Care and medical services/ Telecare
Blood pressure meters, glucose meter
Communication and information
Sensors and micro systems
Localization and valueing:
Specific PHS in practice
Homes and communities:
Practices, networks, devices, values, etc.
Generificat iOin work

Innovation Studies Perspective

- Technological Configurations and Information Infrastructures
  (Fleck 1994; Pollock et al. 2007; Peine 2009; Peine et al. 2014; Peine & Moors 2015)
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- "Generification" strategies and role distribution: Who personalizes Personal Health Systems?

Ideas about users

- Extensive process of user involvement in case studies

- Sophisticated imagery about the "patient-consumer":

"We call it lifestyle vs. care. It is about the combination. A specific care device is doomed to stand in the corner, you need it to function. But you are proud of lifestyle…'look what a beautiful thing I have'… you don't do this with a blood sugar meter or a scale. The idea is that you buy a lifestyle device that helps you as you grow older, this is the philosophy…"

"I think the robot could be bought in younger ages than real elderly people, because the goal of […] is that the robot is some sort of lifestyle product that you are proud of and that you can show to your friends."

- **But:** little of this sophistication to be seen in project outcomes

Universiteit Utrecht

Objectives

To explore how values reinforce different assumptions about PHS users.

To identify how different kinds of value produce different forms of user involvement.

To study how value is co-created with ideas about the personalised health user, to broaden the focus towards user involvement in processes of healthcare innovation.

Value Spaces

Prosthetic Values = disciplined agency in which individuals are empowered to follow pre-configured scriptes for individual action

- Norms of good functioning
- Evidence about improvement of good functioning (HTA)
- Compliance
- Patients
- Primary / secondary care
- Stand-alone / usability
- User involvement
- Technology Acceptance 1.0.

Habilitation Values = interactive individual agency where individuals are empowered to explore and develop their needs and preferences (Callon 2008)

-
  - Negotiating health and illness
  - Learning
  - Consumerism / socio-material practice
  - Consumer innovators / DIY
  - Domestic environments
  - Configurations/ configurability
  - Co-creation
  - Technology Acceptance 2.0

Value spaces of PHS

Prosthesis

- **Patient**-consumer
- Compliance
- "Personalization"
- Usability
- Technology Acceptance
- Cost effectiveness
- Evidence base

Habilitation

- Patient-**consumer**
- User innovation
- Domestication
- "Domesticability" (Peine/Neven 2011)
- Innovation diffusion
- Consumer choice
- New forms of evidentiality

Conclusions

- PHS are configurational technologies, new roles and responsibilities for its users (from user involvement to smart generification)
- How a technology is useful, and how it should be valued is part of the innovation process
- Risks of PHS innovation to suppress this due to the *prosthetic* logic of health innovation
- Questions of responsibility, agency and imagery are crucial … but difficult to evaluate
- We need new ideas of "evidentiality"
  - not new types of or simply more evidence
  - but new conceptualizations of how evidence should be included in the innovation process
- Will Apple succeed in bringing health technology to homes?
  - They did that with the PC
  - They did that with smartphones
  - Establishing technology as a playing field and the process of consumption

Policy implications

- Revision of traditional evidence-based **HTA practices** focusing on efficacy, quality, safety and costs, and bearing risk of health innovations following a prosthetic strategy

- Include social and symbolic values of livability and active and meaningful ageing, following habilitating strategies, envisioning explorative and interactive agency for (older)persons during innovation process

- Further research about habilitating generification, across different stages and locales of PHS innovation needed

Questions?

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Please note that all results, tables and figures may not be used, or redistributed without permission of the Copernicus Institute of Sustainable Development

Nun public bulk consumers as drivers of eco-innovations

EU SPRI 2015
Helsinki, 10 June 2015

Dr. Frieder Rubik / Ria Müller
IÖW – Institute for Ecological Economy Research, Heidelberg/DE

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Table of content

1. **Background**
2. **Methods applied**
3. **Derivation of bulk consumers and of priority eco-innovations**
4. **Empirical findings and results**
5. **Example textile**
6. **(Policy) approaches for activating bulk consumers**
7. **Conclusions**

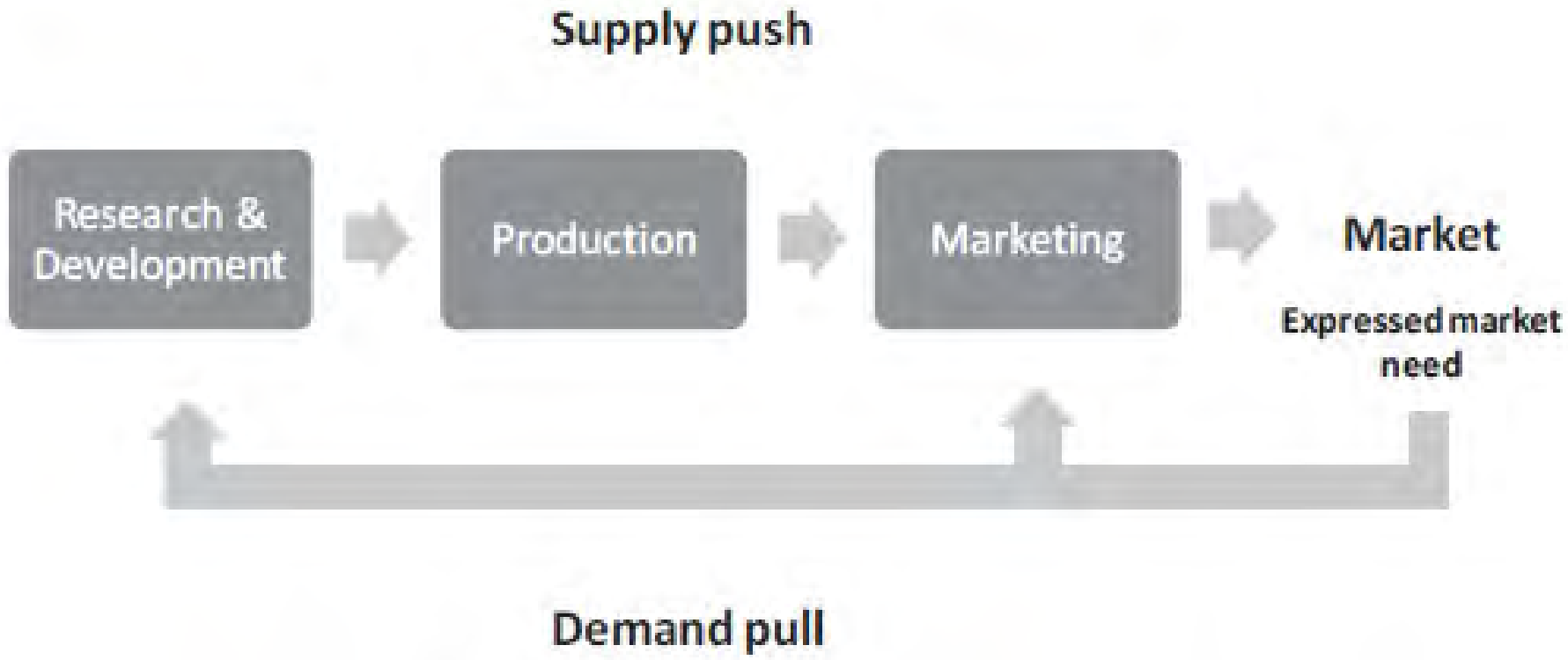
The project

- **Client: German Federal Environment Agency (UBA)**
- **Partners:**
  - Institute for Ecological Economy Research (IÖW) [Lead], Berlin/Heidelberg/DE
  - Fraunhofer Institute for Systems and Innovation Research (ISI), Karlsruhe/DE
  - Institute for Resource Efficiency and Energy Strategies (IREES), Karlsruhe/DE
- **08/2012 – 10/2014**
- **Objectives:**
  - Overview on bulk consumers in Germany and their strategic importance
  - Elaboration of a potential strategy to activate bulk consumers and to bundle their demand to support eco-innovations

Background

- **Innovation as key driver of a „Green Economy“ (UNEP/OECD)**
- **Innovation types:**
  - Technological innovations
    - Products
    - Processes
  - Organisational innovations
  - Social innovations
  - Innovations in design and marketing
- **Definition of eco-innovation according to OECD:** “(…) includes both environmentally motivated innovations and unintended environmental innovations” (2009, p. 149)
- **Innovation policy: All measures of policy influencing innovation processes**

„Technology push“ and „Demand pull“ - debate

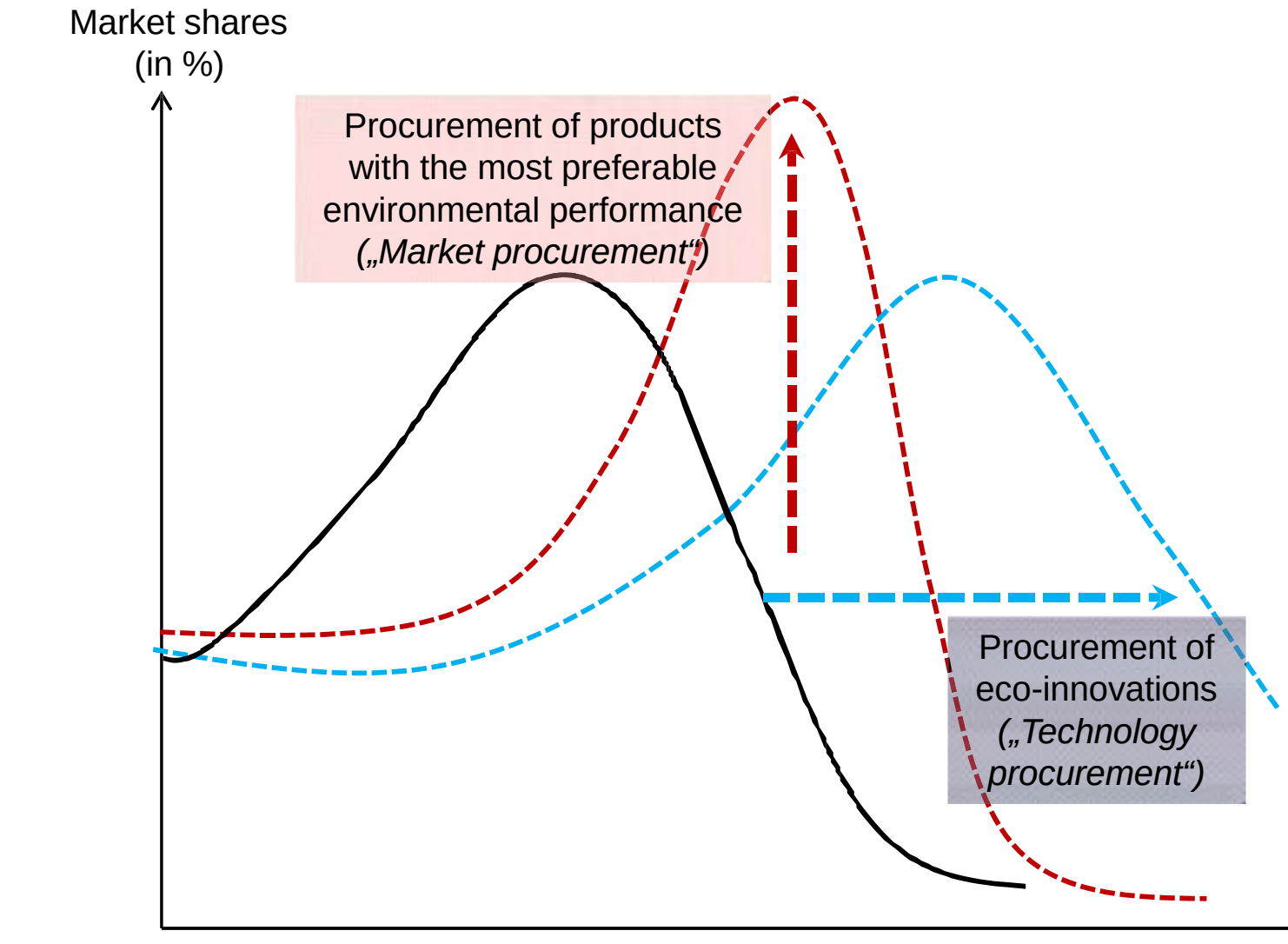


Sources: UNEP (2011, 19) based on Martin (1994)

Demand side innovation policy

- **More attention since mid of 2000ies, e.g. OECD-report 2011**
- **Justification**
  - Market and system failure: *external costs, information asymmetry, lock-ins, non-diffusion of eco-innovations*
  - Lead market: *national test markets for global dissemination*
  - Mission orientation: *double dividend*
- **Key actor groups**
  - Public procurement (GPP)
  - Retailers
  - Private consumers
  - Bulk consumers:
    - commercial as well as non-profit-making,
    - Operating alone or together with partners
    - holding a significant share in the relevant market

Market segmentation and strategies



Source: Based on Ostertag/Dreher (2002)

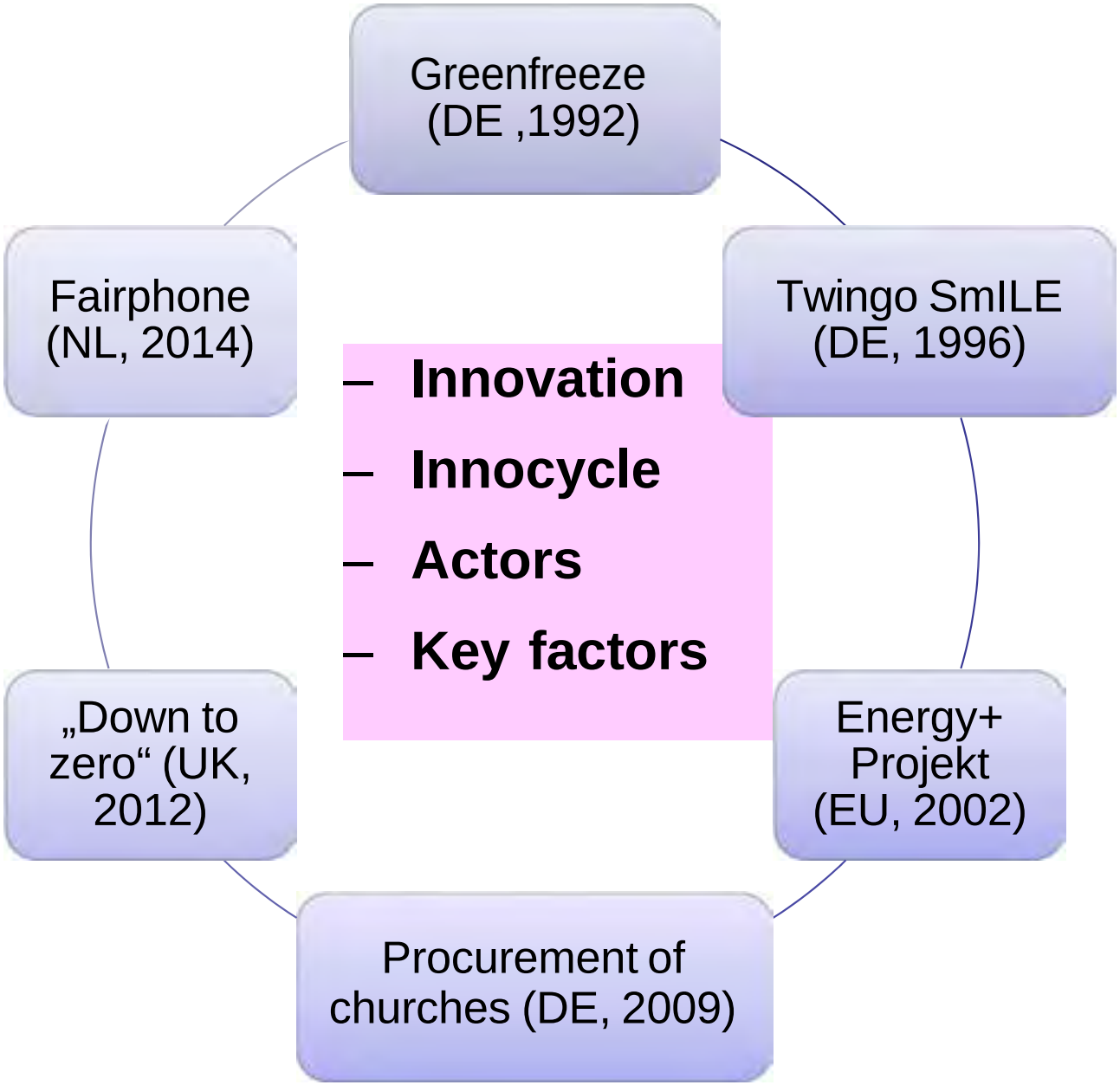
Methods applied

- **Literature analysis**
- **Collection, selection and priorisation of eco-innovations**
- **19 expert interviews with**
  - International scientific experts
  - Practitioners
- **Six case-studies**
- **Three German workshops with bulk consumers**
  - CO_2 air-conditioning systems in passenger cars,
  - Energy-efficient commercial tumble dryers (> 6 kg),
  - Textiles made by recycled cottons fibers or by organic cotton

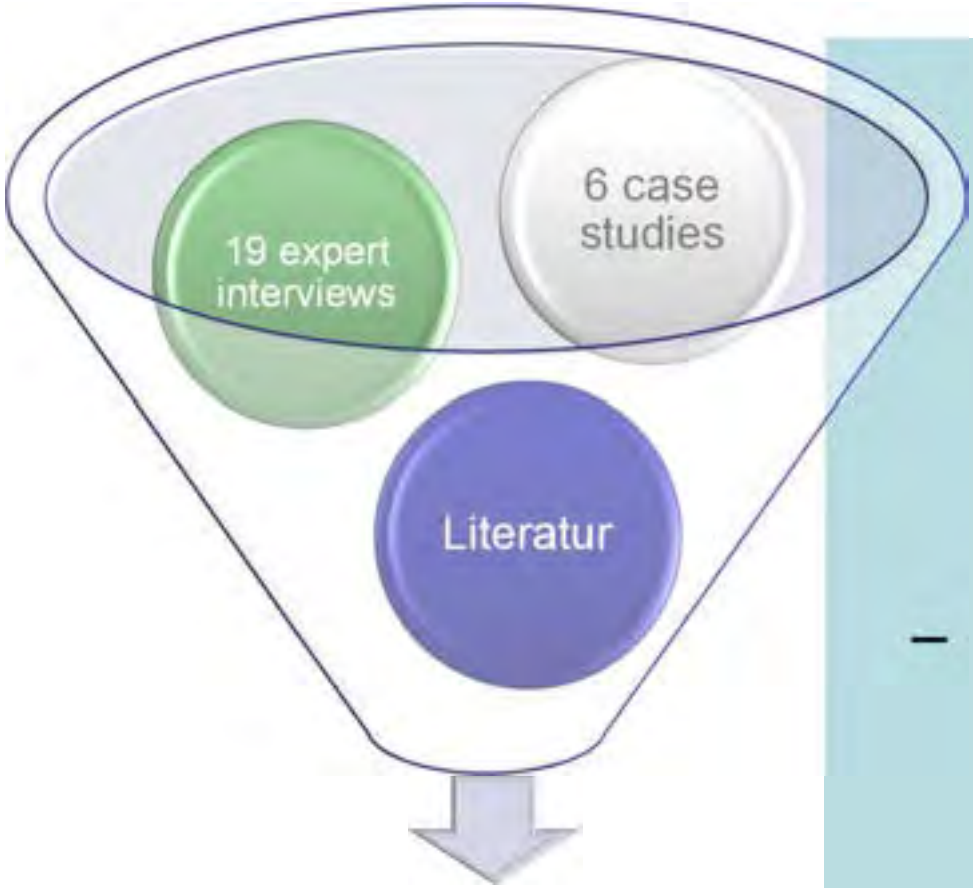
Definition of “bulk consumers“

- **Commercial as well as non-commercial organizations,**
- **Non-governmental organizations,**
- **Organizations which**
  - either present themselves in the market as a central organizational unit with respect to purchasing
  - or which are characterized by common or bundled procurement, and
- **whose shares in the concerned market sector (i.e. purchase quantities and market turnovers per product group or service) represent a significant share.**

Empiricism: case studies



Key suporting / hindering factors



Explanatory model for success & failure

Classification of factors in six clusters

(based on Fichter/Clausen 2013):

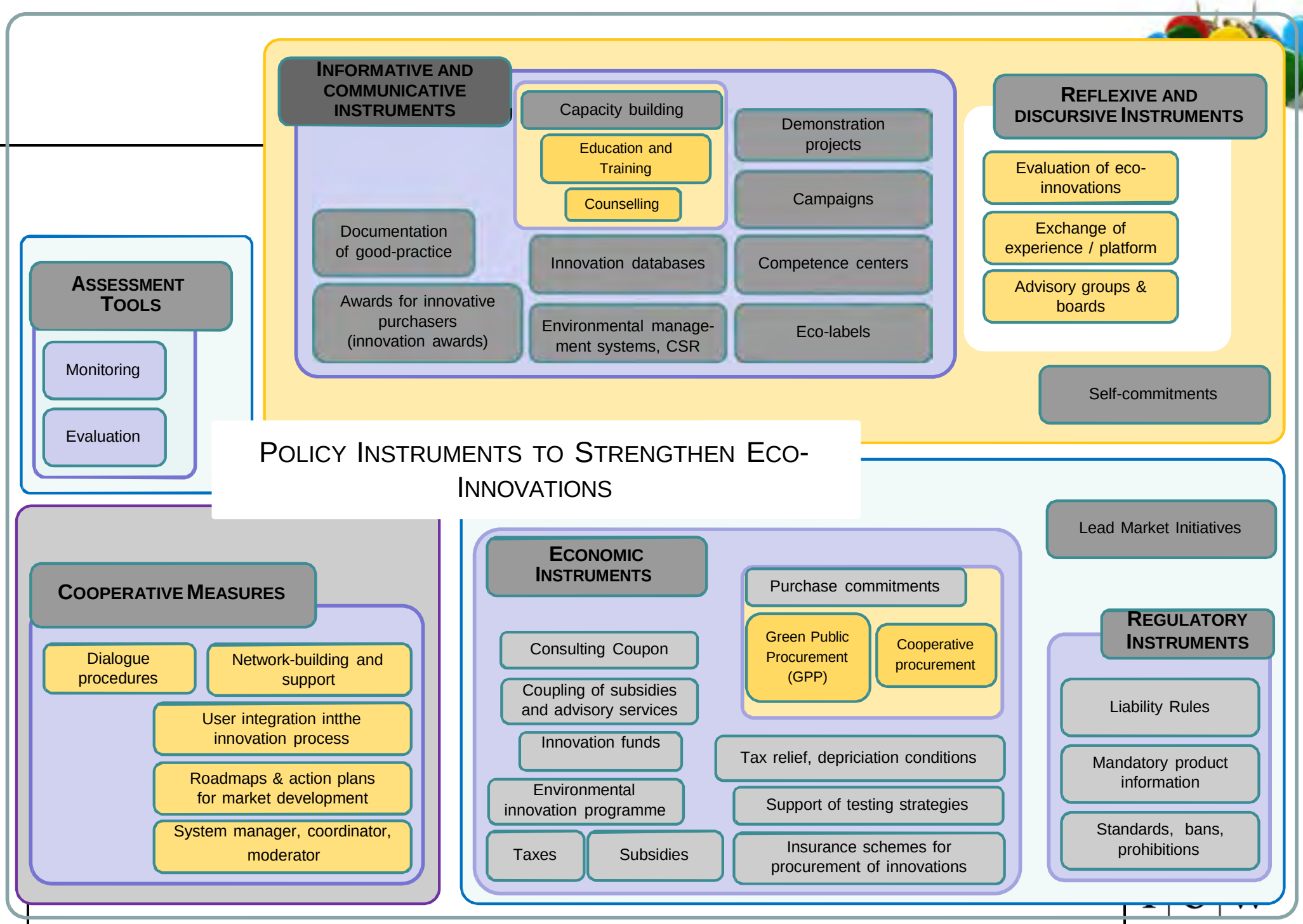
- **Innovation-related key factors,**
  e.g. quality, complexity of innovation
- **Supplier-related key factors,**
  e.g. availability, reputation of supplier
- **Business branch-related key factors,**
  e.g. system manager, lobbies/associations
- **Demand side-related key factors,**
  e.g. routines, change agents, benefits
- **Context-related key factors,**
  e.g. public awareness & interest,
- **Policy-related key factors,**
  e.g. policy framework, lead market

Key lessons learnt I

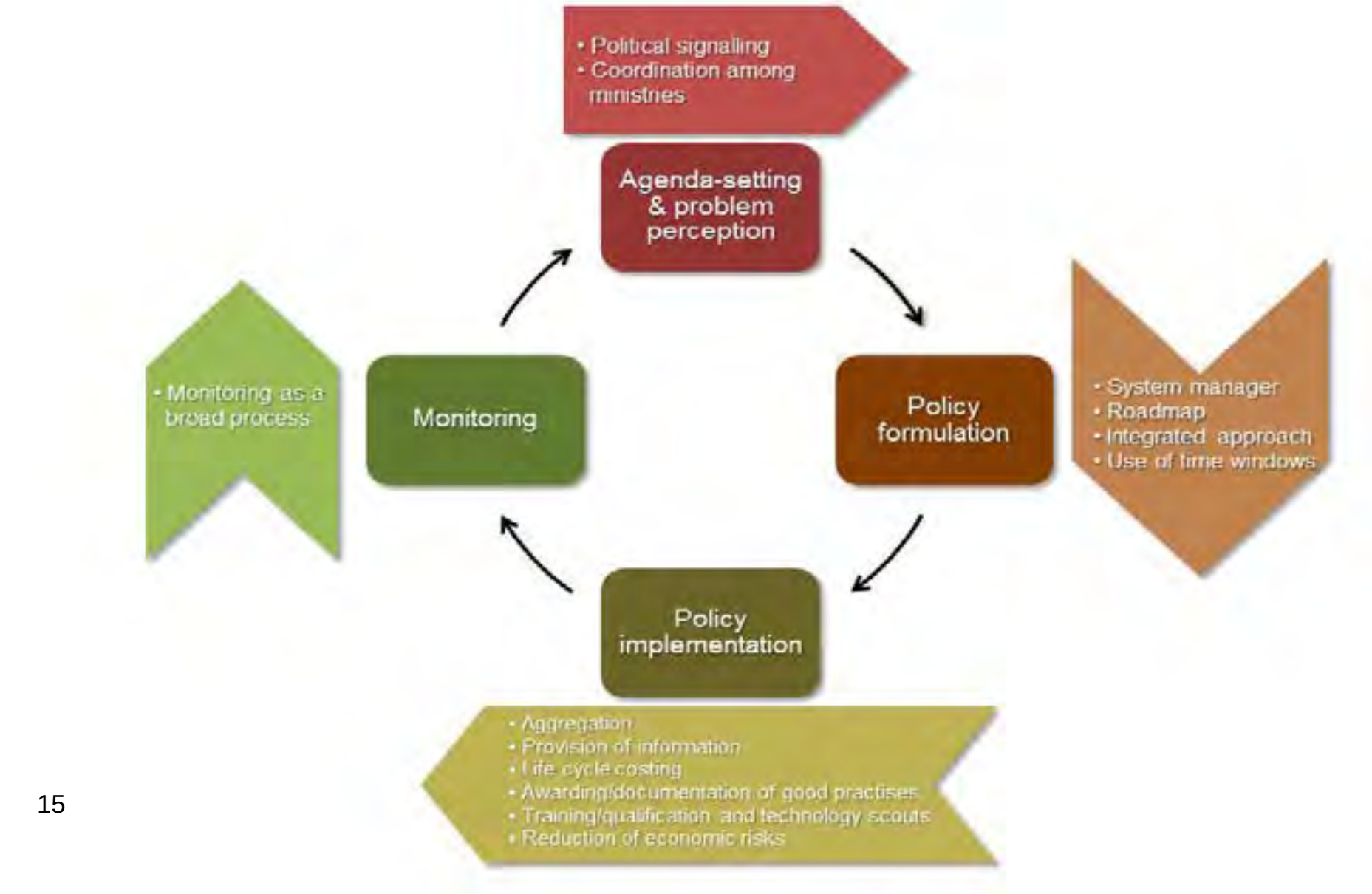
- **Pre-study for market targeting** - strong market targeting is needed
- **Mediators and brokers**
  - Different respected entities
  - Involvement of environmental or consumer NGOs to increase credibility.
- **Roles in innovation process:** Bulk consumers could perform in different roles, namely as triggers for innovations, as co-producers or as “early adopters”.
- **Realisation of theoretical market power in real demand:**
  - Binding demand has to be generated
  - Decentralisation of purchasing within business and public procurement
  - Rare embedment of the purchasing department in the strategic management level.
- **Business application context:**
  - Purchasers as “Change agents”
  - Credible, long-term promotion of eco-innovations
  - Application of “Life Cycle Costing“ (“true costs”)
  - Training of purchasers and applicants
  - Allowance to take risks
  - Differentiated risk sharing between suppliers and bulk consumers.

Key lessons learnt II

- **Pooling of purchasers:**
  - Aggregation of the demand → Increase of market power
  - Competition in case of horizontal cooperation
  - Cooperation public & commercial companies → prescriptions of public tendering & competition laws.
- **Public awareness and problem awareness:**
  - Attention towards environmental challenges
  - Perception of environmental challenges → economic risk for vendors as “incentive”
  - Attention towards “focal“ companies.
- **Political support and and “background music“:**
  - Political system (international and national level) → send strong (regulative) and weaker (policy objectives, long term visions) signals of policy requests to emphasize specific future requests.
- **Monitoring:**
  - Supporting companies to document and transfer their experiences as well as to report them.
  - Dynamic snowball-effects.


Informative and communicative instruments
Capacity building
Education and Training
Counselling
Demonstration projects
Campaigns
Documentation of good-practice
Innovation databases
Competence centers
Awards for innovative purchasers (innovation awards)
Environmental manage-ment systems, CSR
Eco-labels
Reflexive and discursive Instruments
Evaluation of eco-innovations
Exchange of experience / platform
Advisory groups & boards
Self-commitments
Assessment Tools
Monitoring
Evaluation
Policy Instruments to Strengthen Eco-Innovations
Cooperative Measures
Dialogue procedures
Network-building and support
User integration intthe innovation process
Roadmaps & action plans for market development
System manager, coordinator, moderator
Economic Instruments
Consulting Coupon
Coupling of subsidies and advisory services
Innovation funds
Environmental innovation programme
Taxes
Subsidies
Purchase commitments
Green Public Procurement (GPP)
Cooperative procurement
Tax relief, depriciation conditions
Support of testing strategies
Insurance schemes for procurement of innovations
Lead Market Initiatives
Regulatory Instruments
Liability Rules
Mandatory product information
Standards, bans, prohibitions

Approaches to activate bulk consumers



Approaches to activate bulk consumers

- **Agenda Setting and problem perception**
  - Political signaling („Culture of ‚good' procurement")
  - Cooperation with GPP
  - Coordinationing among the different public purchasers
- **Policy formulation**
  - Adequate access: system manager as entry point (preparatory study, broker, support)
  - Development of a roadmap as a dialogic process
  - Integration of different policy measures, cooperation within federal system
  - Use of time windows.

Approaches to activate bulk consumers

- **Policy implementation**
  - Aggregation GPP & bulk consumers
  - Provision of information in various formats
  - Life cycle costing (LCC)
  - Awarding innovate consumers
  - Documentation of good practises
  - Training, qualification and technology scouts
  - Reduction of economic risks (e.g. insurance system)
- **Monitoring**
  - Monitoring as a broad process

Conclusions

- **Bulk consumers → promising strategy, thereby**
  - (relatively) *homogeneous* goods markets
    - → Relative market importance
    - → Mobilize “potential for sanctions” intelligently
    - → Spillovers for a market transformation
  - *heterogeneous* goods markets
    - → Technological market segmentation,
    - → Spillovers difficult
- **But: Empirical evidence to be tested (→ H2020 calls)**
- **No “free ride”-strategy → public engagement requested**

➡ **Triple dividend: Innovators, customers, private consumers**

Thank you for your attention.

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10 June, 2015

Public Procurement of Innovation: A review of rationales, instruments and design

Julien Chicot (julien.chicot@upmf-grenoble.fr)
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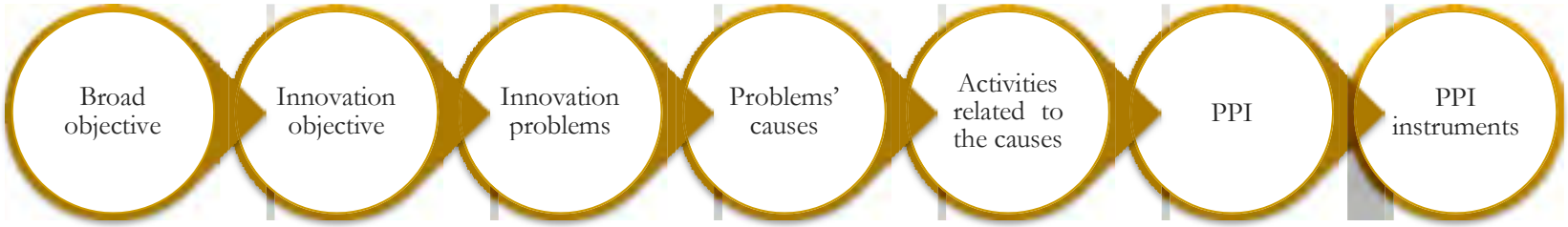
Mireille Matt
INRA, UMR GAEL, Grenoble, France

Context: Increased interest and impetus for PPI

- Public procurement: purchase or order by public administrations of products or services to help them to perform their missions
- Additional objectives e.g. to foster innovation (in a broad sense)
- Greater use of public procurement to leverage research and innovation in OECD countries

PPI, an innovation policy instrument requiring itself instruments

- Need for instruments to make public procurement practices innovation-friendly



Adapted from Borrás and Edquist (2008)

- PPI instruments should be selected according to the economic failures public procurement aims to solve

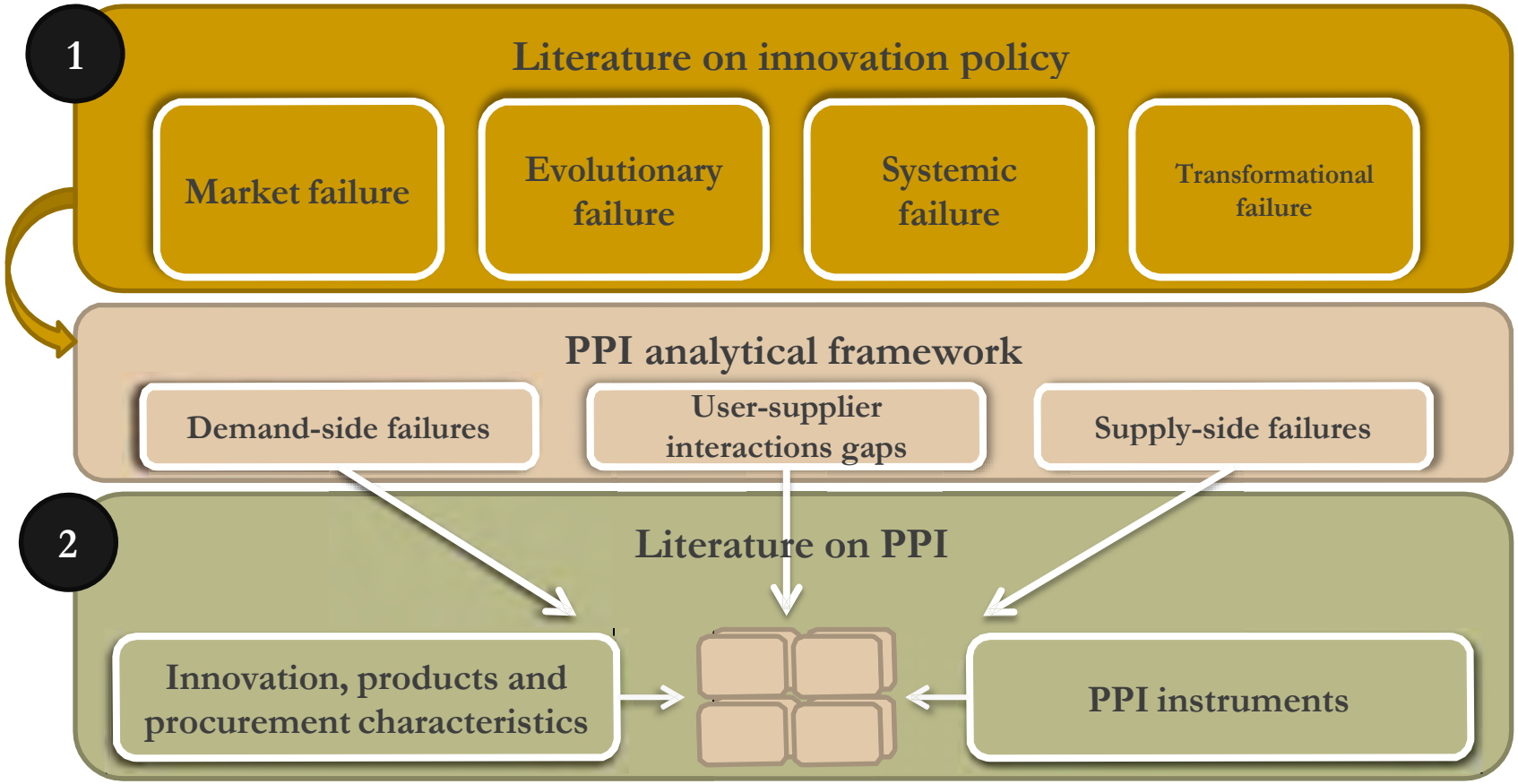
Objective: Build a typology of PPI linking rationales, design and instruments

- Gap in the academic literature on PPI
  - Lack of an unified framework for understanding and justifying their variety
  - Marginal consideration for the failures that impair innovation and which might be resolved by public procurement

- Identification of failures is key for:
  - A reflexive design of PPI instruments
  - An eased evaluation of PPI instruments

⇒ **Research purpose**: to investigate the failures which public procurement might solve in order to:
  - ⇒ Identify categories of PPI
  - ⇒ Connect with previously elaborated typologies through the linking of rationales, design and instruments of PPIs

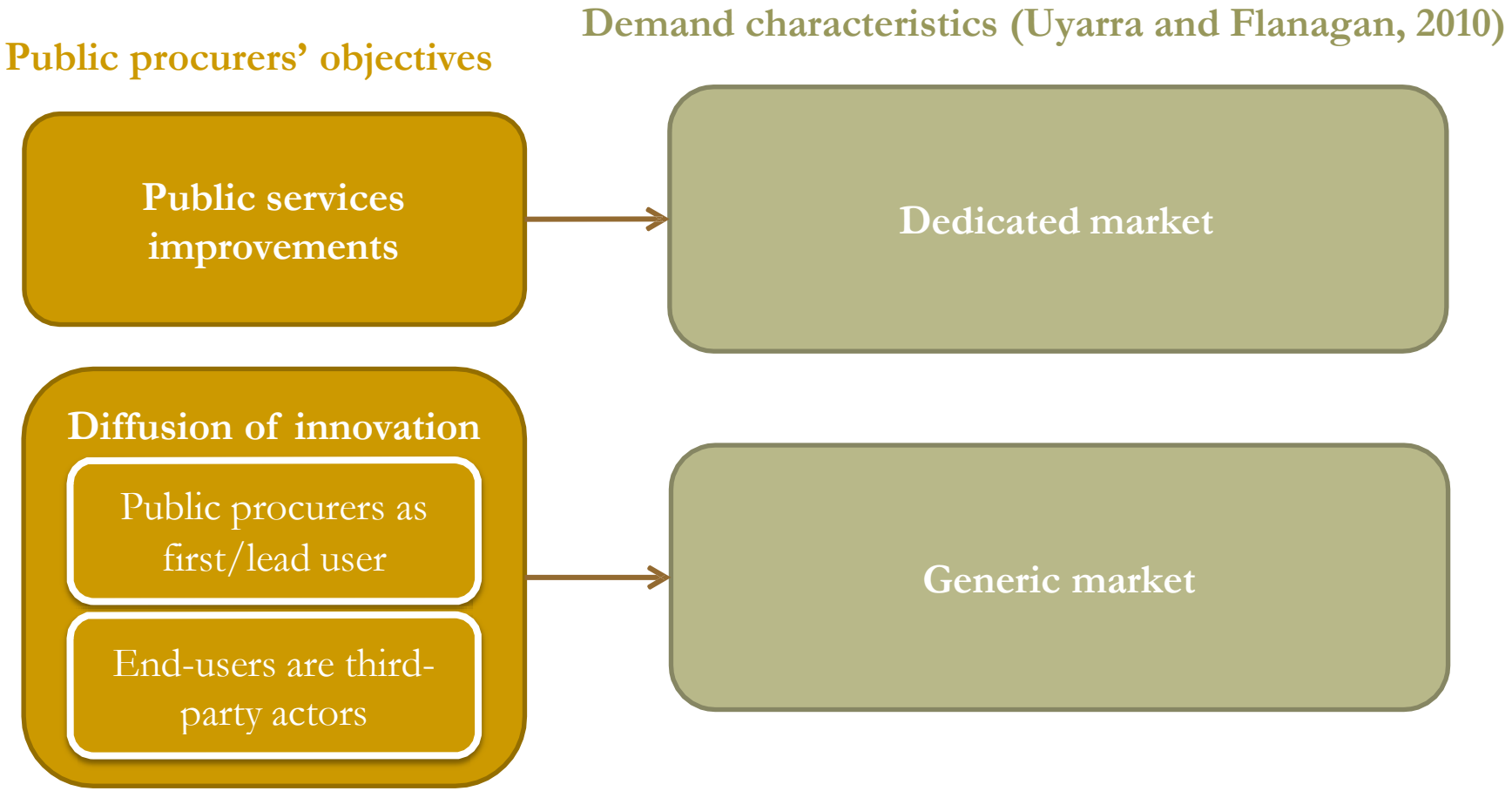
Methodology: A two-step literature survey



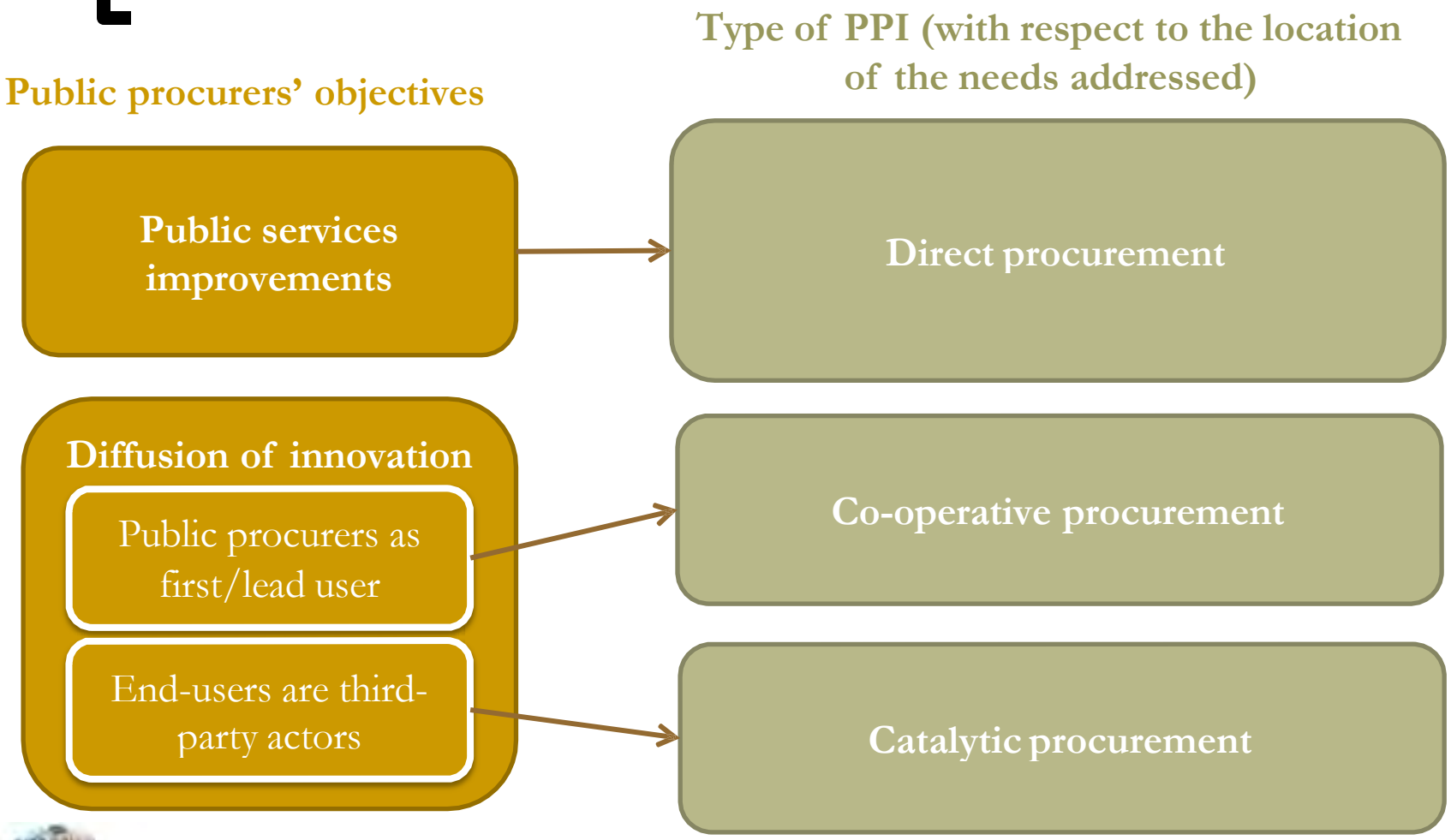
Demand-side failures

- Improvement of public services
  - Needs translated into market demand *(Cave and Frinking, 2003; Edquist and Zabala-Iturriagagoitia, 2012)*
- Diffusion of innovation *(Geroski, 2000)*
  - Procuring public organisations acts as "lead users" *(Edler and Georghiou, 2007; von Hippel, 1976; Mangematin and Callon, 1995)*
  - Increase or orientation of the sole private demand *(Morgan and Sonnino, 2007; Weber and Rohracher, 2012)*

Demand-side failures



Demand-side failures



Demand-side failures

Public procurers' objectives

Public services improvements

Diffusion of innovation

- Public procurers as first/lead user
- End-users are third-party actors

PPI instruments (i.a. Georghiou *et al.*, 2013)

Need for instruments to improve the awareness and skills of public procurers as regards PPI
(e.g. training and guidelines, dedicated strategy)

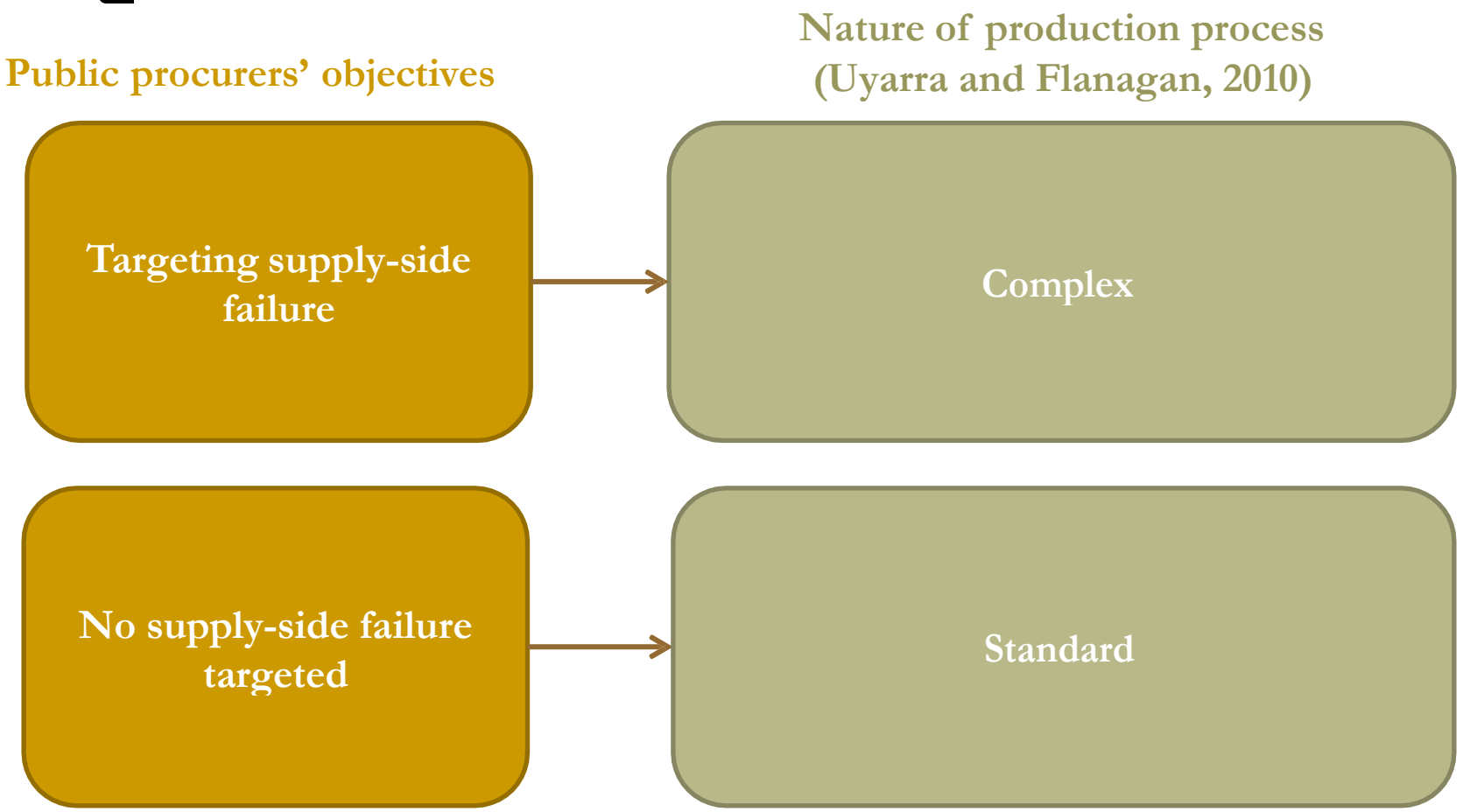
Interactions between procurers and actual end-users

Communication and education instruments

Supply-side failures

- Lack of incentives to innovate
  - Reduction of uncertainty on outcomes *(Arrow, 1962; OECD, 2014)*
  - Overcome surplus appropriability problems *(Montmartin and Massard, 2014)*
  - Inappropriate market structure (*Knutsson and Thomasson, 2014)*
- Lack of capabilities to innovate
  - Lack of resources and lock-in situation *(Malerba, 1996; Klein Woolthuis et al., 2005)*

Supply-side failures



Supply-side failures

Public procurers' objectives	Level of information exchange (Wang and Bunn, 2004)
Targeting supply-side failure	High
No supply-side failure targeted	Low

Supply-side failures

Public procurers' objectives

Targeting supply-side failure

No supply-side failure targeted

PPI instruments (i.a. Georghiou *et al.*, 2013)

R&D funding instruments
(e.g. PCP)

Instruments to enable and/or convince suppliers to innovation
(e.g. innovation requirements, purchase guarantees)

Instruments to adapt the competition structure

Users-suppliers interactions traps

- Firms lack information on the state and nature of demand
  - Reduce information asymmetry by signalling through calls for tenders *(Arrow, 1962)*
- Need for user-supplier collaboration, i.e. interactive learning spaces
  - Reinforce complementarities between users and producers to define the products to be procured *(Bleda and del Río, 2013; Edler and Georghiou, 2007; Klein Woolthuis et al., 2005; Malerba, 1996)*

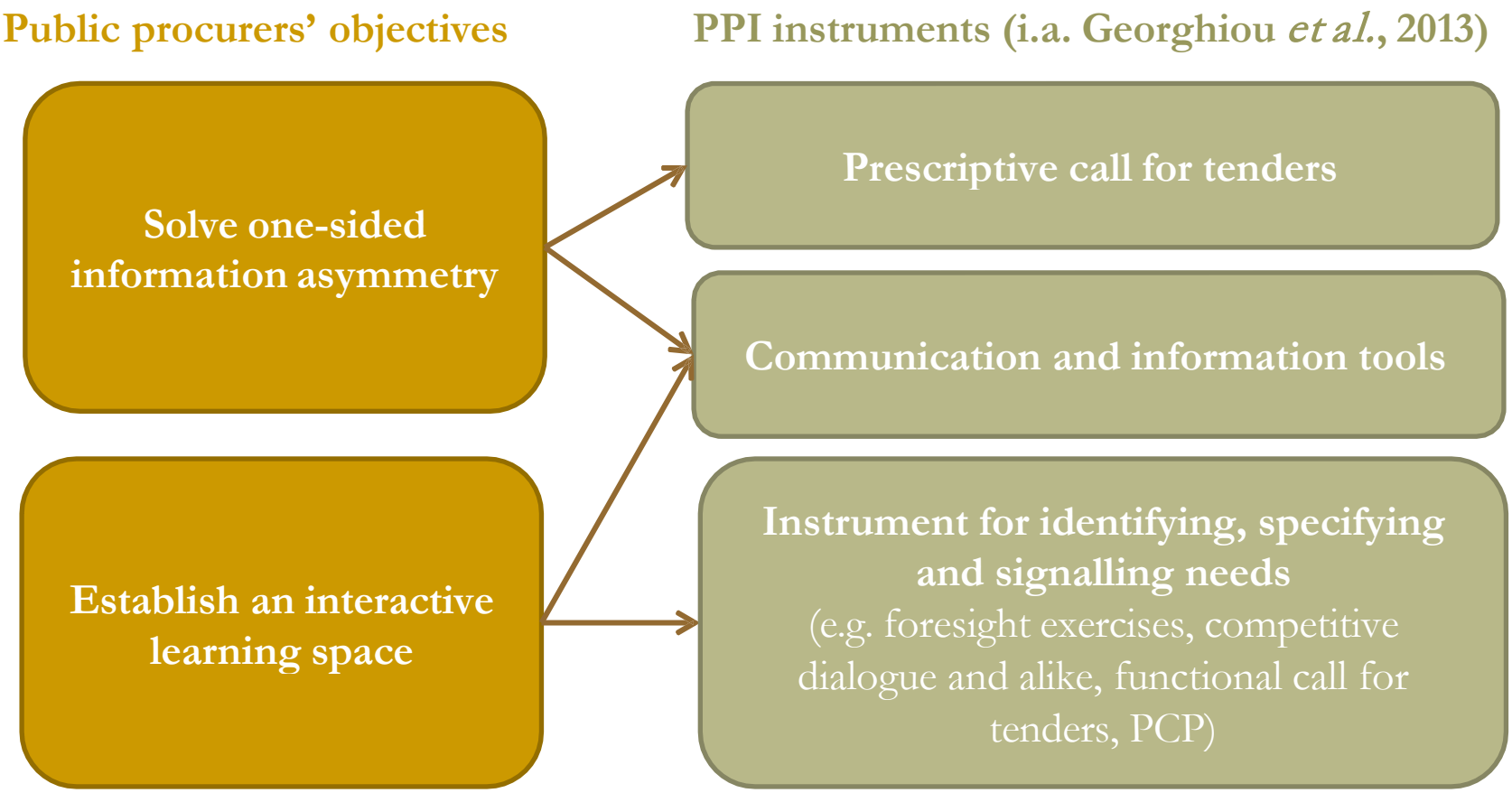
Users-suppliers interactions traps

Public procurers' objectives	Co-operative norms (Wang and Bunn, 2004)
Solve one-sided information asymmetry	Low
Establish an interactive learning space	High

Users-suppliers interactions traps

Public procurers' objectives	Procurer-supplier interactions (adapted from Foray and Llerena, 1996)
Solve one-sided information asymmetry	Vertical
Establish an interactive learning space	"Horizontal"

Users-suppliers interactions traps



Identification of failure-based categories of PPI

- Four categories identified according to:
  - The type of demand-side failure
  - Whether there is supply-side failures or not
- Each category could then be subdivided according to the required level of user-supplier interactions

	Diffusion of innovation	Improvement of public services
Supply-side failures	Transformational	Developmental
No supply-side failures	Diffusive	Adaptive

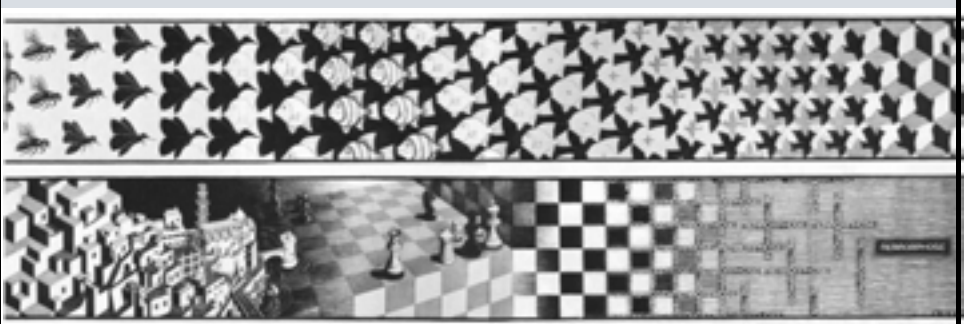
Conclusion

- A focus on failures that impair innovation and which public procurement could resolve enables to:
  - Define PPI categories respectively associated with sets of instruments and other elements of policy design
  - Highlight the potentially hybrid nature of PPI: it is a demand-side innovation policy instrument which can also solve supply-side failures
- The failure-based typology of PPI: a guiding framework by suggesting appropriate PPI instruments
- Remaining challenges:
  - Accurate identification of objectives of policy-makers
  - Lists of instruments to be refined to be further helpful

THANK YOU FOR YOUR ATTENTION

Evolving Concertation

- New constellations of actors addressing Grand Challenges -



Maurits Cornelis Escher, Metamorphose II (1939-40)

Stefan Kuhlmann
with Arie Rip, University of Twente (UT)

Annual EU-SPRI Forum Conference *"Innovation policies for economic and social transitions: Developing strategies for knowledge, practices and organizations", Helsinki, June 2015*

Governing Grand Challenges?

- Orientation towards Grand Challenges (GC) creates a challenge for science, technology, and innovation (STI) policies (Kuhlmann & Rip 2014).
- GC as priorities for R&D and innovation stimulation?
- GC = Manhattan Project or Apollo Project = unambiguous?
- Rather, GC pertain to **heterogeneous** (also "new") actors and forces, to be mobilised, guided and **integrated**, including **social** innovation.
- **GC: open-ended missions, concerning the socio-economic system as a whole, involving heterogeneous actors, even inducing (or requiring) *system transformation.***

New constellations of actors in STI

We witness a *"growing interest in strategic research and accompanying institutional changes, greater citizen involvement and science becoming more reflexive about its own role and impacts. Frictions and tensions occur, partly because of these trends"* (Siune et al. 2009, 4).

- Beyond "excellence" – new orientations in universities and (some) funding organisations: "societal relevance and innovation", "Responsible Research and Innovation", e.g. "New American University", "Civic University" (Goddard).

- Regions (cities), Civil Society Organisations and charitable foundations involved in research, education and innovation initiatives (e.g. Dutch Top Sector Innovation Policy).

Another Grand Challenge

- Building blocks for the governance of GC:
  - GC are heterogeneous
  - Governing GC can require/induce system transformation
  - More broadly defined notion of 'innovation' required
  - Research and innovation systems are evolving and changing themselves (in long-term perspective)
  - 'Tentative governance' needed

- Thus, another Grand Challenge:
  How to modulate research and innovation system changes so that Grand Challenges can be addressed productively?

‘Nature’ of Grand Challenges?

- Strategic initiatives required to address a particular GC will depend on its ‘nature’
- ‘Nature’ reflects what relevant actor coalitions consider as ‘problem’ and key points of leverage
- Definition and articulation of a GC are result of social perception, communication and negotiation
  - GC = inevitable developments, requiring *adaptation* measures
  - GC = influenceable, requiring *mitigation* measures
  - GC = *desirable* development (like better agriculture)
  - GC = *undesirable* development (like clean water shortage)
- *Scenarios* can help to explore, reflect and articulate changes and strategic initiatives

Our take on the ‘other Grand Challenge’

- No one-fits-all policy approach
- Go for *tentative policy mixes, also facilitating system changes* where relevant
- Policy mixes can draw on
  - classical priority setting and implementation approaches
  - on transformation in science (systems) or breakthrough innovation
  - demand-side and procurement policies
- ... and will focus on system-oriented strategic interventions, experimental in design, including out-of-the-box approaches, new combinations of actors and alliances.

Existing policy approaches (options and limits)

- ***"Business as usual" priority setting procedures***
  - Example Germany: R&D funding body develops thematic programmes (drawing on strategic intelligence-based information, foresight, brainstorming with key stakeholders), launches calls for proposals, organises selection with help of experts … *No transformative orientation!*
  - Example Netherlands: 'Top Sectors' policy with priority-setting delegated to standing panels of stakeholders (selected by government); traditional institutions and programmes have now refer to top-sector policy *= some transformation.*
- Business as usual is *decisionistic*: the problem is seen as one of defining priorities, their implementation and realisation then a matter of creating incentives.
- Actual dynamics are more complex, however.

Existing policy approaches (options and limits)

- ***Beyond "Business as usual" priority setting procedures***
  - **Public Procurement** (beyond defense and security) to realize public goods; contract relationship, deliverables to be specified – *for some GC difficult!*
  - Technology forcing through **regulation**, as in California Clean Air Act; clean-exhaust motor cars without specifying how to meet requirements – *not applicable to all GC!*
  - Establishing **credibility pressures**, e.g. 'Green Energy'; companies expected to respond – *based on rather diffuse articulation of priorities in society.*
  - In distributed situations, **concertation** – e.g. through road mapping exercises or Joint Technology Initiatives – *can help to articulate GC.*

German "Energie-wende"?

Existing policy approaches (options and limits)

- ***Concerted policy initiatives***
  - Historical examples: US 'Grand Missions', with 'Green Revolution', next to gov't also strong role of Rockefeller Foundation; UK Wellcome Foundation supporting innovative R&D approaches
  - More recently, e.g. Bill and Melissa Gates Foundation with focus on health in developing countries
  - German Government's 'High Tech Strategy'; 10 'future projects', defined broadly enough to allow for flexibility and inclusion - substantial coordination among many actors, with leading role of gov't
  - European Innovation Partnerships, e.g. on Active and Healthy Ageing, with all actors in innovation cycle, from research to adoption; task of independent mission-driven agency

➢ Here, gov'ts take responsibility for **'directed facilitation' of variety of actors**

System transformation: a scenario-based approach

- 'Research and Innovation Futures 2030 (RIF)' project (2012-14): landscape of science and innovation is changing within two decades (new sponsors; new roles for intermediary organisations and spaces; science institutions and disciplinary organisation replaced, partly because of new ICT, by new knowledge production communities; request for social innovation; etc.).

- In RIF, a scenario approach allowed to address multi-actor and multi-level complexity of trends, tensions, and transformative change.
- http://www.rif2030.eu/

System transformation: a scenario-based approach

A policy transition scenario

- 2015: Governments address GC in new public management style of specifying objectives, offering resources and monitoring performance.
- Soon clear that unable to meet complexities of GCs this way: also faced with transformations of science, of science in society, and growing importance of new sponsors, while burden of expenditures is heavy.
- In late 2010s UK gov't decides to limit research & innovation expenditure drastically and focus on few priorities only. Gov'ts worldwide follow.
- Public-private set-ups, charitable foundations and some firms join consortia for GC, with participation of few govt's trying to 'orchestrate'. Champions of other GC follow this as model.
- In the 2020s, **addressing GCs had moved from a gov't responsibility to an integral part of the functioning of transformed research and innovation systems.**

Orchestrating new actor constellations

- Make sure that *key actors* are involved, next to public policy and industry also e.g. charitable foundations, CSO (free to move, tend to go for public interest goals).
- Combined economic and social changes require also *social innovation.*
- Enable *intermediary organisations* and spaces for interactions to enable and improve concerted action, without a master plan.
- Concerted action requires new capacities and capabilities, so *learning* and transformation is needed.

➢ *Coordinating actor* required: stable, trustable, non-partisan, ready to invest (e.g. EU) (Mazzucato 2013).

Example
Joint Technology Initiative

- Innovative Medicines Initiative (IMI)
- Aiming to "improve health by speeding up the development of, and patient access to, innovative medicines, particularly in areas where there is an unmet medical or social need".
- partnership of EU (H2020) and European pharmaceutical industry (European Federation of Pharmaceutical Industries and Associations).
- Associate or project partners: patients, regulators, procuring organisations.
- €3.3 billion budget for the period 2014-2024 (from EU, industry, associate partners).

➢ Enabled and concerted by European Commission (FP6, FP7)

Concertation
through tentative governance

- Major **public-private initiatives** coping with the transformative potential of a GC need a 'tentative' concept of governance (Kuhlmann et al. 2015).
- **Tentative governance** is designed, practiced, exercised or evolves as a particularly dynamic process to manage interdependencies and contingencies in a non-finalizing way; rather prudent and preliminary than prescriptive and persistent.
- It creates **spaces of openness, probing and learning** instead of trying to limit options for actors, institutions and processes.

Meta-governance

- Tentative governance includes a *meta-governance* dimension (Jessop 2002).
- Meta-governance ('governance of governance') is visible in emerging modes of 'social technologies'
  - Facilitating and framing articulation,
  - Allowing for contestation and negotiation of competing views.
- Functioning working as a 'crash barrier' guiding the ongoing 'making' of governance across the various domains of the research and innovation system effectively.

Responsibilisation

- Yet, while tentative governance helps actors to articulate the nature of "their" GC, there is nobody responsible for overall coverage and **coordination with other GCs**.
- Here one could draw on the possibilities of the presently fashionable notion of **Responsible Research and Innovation** (RRI).
- The governance of RRI is still **evolving**, (e.g. FP7 "Res-AGorA – Governance framework for Responsible Research and Innovation (RRI)" (Walhout & Kuhlmann 2014).
- Towards a **'responsibilisation'** (Dorbeck-Jung 2013) of research and innovation systems.

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Professor Johan Schot – SPRU Director

University of Sussex
SPRU – Science Policy Research Unit

Innovation policy: from a competition to a transformative change agenda

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Capitalist societies: private actors are responsible for innovation, but get help by state through R&D (minister of science and technology), while state is responsible for distribution of benefits to all people (prevent poverty) and manage environmental impacts through regulation

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Developments in Innovation policy

From R&D policy –focus on science & technology policy guided by Schumpeterian model, to innovation system policy – focus on learning by doing, using, and interacting guided by national systems of innovation approach

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The Schumpeterian model

From invention, to innovation, to diffusion

Innovation policy 1.0 = science and technology policy

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National Systems of Innovation model

- Many feedback loops between phases
- Existence of path-dependencies and lock-in
- Importance of learning by producing, using, and interacting
- Innovation policy 2.0 = address national system of innovation problems

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Problems both models & policies

- Focus on economic growth, & competition: does not taken into account need for sustainable & inclusive development
- Neglects World is in transition, 1) globalization, and 2) need to address persistent problems in provision of mobility, energy, food, healthcare
- Neglects issue of technological choice and governance, how to direct technologies and shape new markets.

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Multi-level model (MLP)

Technical change is driven by quasi – evolutionary dynamics

Variation is not blind, but directed at anticipated future selection & attempts to influence future selection through voicing expectations & niche building (creation of selection-environment) & building of bridges or nexus between variation and selection

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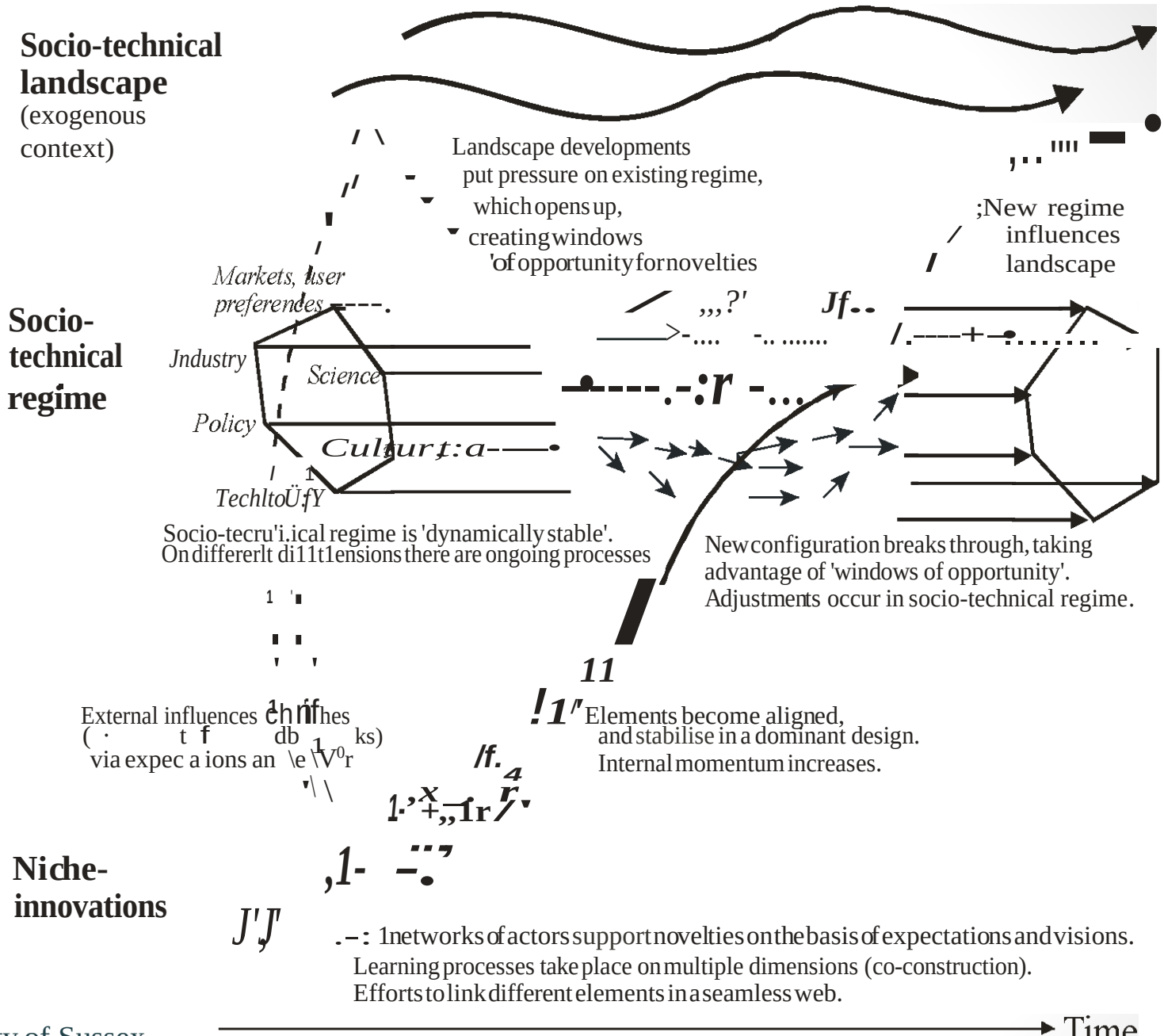
Socio-technical landscape
(exogenous context)
Landscape developments put pressure on existing regime, which opens up, creating windows of opportunity for novelties
New regime influences landscape
Markets, user preferences
Socio-technical regime
Industry
Science
Policy
Culture
Technology
Socio-tecru'i.ical regime is 'dynamically stable'. On differerlt di11t1ensions there are ongoing processes
New configuration breaks through, taking advantage of 'windows of opportunity'. Adjustments occur in socio-technical regime.
External influences (changes via expectations and visions)
Elements become aligned, and stabilise in a dominant design. Internal momentum increases.
Niche-innovations
networks of actors support novelties on the basis of expectations and visions. Learning processes take place on multiple dimensions (co-construction). Efforts to link different elements in a seamless web.
Time

Definition of socio-technical regime

A socio-technical regime consists of a distinct set of stable rules, used by actors to guide socio-technical design, policy-making and use. This rule-set is embodied in shared engineering search heuristics, ways of defining problems, user and policy preferences, expectations, product characteristics, skills and standards

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System change (transitions) occurs when

- Niches are build up (sufficiently). Indicators: deep and broad learning, deep and broad networks, robust and specific expectations
- Socio-technical regimes are open for changes (tensions, de-alignment)
- Socio-technical landscape pressures enable change

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Innovation policy 3.0 aimed at system change/transitions

- Foresight in order to influence perceptions of socio-technical landscape developments & shape expectations
- Experimentation, in order to build up niches (strategic niche management = smart experimentation)
- New institution building, in which actors can meet and discuss how to proceed and develop shared responsibility (de-align dominant socio-technical regime)
- Developing new expertise/capabilities (fusing social sciences & sciences in order to address social-technical nature of technical change)

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Innovation policy 3.0 requires

Using the power of innovation, but at the same time re-embedding innovation in moral economy & providing direction

Focus on sustainable innovation & inclusive innovation

Managing ecological and social issues ex-ante not ex-post

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Thank you for your attention
Any questions?

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IFRIS

MIoIR

Innova&on policy at stake: should we throw the baby with the bath waters or change the composi&on of the bath waters?

Philippe Larédo

EUSPRI conference

Helsinki, 10---12 June 2015

Main points in the debate

- R&I policies are too supply---oriented & forget demand
- R&I policies forget their history – to serve public missions & challenges
- More R&I policies are missing the boat – the sustainability / energy transi&on
- PuOng together research & innova&on has become unproduc&ve
- R&I policies are unable to cope with the changing ins&tu&onal landscape --- remaining locked in their ‘unique space’ paradigm

My take on the debate

Policies since their start have shared the same 3 overarching objec&ves

1. Fostering the science base – remains cri&cal, but has to be reconsidered in its approach
2. Suppor&ng firm innova&on capacity – the priority issue for the last 30 years, and the greatest source of failure & dis---alignment with socio---economic dynamics
3. 'Mission---oriented R&D for 'collec&ve'/public goods – A quasi---forgoZen objec&ves for two decades, and the source since of mul&ple discourses (grand challenges) with limited ac&on.

→→ Presenta&on focused on developing points and discussing poten&al research agenda

Fostering the science base

- Las&ng ques&ons
  e.g. core vs project---based funding, agencifica&on, normal vs fron&er science…
- But in a different organisa&onal environment combining PROs & universi&es --- no longer one or the other model, but systema&c hybrid models (e.g. PROs as key elements for emerging fields & for facili&es; e.g. alliances between both types – the French UMR or the German KIT)
- Driving to a strong ar&cula&on with higher educa&on & new ques&ons: what balance between 'capacity building' and 'academic research'? Are 'academically excellent universi&es' an encompassing answer? …

→→ Should this become a new 'sectoral' policy per se? May be, but it is more of a 'higher educa&on & (academic) research policy' than an old type of 'science policy'

Suppor2ng the innova2on capacity of firms

- The largest issue
- A domina&ng approach: suppor&ng technology---based innova&on capacity of 'manufacturing' firms
- A simplified view of types/phases
  --- collec&ve industrial research
  --- collabora&ve programmes & industry---university rela&ons
  --- suppor&ng SME innova&on (direct / tax credits / clusters)
  --- suppor&ng start---up ecology
- Mul&ple debates
  --- balance between direct & indirect supports
  --- roles of innova&on 'infrastructures': IP but also standards & capacity building
  --- efficiency of tax credits (a 'loose---loose situa&on' for governments)
  --- cri&cal role of midsized firms not addressed
  --- too supply oriented: rebalance with demand---based policies
- **S2ll not addressing the core of transforma2ons: 3 major challenges**

The scope of innova&on ac&vi&es: 3 main issues (1)

Issue 1: How to cope with the over---domina7ng service economy?

Are the 2 ways we categorize innova&on in services enough?

--- firms that operate in a manufacturing mode (transport, banks, construc&on)

--- Knowledge intensive business services (KIBS)

How to consider 'services to individuals' (health, tourism, leisure & culture), apart from their 'manufacturing like bits (e.g. videogames, new drugs).

E.g. What about hotel chains and their analy&cs? What about the role of cultural investments (museums, events) in tourism? Etc.

The scope of innova&on ac&vi&es: 3 main issues (2)

Issue 2 --- New issues raised by globalisa7on

--- Growing concentra&on: few firms in most markets, present everywhere →→ Our compe&&on paradigm cannot cope with this

--- Absolute & no longer compara&ve advantages →→ powerful shiis in manufacturing landscapes (look at shiiing French structure or US 'reindustrialisa&on' discourse)

--- Wide transforma&on of rela&ons between producing firms & consumers: the internet 'revolu&on' & a new focus on 'circula&on' processes (away from produc&on); ecology of new hardware & soiware firms dealing with producer user interfaces

The scope of innova&on ac&vi&es: 3 issues (3)

Issue 3: ShiAing role of users in driving innova7on

- 4 key words to capture the massive transforma&ons underway
  --- crowd sourcing
  --- poli&cal consump&on / responsible innova&on
  --- social innova&on & new forms of local collec&ve development
  --- DIY (fablab, 3D prin&ng, …) / sharing economy (cars, tools, even houses…) ques&oning ar&cula&on of consump&on & ownership
- Are these movements marginal, or do they, together, drive to a reconsidera&on of innova&on dynamics (as a permanent source for renewed and enlarged consump&on)?

Suppor2ng the innova2on capacity of firms

- For policy makers in numerous regions/countries, both the ‘technology---based’ & ‘manufacturing’ foci are now ques&oned
- But what understanding and frameworks can we propose to cope for the 3 issues iden&fied (even phrased differently!)
- One striking phenomenon (when analysing recent reports): researchers in advisory posi&ons keep focusing on the old ‘manufacturing’ models
- Thus URGENT need to fully redefine the research agenda for the study of firm innova&on processes

Developing research & innova&on in support of “public / collec&ve missions”

- Mission---oriented has always been the core of public funding – over 90% in the US for instance.
- An old model ‘forgoZen’ (Piganiol report):
  --- R&D in all departments
  --- driven by ‘demand’ (e.g. problems iden&fied by ministries)
  --- a transversal ‘responsibility’ at high government level to balance efforts & organise coordina&on & transversal approaches
- An evolving balance of themes over &me:
  --- the endless rise of ‘health’ issues & life sciences
  --- the rise to prominence of environment
  --- the changing priority of energy policies (from ‘na&onal autonomy’ to CO2---free renewable energies)
  --- the downsizing of defence R&D
  --- a point to note: the con&nuing importance of communica&on issues while shiiing from transport to telecommunica&ons & internet

R&I for public missions (2)

- What does the no&on of ‘grand challenge’ bring?
  --- a move toward ‘solu&on development’
  --- more integrated approaches (technological & social, upstream & downstream)
  --- interdisciplinary focus in research
- References in history: ‘large programmes’ & a wealth of forgoZen knowledge on the approaches developed
- A key change: we no longer can reduce it to types of ‘militaro---industrial complexes’ (where researchers as advisers & operators played a central role!)
  →→ requires important work on governance & on understanding the new roles of researchers in a knowledge---based society

R&I for public missions (3)

- However a crucial dimension: poli&cal will to focus alloca&on of resources
- Limita&on 1 – alloca&on of resources & balance between priori&es is not a 'R&I' issue but a democra&c issue at large. The research agenda should thus be shared…
- Limita&on 2 – under which condi&ons can long term issues (with effects not visible or not yet commensurable) can be embedded? Should we study the power of 'proximity approaches' compared to over---domina&ng approaches of 'inter---governmental' or 'global' approaches?
- Links with cri&cal debate about 'who' is developing R&I policies.

Who is the policy---maker? What are the 'spaces' we consider?

- Our three domina&ng paradigms facing evolu&ons:
  --- The country taken for granted as the central actor (even facing the rise of regions or the EU): NIS framework
  --- From Government to Governance and arenas
  --- Mul&---level 'governance' to face the mul&plica&on of 'legi&mate' authori&es ac&ng in the same territory (city, region, country & the EU)
- BUT we know liZle on how this works in prac&ce – look at limited work on their interac&ons in the field (cf. J.A. Heraud)
  →→ requires important research efforts on the revised role of 'place' (mostly urban/metropolitan areas in our field) as a driving force and 'de facto' aligning/coordina&ng actor.

To sum up

- We s&ll face a ‘baby’ (60 years in the policy landscape is limited!)
- Should the baby disappear – e.g. for new types of ‘grand challenge policies’? I doubt it (in any case as for most radical innova&on in policymaking, history tells us that we are bad, very bad in an&cipa&ng!)
- Should we reconsider borders? The first OECD evalua&ons showed that borders should differ between countries, depending upon ‘na&onal preferences’ and past histories … so no general solu&on but urgent redefini&on of so called ‘science policies’ required!
- Should we radically change our approach to the ‘friendly firm innova&on ecology’? clearly yes, with a major research agenda facing us
- Should we focus on ‘grand challenges’ more? The only answer can be for the research agenda and it is Yes, but it should be more grounded on historical learning rather than star&ng from a blank sheet…

Social Innovation Futures:
what can social innovation learn from the Multi-Level Perspective?

Paper presented to EU-SPRI 2015 Annual Conference, Helsinki, 10th-12th June 2015.

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With

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Magnus Gulbrandsen, Centre for Technology, Innovation & Culture (TIK), University of Oslo, Norway

Manchester Institute of Innovation Research (MIOIR)

Overview

- Social innovation as a solution to Grand Challenges of the 21st Century?
- Retheorising social innovation with MLP of socio-technical transitions
- Beyond 'thin concept borrowing' (Hassink, 2007) → matching MLP and SI processes
- Towards an agenda for mutual learning, SI enriching IS & vice versa

Part I

SOCIAL INNOVATION & GRAND CHALLENGES

Social Innovation & Grand Challenges

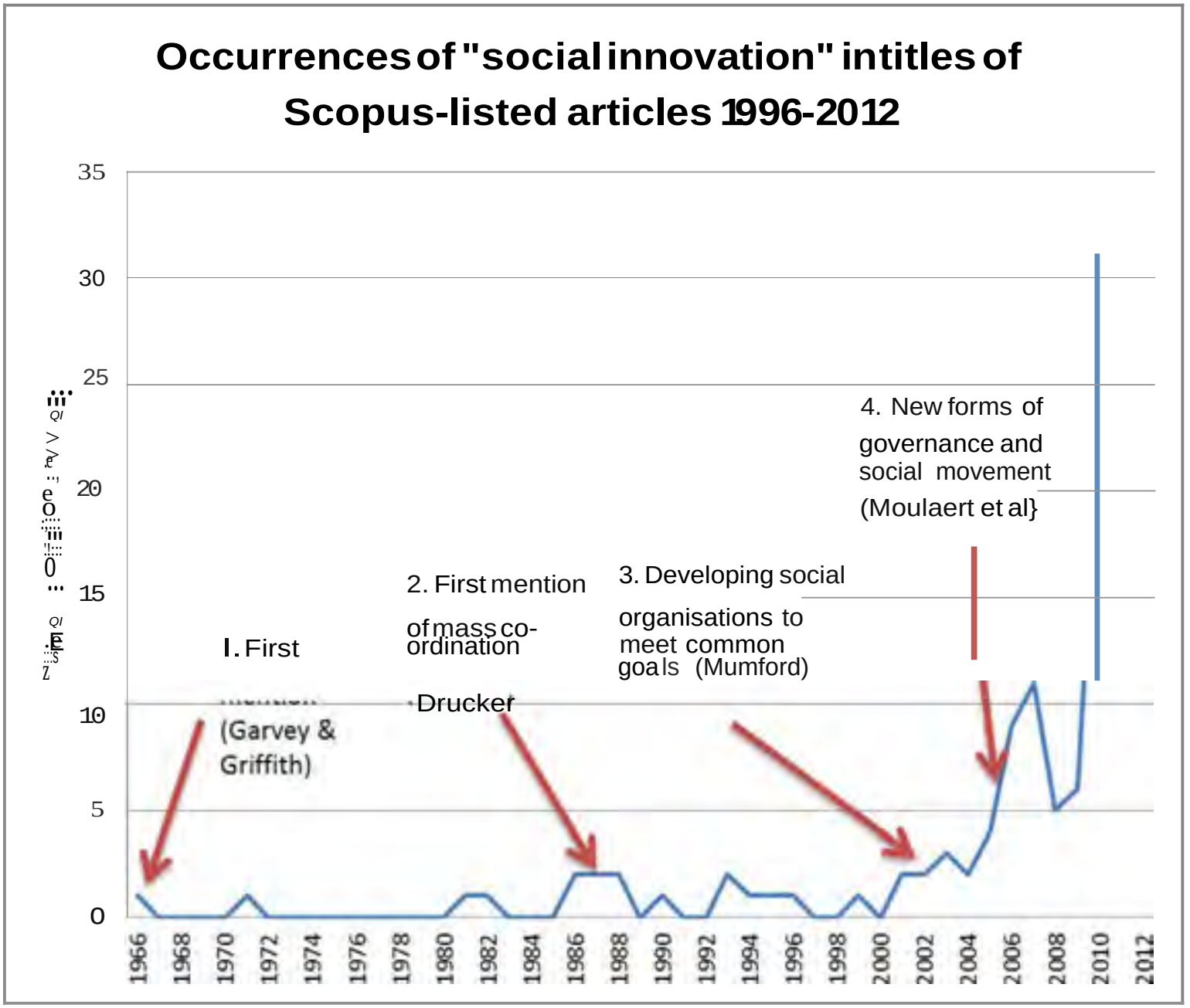
- Grand Challenge of 'social exclusion'
- Demands for new kinds of social infrastructures
- Demands for new kinds of knowledge (not just technical)
- Emergence of new kinds of innovation models (creating new social structures)

Social innovation in a nutshell

- Grand challenges demand new kind of innovation, changing existing social systems not incrementally evolving (Garud & Karnoe, 2013).
- Innovations create new social networks & capacities → new social structures and systems
- Social Innovation emerged to describe:
  - bottom-up phenomena of new ideas, approaches, techniques, organisational forms grew into new social capacities

SI is everywhere in policy

- Eu2020 strategy aims to make Europe :
  - "smart, sustainable and inclusive economy" through selective policy interventions in "employment, innovation, education, social inclusion and climate/ energy" (CEC, 2010).
- Geoghegan-Quinn (2012)
  - 'Research and innovation must respond to the needs and ambitions of society, reflect its values and be responsible'
- OECD (2014): Fostering Innovation to Address Social Challenges
  - 'The multidimensional package of existing social challenges and the systemic failure in fostering social innovation clearly call for a reform of the research and innovation system governance' with participation of multi stakeholders (e.g. universities, research institutes, private companies, government, civil society, citizens).


Occurrences of "social innovation" in titles of Scopus-listed articles 1996-2012
35
30
25
20
15
10
5
0
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
1. First
(Garvey & Griffith)
2. First mention of mass co-ordination
Drucker
3. Developing social organisations to meet common goals (Mumford)
4. New forms of governance and social movement (Moulaert et al}

Definitions of social innovation

(a) Concerned with socially innovative practices

- Novel solutions better using resources to solve needs
- System-changing & -challenging, increasing resilience
- Involves actors at a range of spatial scales
- Cross-sectoral, cross-disciplinary, cross-territorial

(b) Concerned with socially just outcomes

- Addresses social and human needs overlooked by markets
- Focus on social value creation & community development
- Construct/ build networks enabling new social capacities
- Empowerment of individuals to act, raising resilience

Benneworth & Cunha, 2013, 2015*

Definitions of social innovation

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"A true social innovation is systems-changing by developing ***novel solutions in border spanning learning communities*** *to create social value and promote community development,* ***challenging existing social institutions through collaborative action*** *developing wider networks."*

SI problems as innovation problems

- SI - weakly-theorized change process
  - Which fields could help sort the mess?
  - How can we mobilise IS to 'save' SI?
- SI as (Benneworth/ Cunha, vv., 2013a, b):
  - Mass change in how activity organised…
  - …collectively co-ordinated…
  - …with new social institutions…
  - …changing social power relations.

Part III The value added of the Multi-level Perspective

CHANGING SOCIAL POWER RELATIONS

AS SOCIO-TECHNICAL TRANSITIONS

The social innovation problem

- Why don't good ideas travel?
- "If you build a better mousetrap, then people will beat a path to your door"
- Except there have been over 4,000 mousetraps patented and only a handful have ever made a profit.
- So why don't good ideas – that have a clear societal value-added – travel well to new contexts?

SI, SST and the Innovation Myth

- "The most damaging of the several myths surrounding innovation is that it is all about ideas. Managers and researchers are both led into counter-productive behaviours as a result of this myth. This is not to discount the importance of ideas in innovation – every innovation starts with a great idea [but] … generating great ideas is actually the easiest part of innovation."
- Kastelle & Steen, 2011, pp. 199.

The Social Innovation problem

- Innovation is about more than technological invention. It involves change of many kinds: cultural, organisational and behavioural as well as technological. So, in a world crying out for social justice and ecological care, innovation holds enormous progressive potential. Yet there are no guarantees that any particular realised innovation will necessarily be positive. Indeed, powerful forces 'close down' innovation in the directions favoured by the most privileged interests. So harnessing the positive transformative potential for innovation in any given area, is not about optimizing some single self-evidently progressive trajectory in a 'race to the future'. Instead, it is about collaboratively exploring diverse and uncertain pathways – in ways that deliberately balance the spurious effects of incumbent power.
- (Stirling, 2015, p. 1).

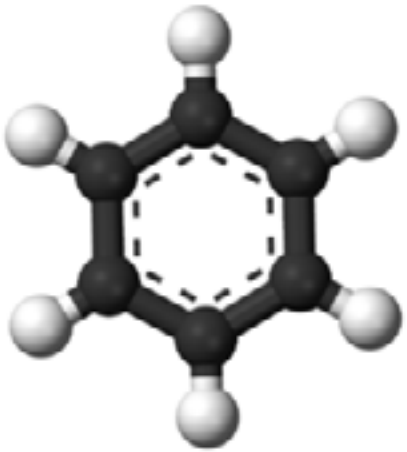
http://steps-centre.org/wp-content/uploads/Innovation-Democracy.pdf

Socio-technical transitions

- How can agency be exerted in long-wave change processes?
- A mid-level evolutionary innovation theory
- Path dependencies consequence of knowledge inscribed in artefacts (modules)
- How can concatenated modules (be) form(-ed) that create coordinated shifts?

What governs this modular concatenation process?

Which good ideas stick to themselves and a small audience



Which good ideas grow and create transformative new societal infrastructures?

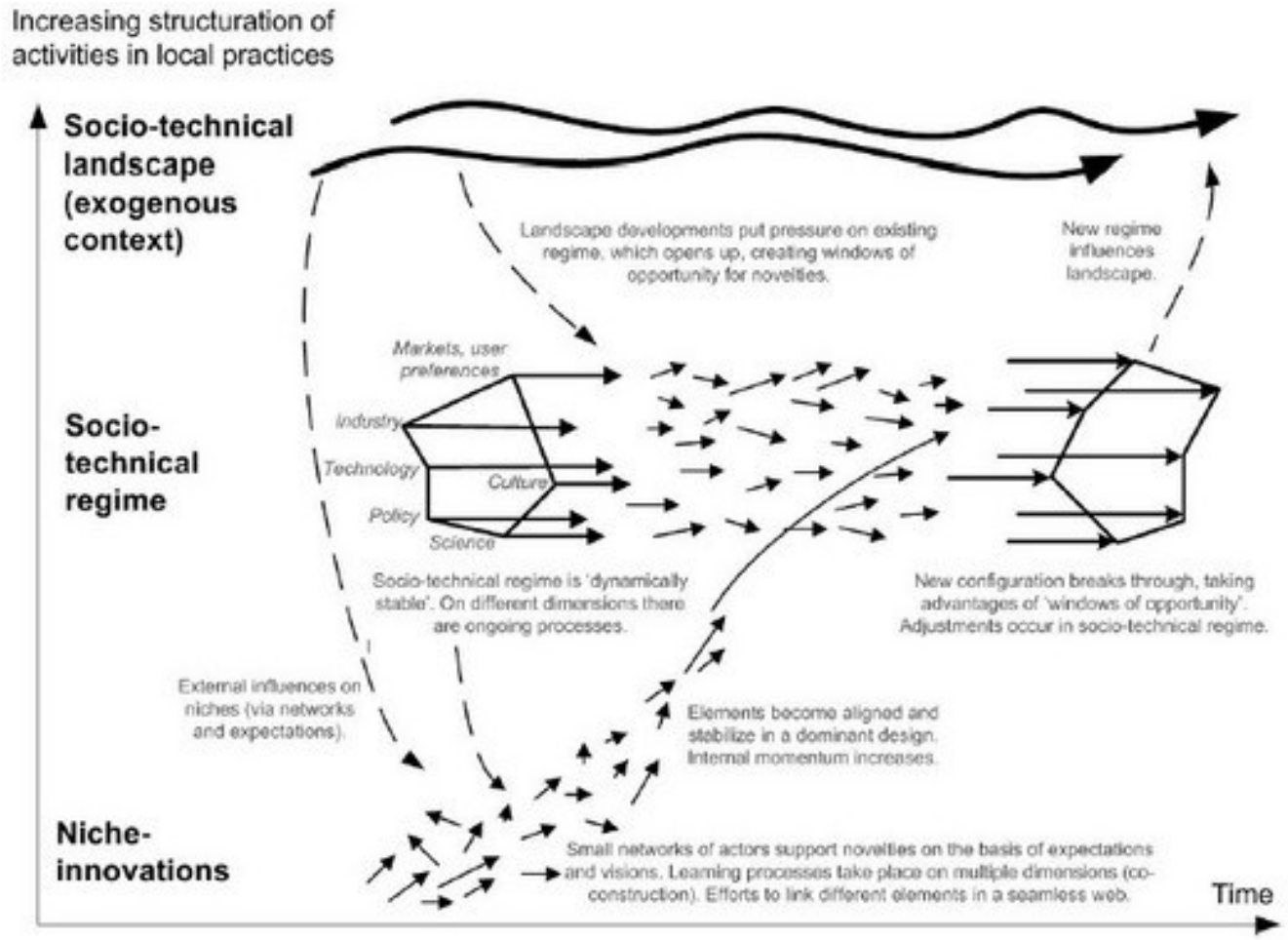
- Need to bring in a model of the outside world…

Niches, regimes, landscapes

- Niche: small experimentations akin to mutations
- Regime: stable constellation of accrued technological knowledge
- Landscape deep (analytically exogenous) structures of technological organisation

- How/ can niches worm into the DNA of regimes and shift landscapes?

The essence of the MLP



Mapping or management?

- Strategic niche management (Rotmans et al, 2001): normative-emergent
- Multi-level perspective (Geels, 2004): objective-analytic
  - Niches protected space to connect niches to to regimes (Smith & Raven, 2012)
    - 'Fit & conform'
    - 'Stretch & transform'
- Not always unproblematic – moments of opportunity (eg regime crisis)

Applicability to Social Innovation

- Transitions theory good for in handling changes between levels over time; SI need focus on distinguishing two things:
  - (a) which unchallengeable factors ('landscape) exist for this SI?
  - (b) Which elements are part of 'regime' and hence can be directly challenged?
- Within the regime:
  - How is SI embedded in wider social systems?
  - How can regime problems enable SI?

Limits to STT transferrability

- Transitions theory is a promising field
  - And suffers from 'panacea problems'
- Transitions theory is a work in progress
  - Not established body of literature
- TT makes its own assumptions
  - The class of things it can't speak about
- Policy relevance or theory development?
  - The challenge of strategic niche management

Mutual learning between SI & STT

- What are common underlying processes?
  - System change driven from below
  - Contestation & incumbent resistance
  - Creative creation
  - Deviation then homologation/ systematisation
- What are the common lacuna?
  - 'Big P' Politics
  - Valueing diverse ethics & values
  - Culture as more than a residual – implicit economism

AN ATTEMPT TO MEASURE INNOVATION DIFFERENTLY – RESULTS OF A PILOT SURVEY

Janne Huovari (PTT), Olavi Lehtoranta (VTT) and Mika Nieminen (VTT)

EU-SPRI 10.6.2015 Helsinki

Measuring innovations

Part of the larger project: Measuring Broad-Based Innovation.

Two problems in measurment:

- Defining what is innovation
  - *innovations can never be sharply defined*
  - *subjective*
- Broardening scope of the innovation
  - *Organization, marketing etc innovations*

The broad-based innovation

At least it is used to refer:

- Broadening scope of innovation activity beyond traditional supply-driven R&D based innovations to e.g. demand/user-driven innovation activity
- **Broadening scope of innovation beyond product and process innovations to other forms of innovation (organization, marketing, etc.)**
- Moving from linear model of innovation to systemic approach
- Broadening industry scope to low tech and service industries and to public sector
- Broadening policy instruments beyond traditional innovation and science policies to "all" policy sectors
- Broadening policy goals beyond productivity, employment and firm performance

How the survey was done

- Subjectivity was (partly) transfered from respondents to researchers.
  - *We did ask changes and they novelty value, not innovatios.*
  - *Innovativeness was interpreted from novelty value.*
- Multiple-choice and open-ended questions.
  - *Double check innovativeness*
  - *Given definitions might hide useful information.*

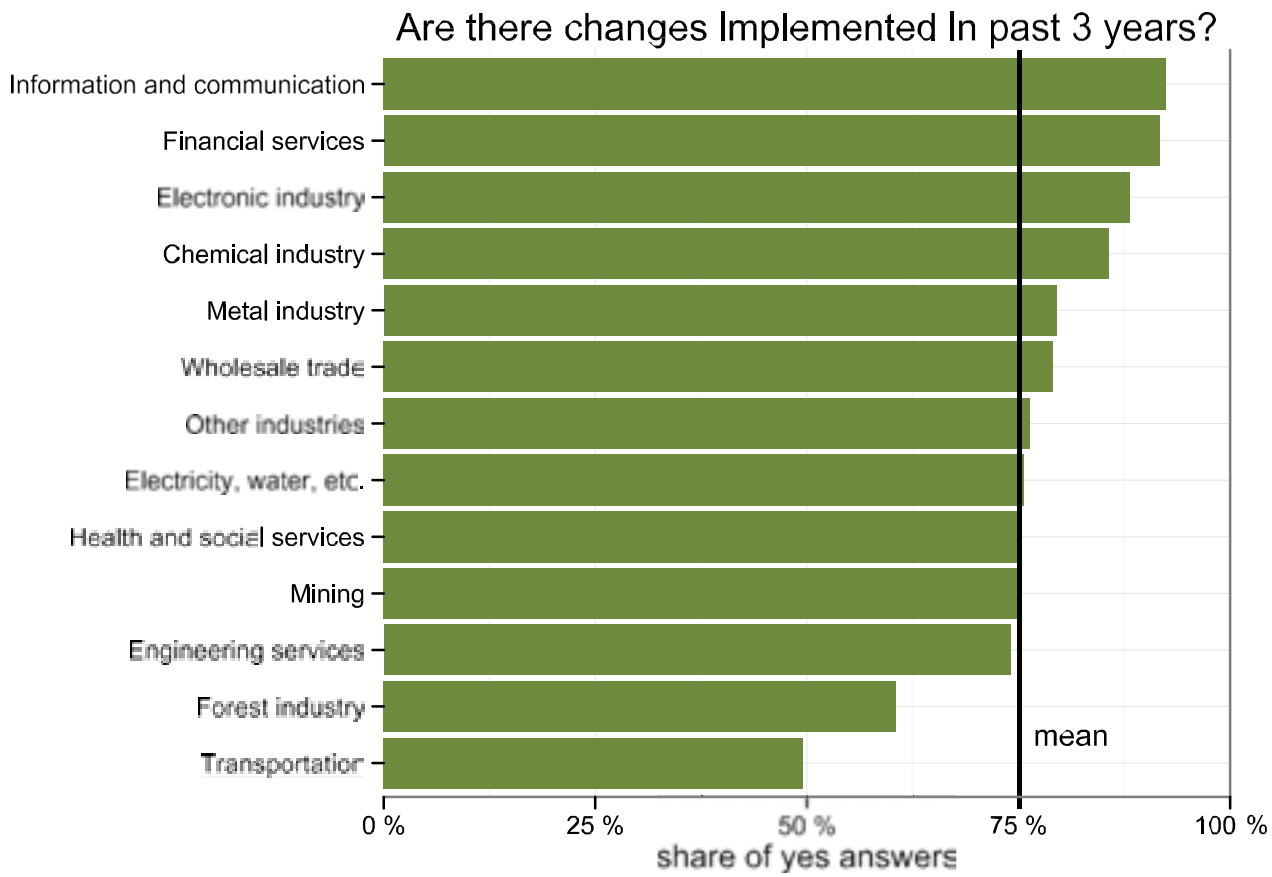
Technical details:

- In past tree years (2010 - 2012)
- Same target group as Finnish CIS survey. All firms with at least 250 employees and a sample of firms with fewer than 250 but more than 10 employees.
- Stratified simple random sampling, personnel size groups and industrial classification.
- Statistics Finland did the sampling and carried out the survey.

Answers

- 819 responses out of 2,860 sent (28.6 %).
- Quality of open-ended answers was good, even if usually quite brief.
- Seemed to be motivated to answer.
  - *Proud of changes.*
  - *A mean to voice their views.*

Changes done

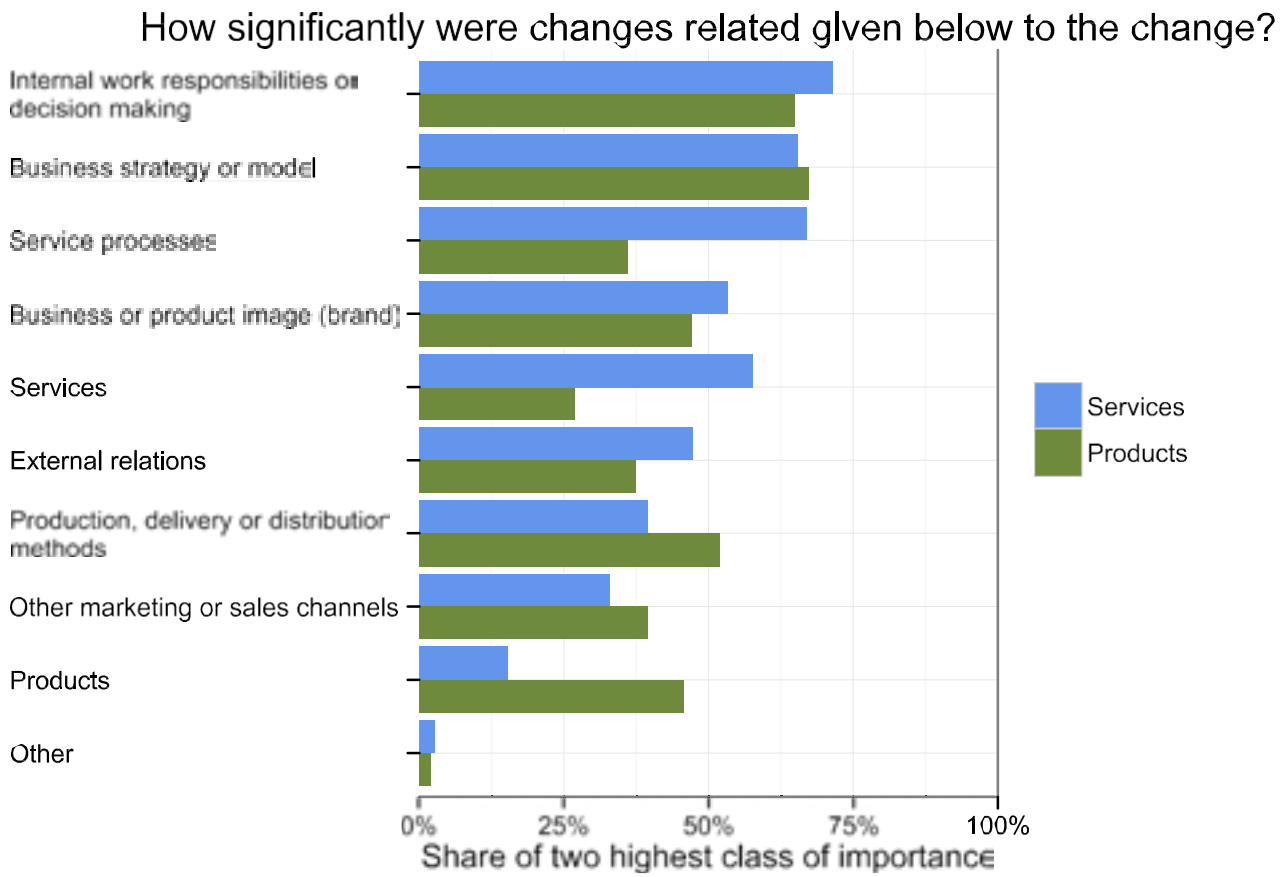


What kind of changes are made?

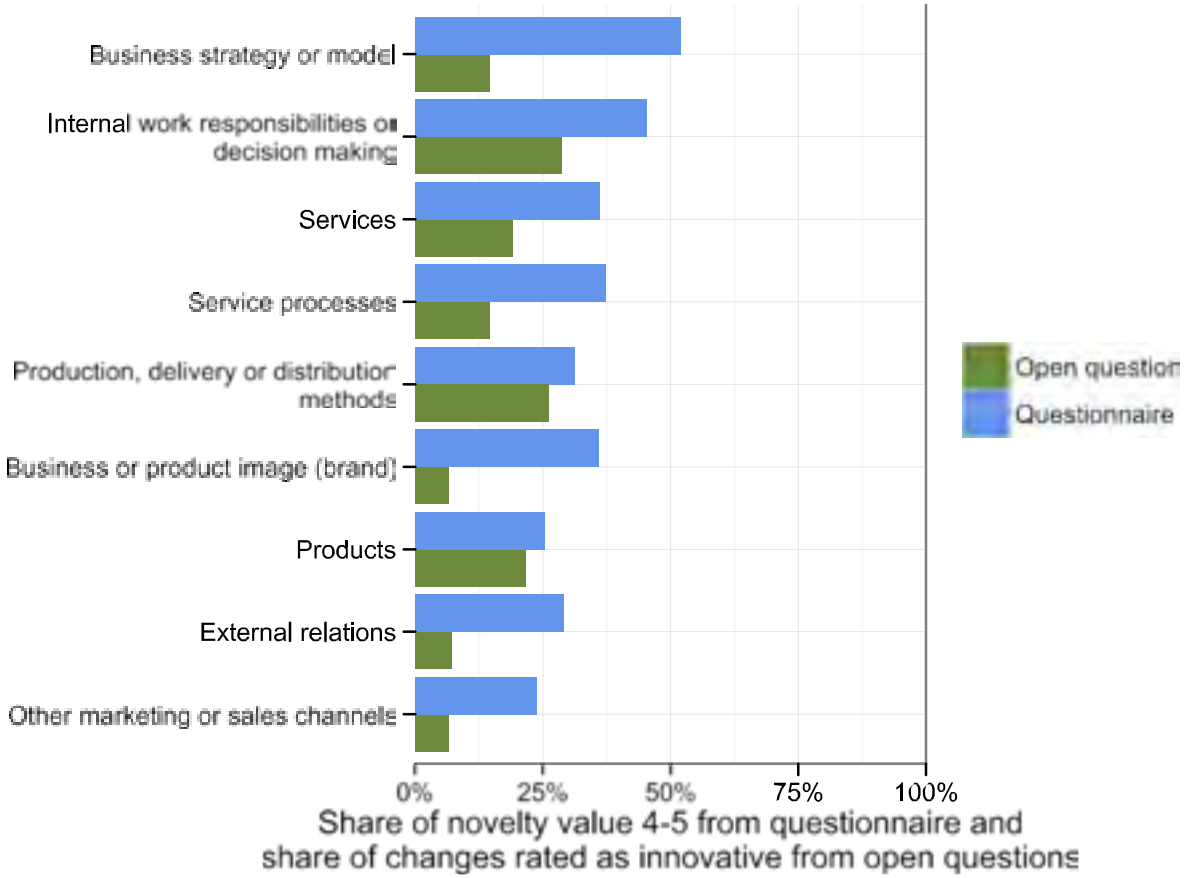
"What has been the most important change implemented in your company in the past three years? Please describe."

- Changes were mostly complex and indicate the need for complementary changes in the organizations.
- Changes comprised concurrent changes in the strategy, organisation, processes, products, etc.
- When something is changed, it is usually accompanied by other changes.

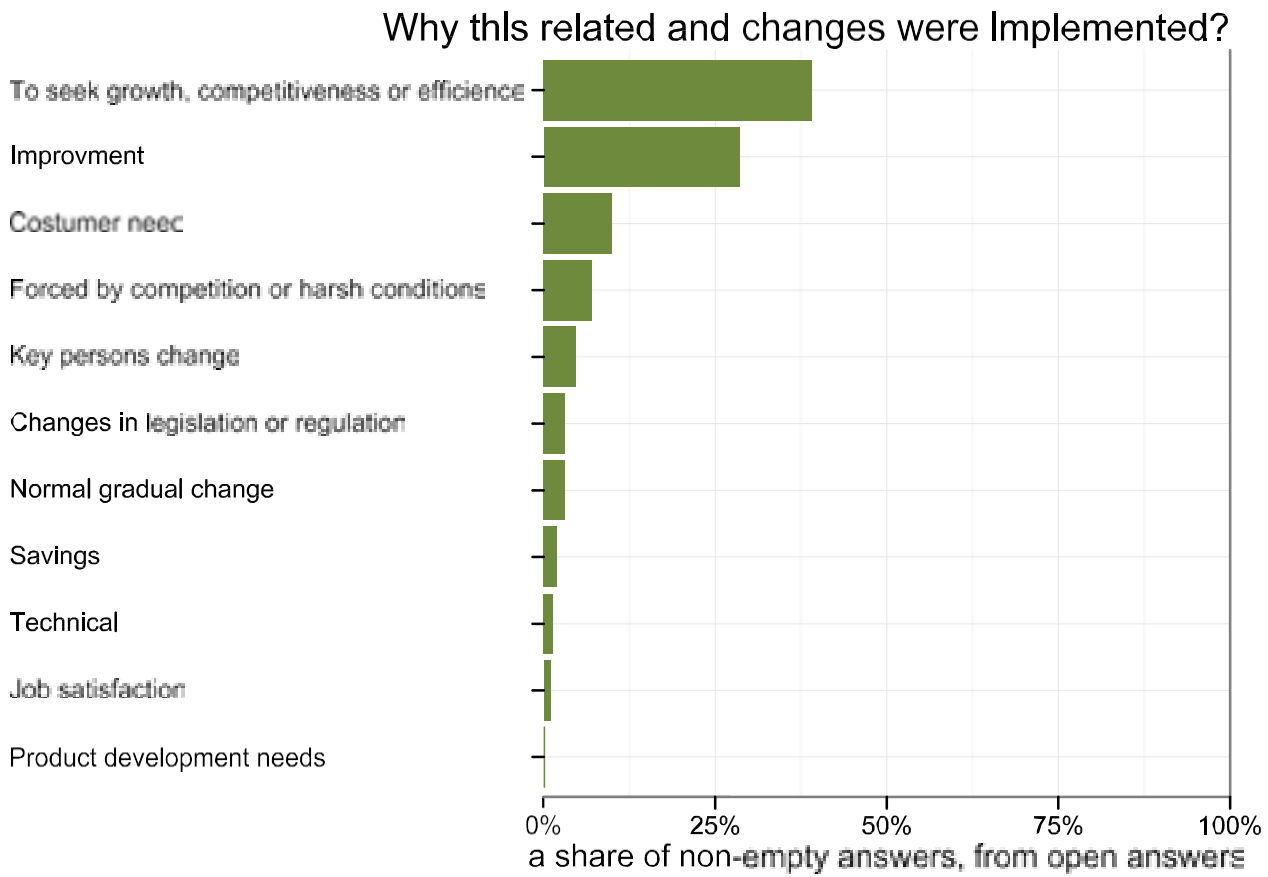
What kind of changes are made?



Innovativeness of changes

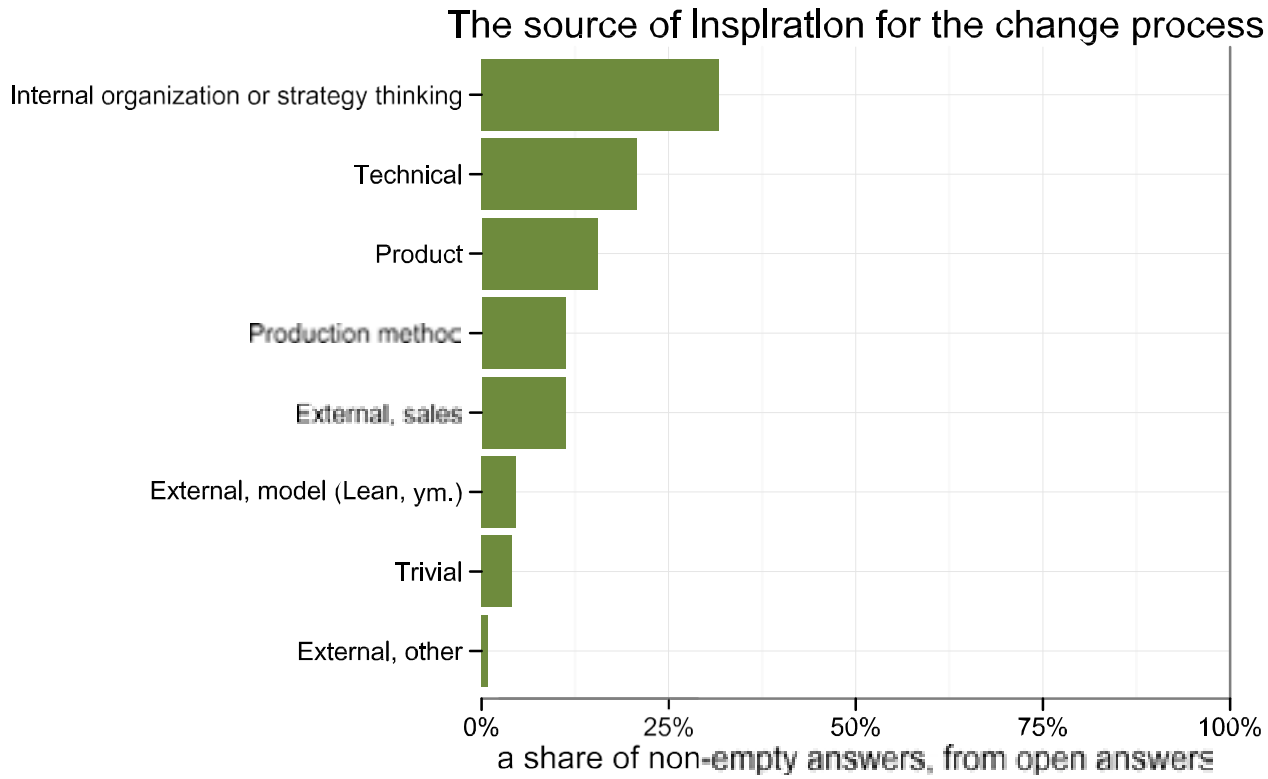


Reasons for the change



The main reason for companies to make changes was a forward-looking desire to grow, to be more competitive and efficient.

Inspiration for the change



- The main inspiration for changes came from internal discussions within the management team. Was not even included in multi-choice questions!
- Technology-related inspirations were also very important.

Broad innovations in surveys

- Changes are complex by nature
- It is difficulty to assess the innovativeness of changes. In particular, in the case for a broader concept of innovation. Product and production process changes are easier.
- It was difficult to assess innovativeness on the basis of open-ended answers. This also raises a question as to whether a change really was a significant and novel one if there was no mention of it in the open-ended answer. This suggests that assessment of innovativeness is difficult for companies. It might be also doubtful how often organisational changes or changes in business models really are innovative. At the very least, it is difficult to measure their innovativeness reliably.
- For product and process innovations CIS type surveys are valid.
- For others there are serious doubts. Mayby better approaches:
  - *Intangible capital.*
  - *Management surveys.*
  - …

The emergence and troubled growth of bio-diesel innovation system in Taiwan (1997-2015)

Chao-chen Chung
Department of Political Science,
National Cheng-kung University,
Taiwan

Research Background

- Bio-diesel
  - replace fossil fuels
  - reduce the emission of green house gas (GHG)
- Global trend of reduce emission
  - United Nations Framework Convention on Climate Change (UNFCCC) in 1992/ Kyoto Protocol in 1997
  - Bio-diesel to reduce emission and thus encouraged by the governments all over the world
- Taiwanese government also encouraged bio-diesel
  - as the response to the international regime of reducing emission, even though not the signatory
  - Max production volume of was only 10,000 kL from 2008 to 2013
  - Totally ceased since mid-2014

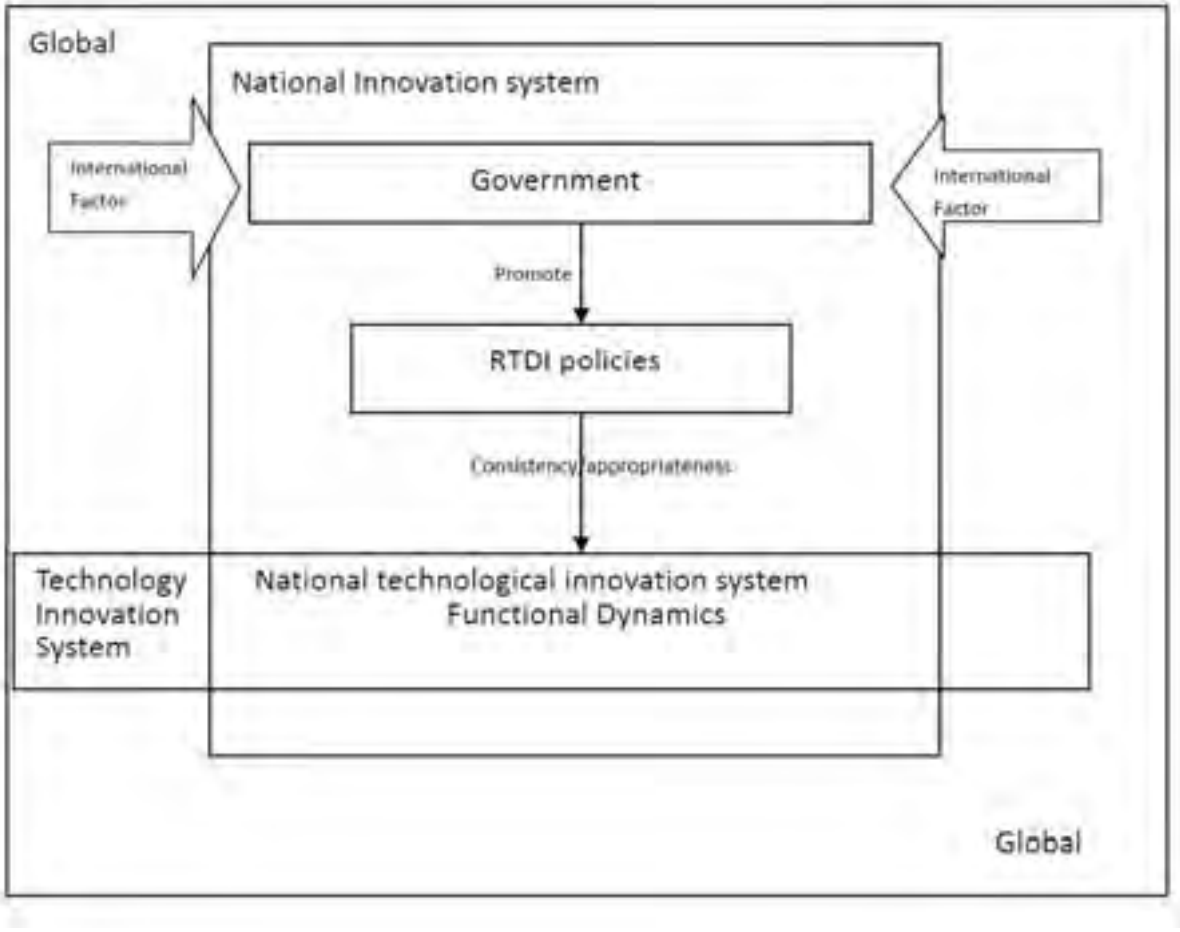
The research questions of this article

- How the international factors could shape the national RTDI policies (research, technology, development and innovation policies)?
- How should the government properly respond to the international factor?
- How does the government's response further influence the evolution of the domestic innovation system?

The theme of this article

- Links three variables together:

Analytical framework



Analytical framework (con.)

- Definition of an innovation system: *National technological innovation system* **(NTIS)**
  - National innovation system: geographical boundary of the nation VS. Technological innovation system: develop globally
  - International factors (defined in this article) : treaties, norms, diverse inter-governmental organizations (Gallagher, 2012)
  - International factors will influence the domestic RTDI policies
  - Example: Gee and McMeekin (2011) bio-ethanol in the United States and Brazil

Analytical framework (con.)

- Government RTDI policies: *consistent* and *appropriately*
  - Consistency: defined from two aspect (Chung, 2013)
    - First: the policy objectives and the policy instruments of the set of interrelated policies are not paradoxical but ideally complementary to each other
    - Second: direction for the implementation of each single policy is complementary to the policy objectives of the policy.
  - Appropriateness: RTDI policy match functional dynamics of the NTIS (Bergek et al, 2008; Hekkert et al, 2007)
    - Seven functions
    - Entrepreneurship Activities (Function 1), Knowledge Development (Function 2), Knowledge Diffusion (Function 3), Guidance of Search (Function 4), Market Formulation (Function 5), Resource Mobilization (Function 6), Legitimation (Function 7).

Methodology

- The data were collected through two rounds
  - First round of even analysis.
    - The events searched are the activities revealing the functions of NTIS.
    - The written documents, including newspapers, journals, government reports and websites.
  - Second round of in-depth personal interviews.
    - 13 experts who have been deeply involved in the innovation and production of bio-diesel in Taiwan were interviewed in order to find out the additional information which was not displayed in the written resources. The interviewees include 4 government officials, 6 industrial experts, and 2 academics.

The case of bio-diesel in Taiwan: Initial expansion (1998-2008)

- Initial policy guidance (F4)
  - National Energy Conference (First and Second) (F4):
  - First National Energy Conference in 1998: As the response of Kyoto Protocol opening for signature in 1997. The potential of the mass production of first generation bio-diesel made from used cooking oil was for the first time systematically evaluated
  - Second National Energy Conferences (2005): As the response to the Kyoto Protocol which was came into effects in 2005. Re-confirmed the policy supports for first generation bio-diesel made from used cooking oil (F4)
- R&D (F1,F2,F3,F6,F7)
  - The Ministry of Economic Affairs has allocated the research funding through ITRI to support the innovation process on bio-diesel since 2000 (F6).
  - The first trial bio-diesel refinery factory was established in 2004, which was able to produce 3,000 tons/per year (F2) (NSC, 2013).
  - The innovation was positively expected by private SMEs (F7). The innovation was initially transferred to Taiwan NJC Corporation, the new and the first bio-diesel company in Taiwan in 2004 and later on many others (F1, F3).

Initial expansion (1998-2008) (Con)

- China Petroleum Corporation (CPC, public oil company) (F1,2,3,6)
  - Also invested in the recycling service of used cooking oil and provided the raw materials for the refinery factories (F1, F6)
  - Corporation also invested in the genetic modification to improve the genes of non-edible energy crops, such as Jatropha curcas and microalgae (F6) for the second generation bio-diesel. It cooperated with universities to accelerate know accumulation (F2, F3).
- The supply chain of the bio-diesel was gradually established.
  - CPC provided used cooking oil to private SMEs as refinery factories
  - Private SMEs refined the used cooking oil to be B100 diesel (100% bio-diesel) and provided to CPC
  - CPC blended the B100 oil to be B1 oil (1% bio-diesel: 99% oil) and delivered in its own petrol stations .

Initial expansion (1998-2008) (Con)

- Regulation policy (F5)
  - When the domestic production system of bio-diesel was established, the regulation of the blending ratio between bio-diesel and oil was formally launched in 2008.
  - The Ministry of Economic Affairs implemented the new clauses of the Act and forced all domestic vehicles to refuel B1 oil in 2008 (Bureau of Energy, 2014).
  - The regulation in fact formulated a stable market for the bio-diesel industry (F5).

The case of bio-diesel in Taiwan: industry stagnation (2008-2014)

- Policy guidance (F4)
  - Third National Energy Conference in 2009: In response to Copenhagen Accord in 2009. The government claimed to encourage second generation bio-diesel made by algae.
  - The vision of sustainable development was re-confirmed, and the second generation of bio-diesel will play an important role to fulfill the vision (F4).
- Regulation and R&D policies
  - Both policies were promoted under the guidance of National Energy Conference
  - However, the two policies were not consistently implemented

Industry stagnation (2008-2014) (con.)

- Regulation policy (-F5, -F1, -F7)
  - Ministry of Economic Affairs forced all domestic vehicles to refuel B2 oil in 2010 on the basis of the new clauses of the Act. Such regulation was expected to enlarge the market for the domestic bio-diesel industry (F5).
  - In practice, until 2011, only 4 out of 11 SMEs still remained in the bio-diesel industry. CPC only purchased 40% of bio-diesel from domestic and 60% was imported, the SMEs which could not supply bio-diesel to the Corporation went into bankruptcy (-F1).
  - Furthermore, in mid-2014 after complaints from several tour bus enterprises that their buses refueling with B2 oil occasionally stalled and caused potential traffic accidents (-F7), the Ministry of Economic Affairs abruptly terminated the regulation of B2 oil.
  - The once formulated market of bio-diesel was completely eliminated and thus whacked the development of bio-diesel industry (-F5).

Industry stagnation (2008-2014) (con.)

- R&D policy: The National Program
  - The National Program continuously funded the research of algal bio-diesel since 2009 (F2, F6).
  - The research funding has positively responded by universities (F4, F7).
  - However, since there is no domestic market for bio-diesel, it could be quite difficult to persuade the private SMEs to transfer the knowledge of second generation bio-diesel (-F3).

Discussion

- The consistency of the bio-diesel policies: only consistently implemented from 2000 to 2008, not in the period from 2009 to 2014.
- The appropriateness of the bio-diesel policies
  - From 2000 to 2008:
    - The regulation policy of the Act Formulated the Market of B1 oil (F5)
    - The Ministry of Economic Affairs Mobilize Resources (F6) to encourage the Knowledge Development (F2) and Technology Transfer (F3) to private companies.
    - Such implementation of policies was legitimized by companies (F7).
    - Private SMEs were newly set-up (F1). Both private SMEs and public company, CPC initiated the new investments in the production and distribution of bio-diesel (F6).
  - From 2009 to 2014:
    - The implementation of the new clauses of the Act, which once expanded the market of bio-diesel to B2 eventually terminated and eliminated the Formulated Market (-F5).
    - Even though the National Program kept Mobilizing Resources (F6) to encourage universities to Develop Knowledge (F2) of algal bio-diesel, the National Program alone could not stimulate companies to involve in bio-diesel industry.

Policy Implications

- International regime did influence the domestic RTDI policies.
  - The direction and principle of the international regime will shape the policy objectives of domestic RTDI policies which play the functional role of guidance of search for the technology trajectories of domestic innovation system.
  - Even the country is not the signatory of the international regime, the non-signatory are also influenced by the international regime.
  - In other words, the international regime would eventually play the role of guidance of search which eventually shapes the technology innovation systems across countries all over the world.

Policy Implications

- The response of the domestic government to the international factor will influence the performance of the domestic innovation system.
  - The government should respond to the international factor with consistent RTDI policies which appropriately match the functions of the NTIS.
  - Since different NTIS possesses unithe NTIS should be supported by different que functions, RTDI policies. The RTDI policies which is copied from another technology innovation system of the nation or copied from foreign countries will not be effective on the other.

Policy Implications

- In the energy field, a RTDI policy copy from a energy will not match the innovation of another.
- The majority of countries should adopt multiple resources of renewable energies, the governments should pay attentions to the different functional dynamics of each renewable energy innovation system in order not only to fulfill the international obligation, but to accelerate the development of domestic renewable energy industries.

Contribution

- Both the theoretical and empirical contributions.
  - The theoretical contribution: an innovative framework
    - makes one of the first attempts to explore how the international factor could shape the domestic RTDI policies which further shape the domestic technology innovation system, NTIS.
  - The empirical contribution: explores the empirical case of bio-diesel in Taiwan
- Two limitations.
  - First, we only apply the framework of NTIS to the empirical case of Taiwan. We actually need more empirical examples to further explore the analytical framework.
  - Second, we adopt the qualitative method. We would need more scholars to apply more divergent methodologies to have the in-depth analysis of the framework of NTIS.

The Practice of Entrepreneurship: Support for Innovation on private forest land

A. Ludvig, V. Tahvanainen, A. Dickson, E. Chapman, C. Evard, M. Kurttila, M. Cosovic, M. Wilding, G. Weiss

The 2015 Annual Conference of the EU-SPRI Forum

StarTree

Luke NATURAL RESOURCES INSTITUTE FINLAND

BOKU

Multipurpose trees and non-wood forest products: a challenge and opportunity

www.star-tree.eu

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Background

Non-Wood Forest Products (NWFP):

- Products that are from forest but not timber:

berries, mushrooms, birch sap, bark…

Innovations in Forestry

- Innovation system is focused on timber production,

and the rest is rather negelected (Rametsteiner et al.)

Innovations in the NWFP sector

- Especially weak institutional support
- Most is happening „in-between“ other Innovation systems

(Weiss et al.)

- Sectoral obstacles (Buttoud et al.)

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Aim of the research

The practice of entrepreneurship:

1. Entrepreneurial activity
   What were the business motivations and behavior in the innovation?
2. Institutional support
   To what extent and in what form the innovations were supported by the institutional system or other actors?

Method: Empirical in-depth case studies of innovations in different European regions – innovative companies or projects.

Methods: interpretative, problem-centered, semi-structured interviews with entrepreneurs.

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Concepts and Definitions

Innovation

- A new idea, introduced to market;
- Incremental or radical;
- Products (good or service) or processes (organisational, market, institutional) (Schumpeter)

Entrepreneur

- „An entrepreneur is a person willing to buy at a certain price and to sell at an uncertain price “ (Cantillon);
- „is searching for *opportunities“* (Drucker; Lindh de Montoya);
- Non-conventional ways, flexible, adaptive (Cromie)
- Creative, intrinsically motivated (Ryan and Deci)

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Concepts and Definitions

Systems supporting Innovations (Innovation systems):

- Actors and Institutions (explicit and implicit norms), who supported Innovations; national, regional and sectoral systems of innovation

Functions supporting Innovations:

- Information, Financial support, Coordination (Edquist)

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The Four innovative cases

Case 1: Birch Sap (FI):

- New method of production (Birch sap collection and bottling system)

Case 2: Country Wines (Scot, UK):

- New product (Wine from Oak leaves & Elderberries)

Case 3: Hand picked tea (Wales, UK):

- New product (Home grown & Hand picked Tea)

Case 4: Mushroom Hotel (Catalonia, ES):

- New Service (Mushroom picking combined with Tourism: hotel and restaurant)

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Birch sap (FI)

The Innovation

- New method of extraction, which allows longer shelf life without preservatives.

Creation of the Innovation

- Entrepreneurs moves to country side and searches for income possibilities: birch sap from own birches, trial-and-error, first besides main occupation; marketing: learning from similar products, directly to international markets.

Innovation Support

- Support for product development and investments through several national and regional actors, and business counceling. No big funding.

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Country Wines (Scot, UK)

The Innovation

- Fruitwines, partly from wild leafs, flowers and berries.

Creation of the Innovation

- Entrepreneurs were selling sheds and financing the innovation from their own funds. The knowledge accumulation from books, there is no experience on wine from oak leaves etc. Marketing through local groceries and wine-shops. Today own shop and cafè.

Innovation Support

- Support mainly through private networks, no big funding. Slow growth of the company.

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Hand picked tea (Wales, UK)

The Innovation

- Hand-picked, local tea-mixtures.

Creation of the Innovation

- Entrepreneurs had prior knowledge in perma-culture and food technology; took courses and read books „until our knowledge overtook“, start giving courses and guided tours in „Foraging“,; local marketing in Cafès and Shops.

Innovation Support

- Support through private and public organisations (such as the European herbal tea association and LEADER) but no big funding.

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Mushroom Hotel (Catalonia, ES)

The Innovation

- Hotel and Restaurant with mushroom picking licence and mycological path for tourists.

Creation of the Innovation

- The entrepreneur could not get a general licence for the whole valley, but only on his own proprety (220 ha) around his hotel. The path and the mushroom picking are a marketing idea for his hotel and gourmet restaurant.

Innovation Support

- Support through own networks (tourism association, later turned against him). Mycological path was supported through a forestry research institute and an EU-project there.

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Results: 1. Entrepreneurial behaviour

Motivation

- Own initiatives to gather information, finances, networking, marketing (all cases)

Know-how

- Entrepreneurs knowledge from earlier work and studies was utilized and helpful for the process (all cases)

Sources of Information

- Most were largely self-taught (all cases)
- Additional information aquired by own initiative from variety of sources (all cases)

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Results: 2. External Support

Funding +

- Mostly self-financing, slow growth, low risk.
- Small Grants from regional sources.

Coordination und Cooperations ++

- Networking via regional development organizations.
- Own retail and institutional networks are important.

Information +++

- Most are “self-taught”, looked for informations on their own
- Some Advice, technical information, etc. of research institutes, regional authorities, regional development organizations

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Discussion: Support for Innovation

Entrepreneurs had local cultural knowledge and creativity:

- Not only in regards to the production but also regarding the possibilities of marketing. (Tea in the UK, International markets for birch sap)

Support through regional Innovation systems:

- Not national or sectoral innovation systems. Regional development organisations and other relevant institutional actors (e.g. research institute in Catalonia).
- The same actors are also important for networking, information and consultation. Monetary funding less important for the innovation.

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Discussion: Non-Wood-Forest Products

Taste is local

- All products originate in the local contexts and bear local consumation habits. Only the Finnish company exports the product.

Innovation combines old knowledge with new demands

- Builds up on traditional knowledge, but enlarges it with new demands (preservation/durability of birch sap) and customers (international and urban).

The taste of tradition as experience and adventure

- The product itself is the bearer of the experience (nature, fashionable historical tradition).

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Thank you for your attention!

CONTANCTS

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This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

LUT

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University of Technology

Socio-technological transitions and new business logics – from cluster policies towards ecosystem policies

Satu Pekkarinen
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Vesa Harmaakorpi

Lappeenranta University of Technology
LUT Lahti

EU-SPRI Conference, 10-12 June 2015, Helsinki

Tekes

Overview

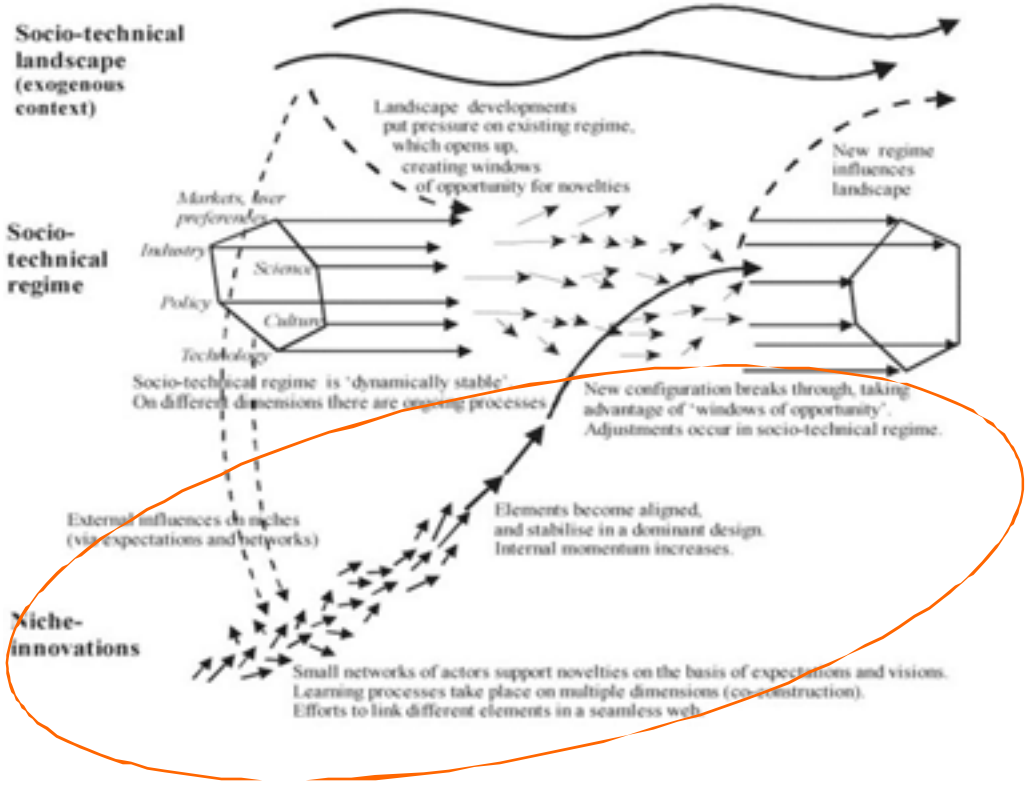
- Combining the perspectives of socio-technological transitions and innovation ecosystems

  --- How the ecosystem perspective can contribute addressing ”grand challenges”

- Description and analysis of the shift from cluster-based business logics and innovation policies towards ecosystems-based logics and policies
- Conclusions and suggestions for further research

Background & context

- Socio-technical transitions & multi-level perspective of transitions (Geels 2002; Geels & Schot 2007)



- Focus: the emergence of radical niches in socio-technical transitions:
  Niches as ”seeds for change” when current regime is experiencing destabilisation due to macro-level landscape changes, like climate change, population ageing etc.

Background & context

- The shift from cluster-based business logics and innovation policies towards ecosystem-based ones
- A need of combining ecosystem and transition management approaches (see. eg. Walrave et al.2013)
- --7 The role of new business logics in socio-technical transitions?
- --7 Literature review and analysis

Shift of the economic environment: from clusters to ecosystems

Business ecosystem:

In a business ecosystem, companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations. (Moore, 1993)

loose networks (of suppliers, distributors, outsourcing firms, makers of related products or services, technology providers and a host of other organisations) that affect, and are affected by the creation and delivery of a company's own offering (Iansiti & Levien, 2004)

- Business Ecosystem vs. Innovation Ecosystem
- Cluster concept widely used and popular concept in innovation and industrial policies. However, the rapid change of economic and business environment (e.g. internet economy) have changed the traditional business logics.

Main characteristics of cluster and business ecosystem concepts

		Cluster	Business ecosystem
STRUCTURE	Geographical scope	Local/Regional	Global
	Scope	Certain industry and related businesses	Complementary industries, niches and firms
	Actors	Firms within a certain industry and related fields	Ecosystem firms and organisations
	Key actor	Lead firm	Keystone organisation / Lead firm
	Networks	Local networks	Global networks
FUNCTIONS	Dynamics/ driving force	Localisation economies	Complementary assets, shared value creation
	Knowledge and innovation	Highly specialised knowledge, local knowledge spillovers	Complementary and specialised knowledge pools, open innovation
	Cooperation	Cluster firms and related organisations	Ecosystem firms and organisations
	Value creation	Value chain	Value network
	Governance	Top-down	Peer-to-peer
POLICY	Public sector role	Education, training, infrastructure	Removing the bottlenecks of evolution?
	Policy objective	Foster local cluster growth and competitiveness	Nurture new entrepreneurship, foster ecosystem renewal?
	Key policy challenge	Old, declining industrial clusters	Ecosystem growth/renewal/death?

Towards ecosystem policies

- Changes in economic environment and business logics call for changes in innovation policies
- Some points for ecosystem policies
  - Feed variation --- niche development
  - Variation & selection
  - Old planning-based policy does not work in current environment and when trying to tackle wicked problems
  - Experimental policy: Rapid feeding of successful experiments and cutting off unsuccessful experiments early enough
  - Dynamism & complexity
  - Facilitation & orchestration
  - Innovation policy cutting across policy sectors
  - Quadruple Helix

Conclusions: Why the shift from cluster policies to ecosystem policies are likely to accelerate transitions?

- Because of their ability to *create radical niches* that are needed for transition
  - Complementary assets, shared value creation and open innovation are characteristic for ecosystems
  - Innovations are created in interaction with several actors where various types of knowledge and expertise are combined (Chesbrough 2003, Granovetter 2005)

- Because of their ability to facilitate the *breakthrough of radical niches*
  - Ecosystems may reduce the inertia between niches and regimes
  - The characteristics of the ecosystems: global multi-actor collaboration, continuous renewal, peer-to peer governance and ecosystems as systems of use, not only as systems of production
  - These characteristics reduce the risk of locking into existing rule systems

Discussion

- Moving towards ecosystems perspective in innovation policies may help the alignment of innovation policies and transition policies (see Alkemade et al. 2011), combining economic growth and societal needs
- We suggest that paying more attention to the ecosystem perspective could contribute to the study of transition dynamics
- More research is needed on business ecosystems, related policies and their role in societal transitions
- Need of empirical research

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Funding and Ownership of Academic Inventions: Evidence from a Patent-level Survey

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Helsinki, EU SPRI Forum
10-12 June 2015

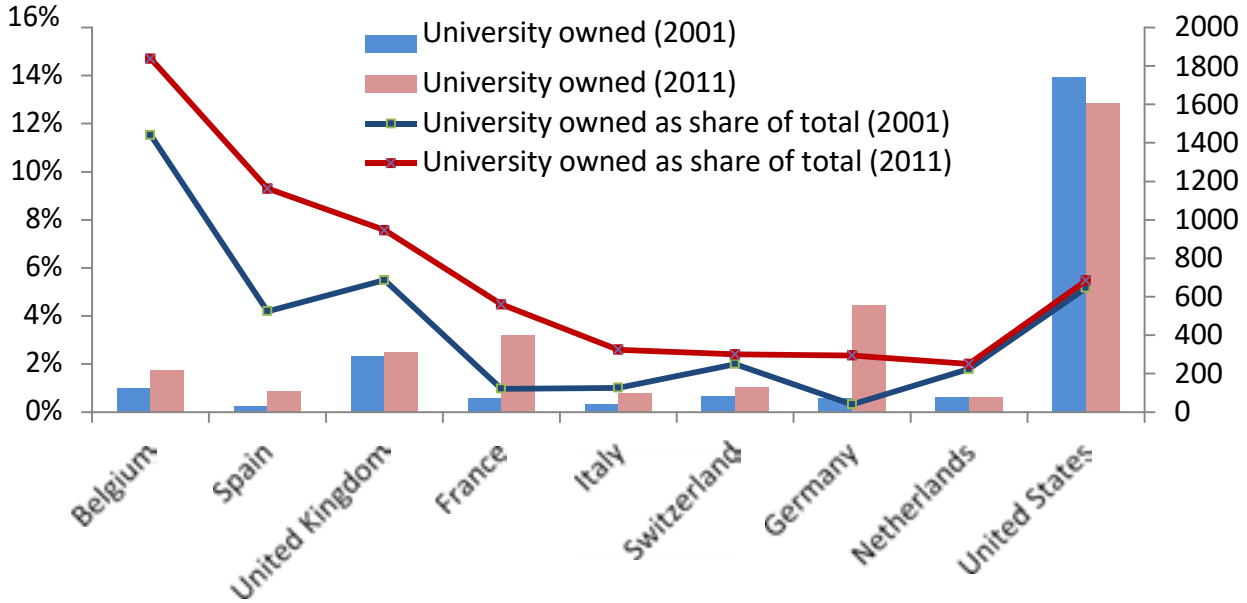
Objectives

- **Taxonomy** of academic-invented patents based on survey responses about
  - Funding sources
  - Timing of patenting decisions
  - Timing of ownership decisions
  - Role played by the TTO
- How does it map onto the nature of **technology**?
- How are the different types associated to **patent use** and different models of **commercialization**?
- Is there a relation between model of commercialization and **technological importance**?

Policies promoting academic ownership

- US Bayh-Dole Act 1980 (Mowery and Sampat 2005). Austria, Finland, Germany and Denmark abolition of professors' privilege (von Proff *et al* 2012; Lissoni *et al.* 2009) → general trend of pushing universities to take title of IPRs and take the lead in commercialisation

- The share of academic-owned patents has increased over the years



Source: Own elaboration based on Patstat and EEE-PAT April 2014

- But patents filed over academic inventions in most European countries **still belong to a large extent to business companies** (http://www.esf-ape-inv.eu/)

Research question

- What determinants of ownership of academic patents (university vs business)?
  - Funding scheme (public vs private; national vs international)
  - Technology class (science-basedness; biotechnology as a special case)
  - Role of TTO in finding sponsors/buyers/licensees

Key research tool: survey

- Surveys on academic incentives to patent and obstacles in European countries: Gulbrandsen *et al* (2006); Baldini *et al* (2007).

Spain as an interesting case

- 48 public universities and many PROs [largest one is CSIC → top patent applicant at OEPM)
- No professor's privilege, ownership by academic institution, unless R&D contract specifies otherwise
- Publication performance is the main criteria for academic evaluation, despite patents and contracts increasingly count for research evaluation exercises and career promotion (especially in Engineering fields)
- Since 1983 industry-university contracts allow academics to get significant increases in personal income as a bonuses (in some cases up to 3.5 time more of a professor salary)
- Generally, low level of absorptive capacity at local firms

Our survey

Online patent-based survey: maximum of 3 patents per inventor, questions linked to Patstat database and author-inventors database (Maraut and Martinez 2014)*

Patent-related questions divided into eight different sections, plus personal/professional questions to inventor:

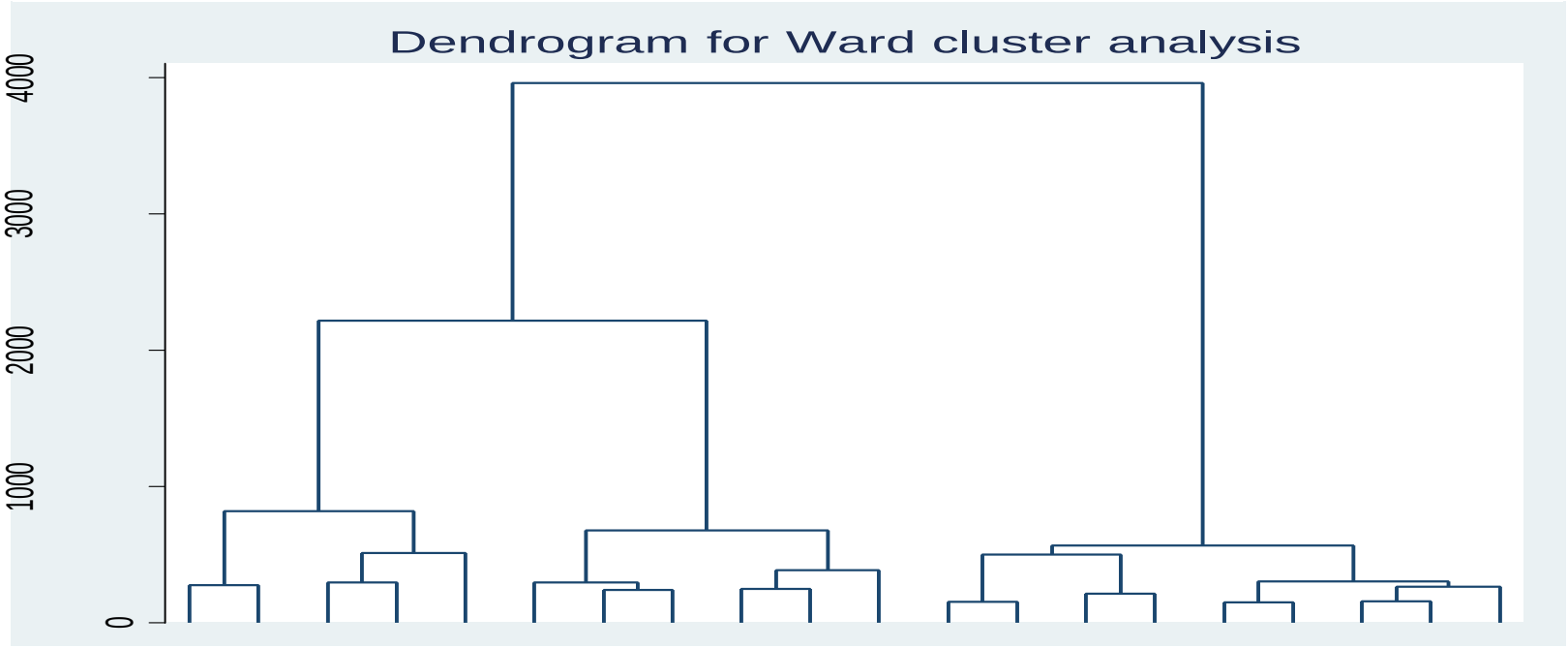
i) types of funding;
ii) timing of the decision to patent;
iii) timing of the decision about patent ownership;
iv) Commercialization (used internally, sold, licensed, entrepreneurial activity);
v) role of the university administration at the research funding phase;
vi) role of the university administration at the patenting phase;
vii) publication of related results;
viii) occupation of co-inventors at the time of patenting.

Responses from inventors

- The target population consisted of 3,142 academic author-inventors (with about 2 patents each, but a few having more than 100)
- A valid email address was found online for a total of 2,511 (more established, less mobile, older)
- No significant differences between respondents and non-respondents. Only a weakly significant gender difference (relatively less women replied).
- 15% response rate from target academic author-inventors, 19% from those effectively contacted (with email available).
- Analysis of responses at the patent-level, after some cleaning to ensure consistency, taking means when multiple responses per patent (academic co-inventors)

Ward minimum variance hierarchical clustering → 3 types of patents

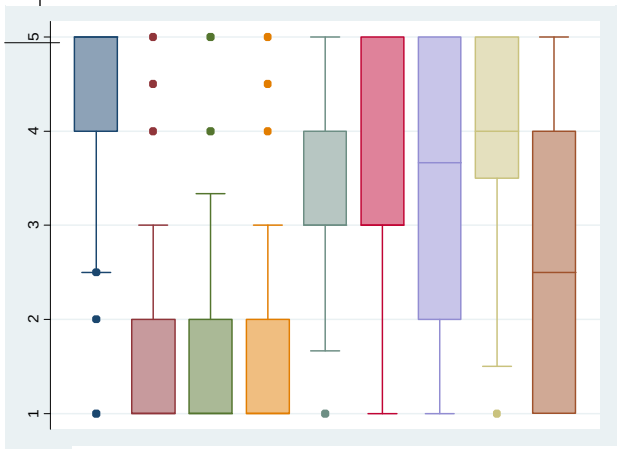
	Nbr of patents	% all patents
G1, National public funding with TTO	151	30
G2, Mixed public funding without TTO	178	35
G3, Industry funding without TTO	176	35
	505	100



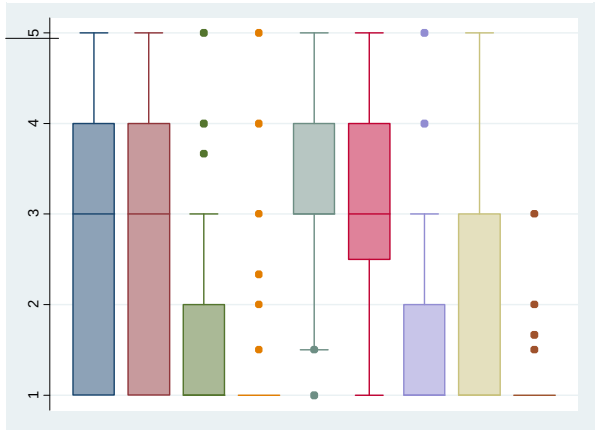
Distinctive features

- National Public Funding
- International Public Funding
- Research Joint Venture with Industry
- Contract Research with Industry
- Timing of decision to patent
- Timing of decision about ownership
- TTO negotiated assignment
- TTO did patent filing
- TTO marketing of patent

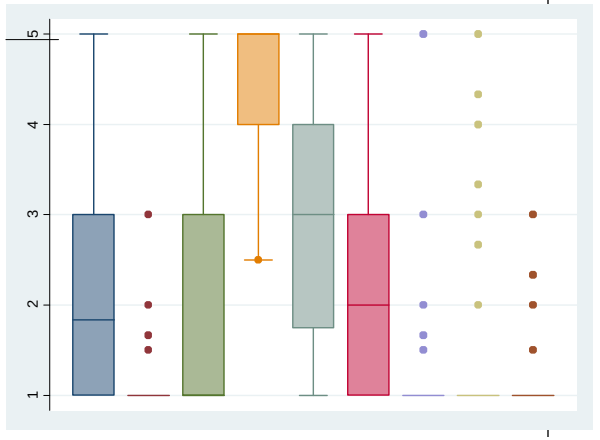
G1: National public funding with TTO (151)



G2: Mixed public funding without TTO (178)

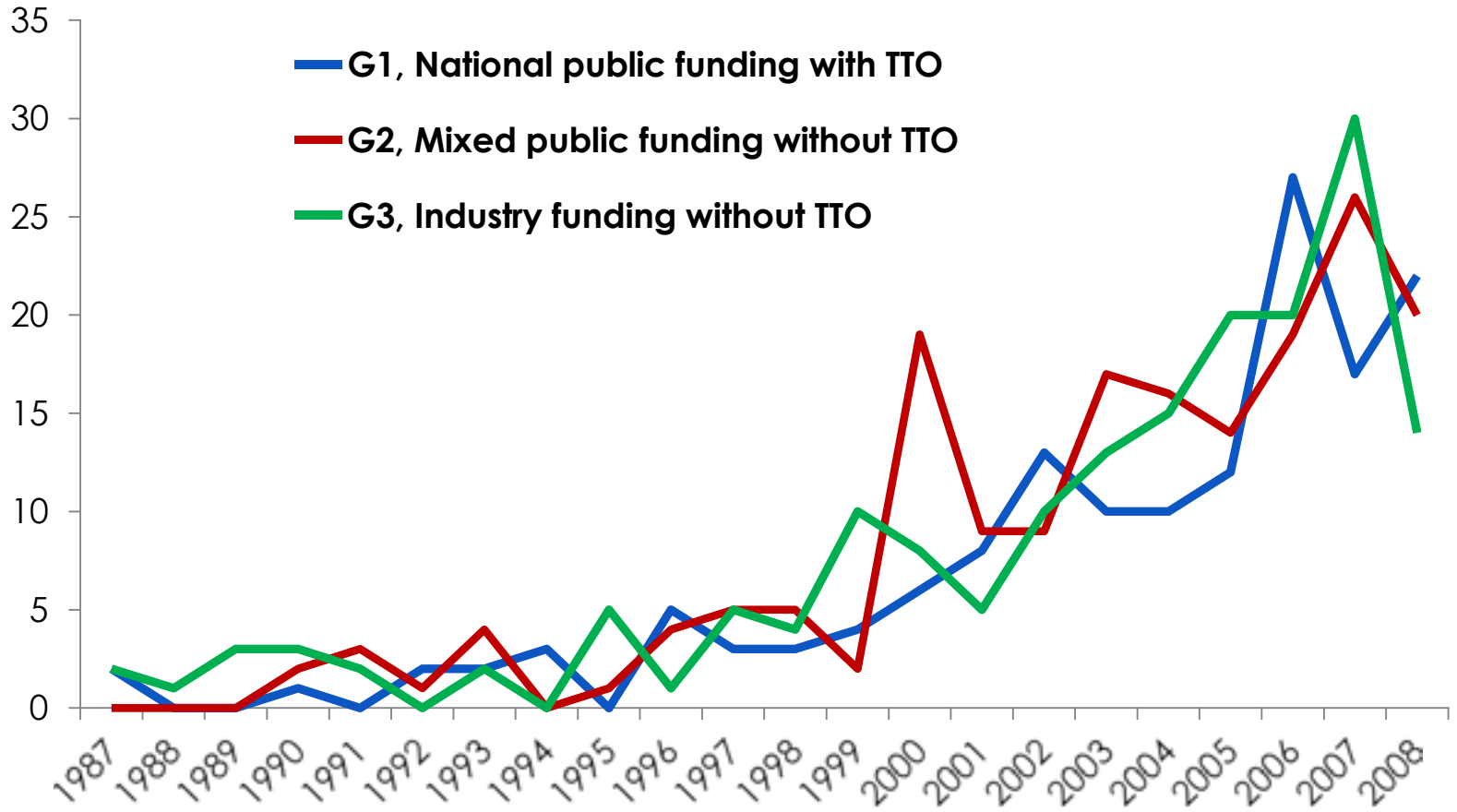


G3: Industry funding without TTO (176)



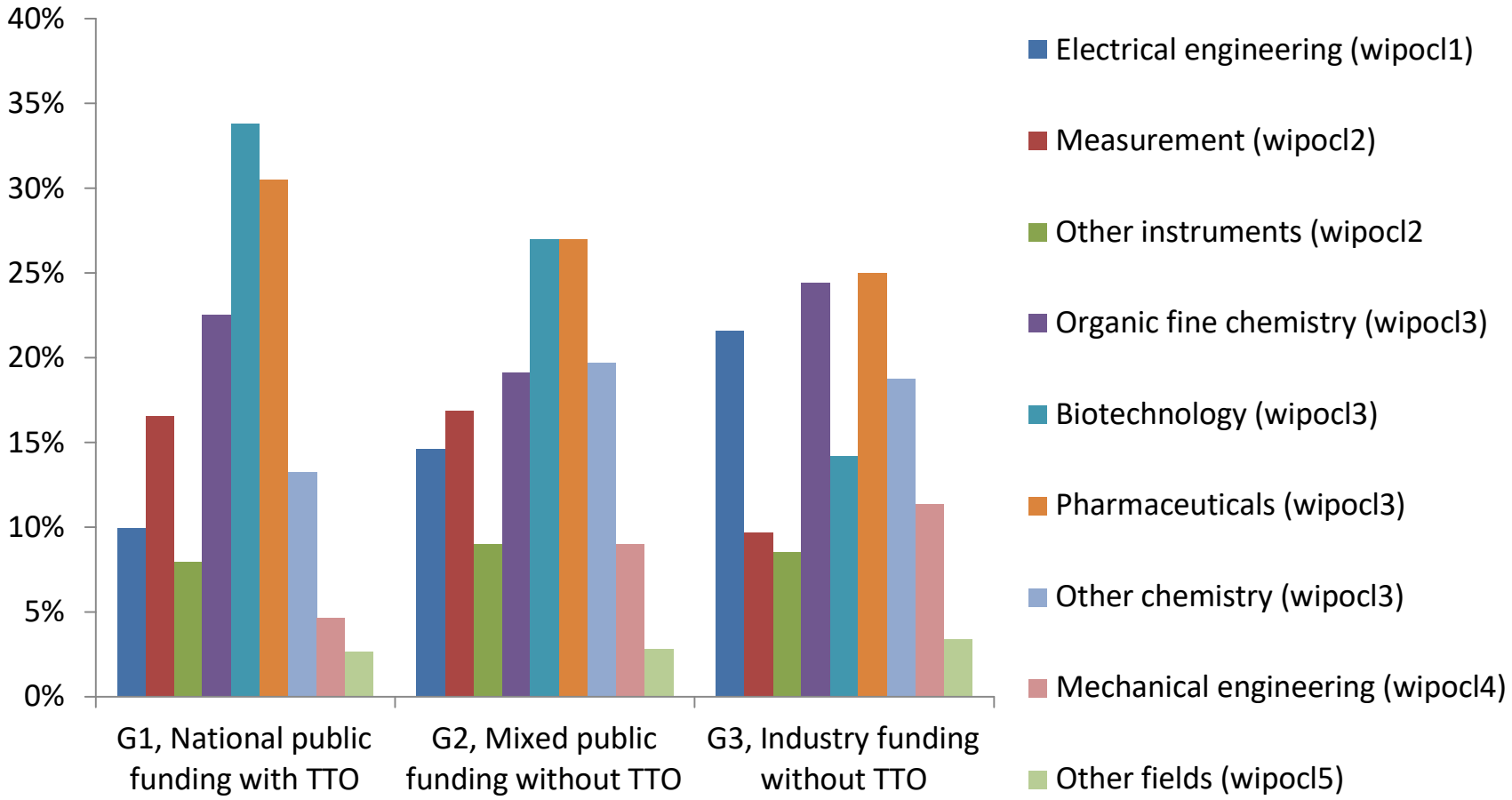
Distribution of the values of the answers by clusters
(mean values for patents with more than one answer)

Similar trends

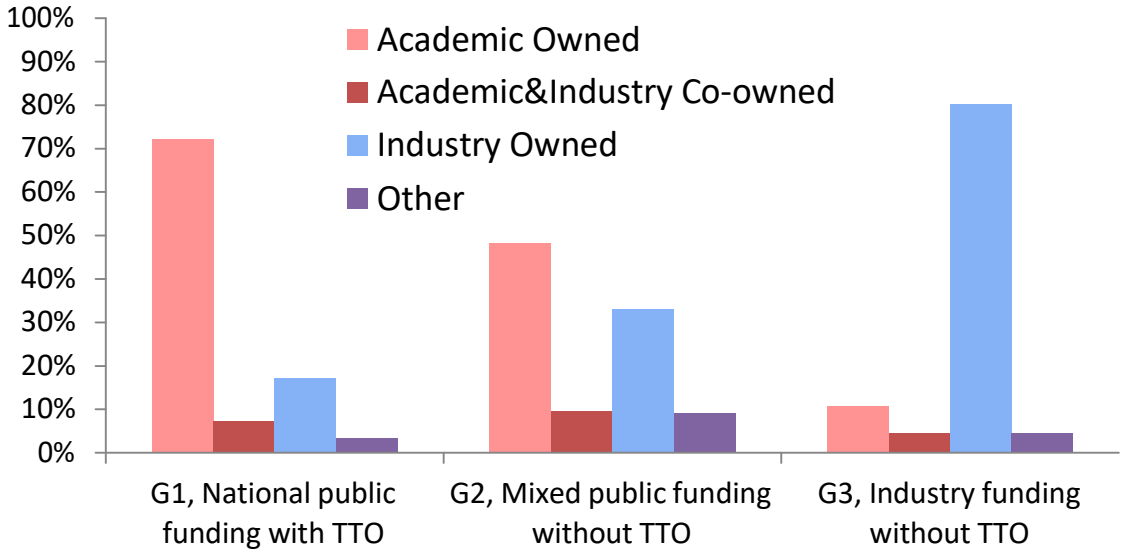


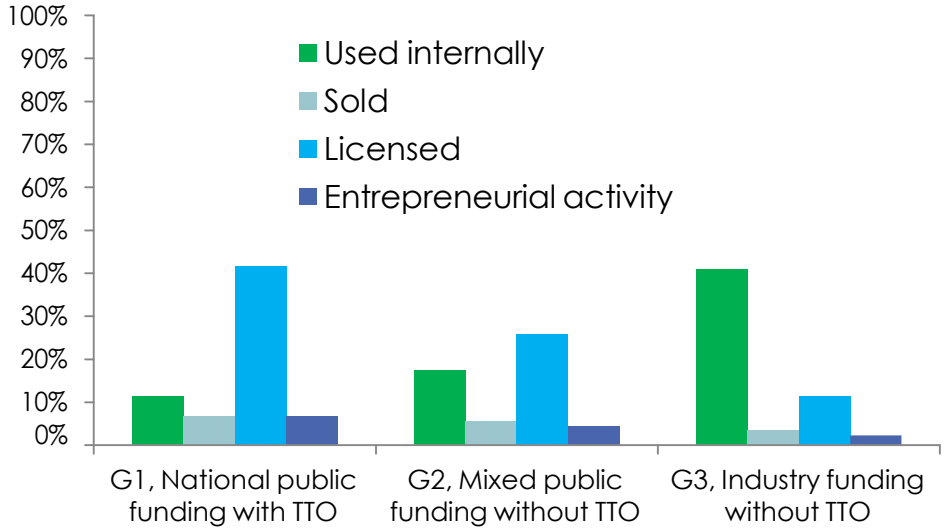
Different field composition

top WIPO5 and WIPO35 fields



Breakdown by type of ownership



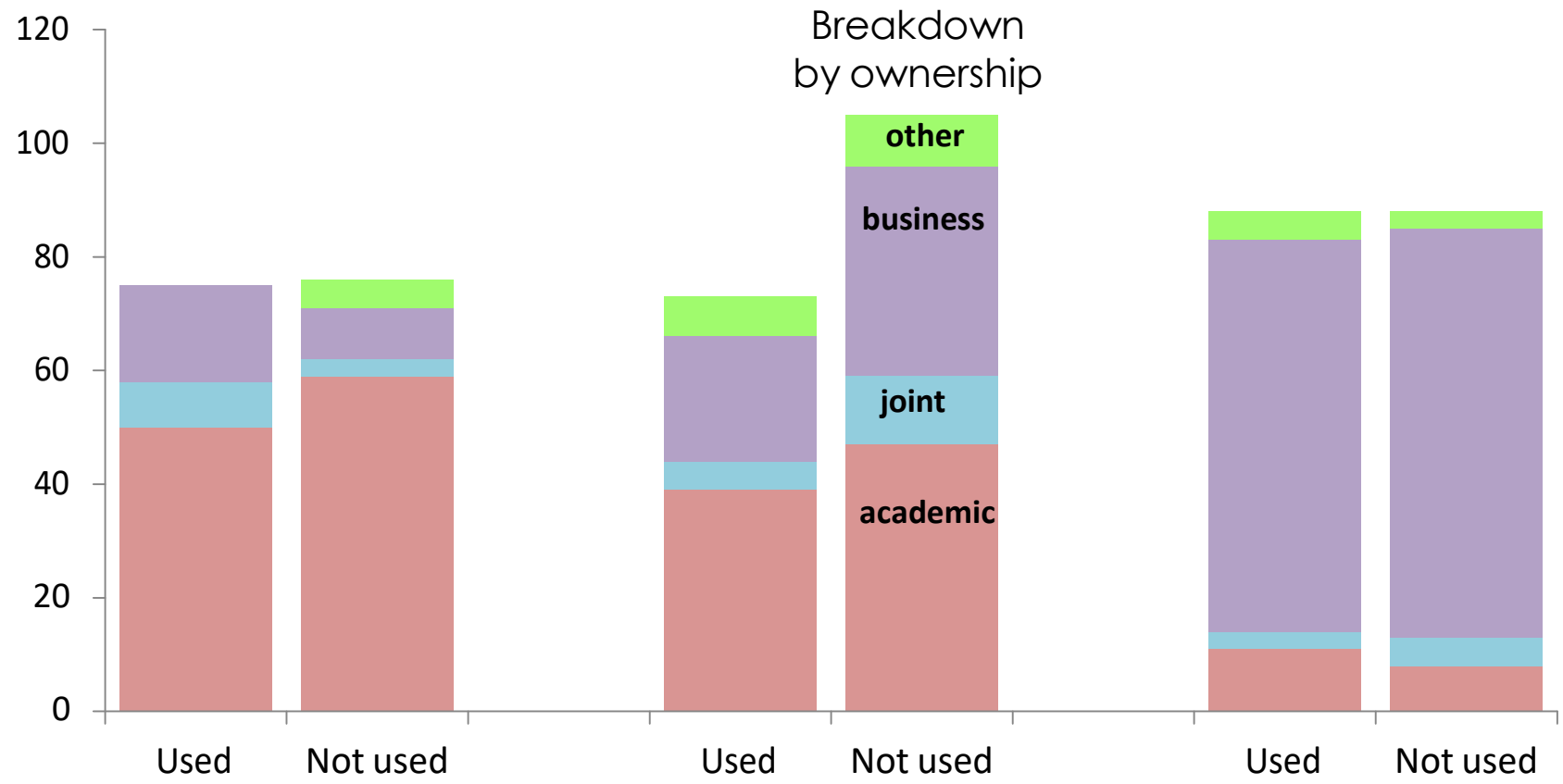


and models of commercialisation

Dummy=1 when response>3

Ownership & Use by type

Use=1 if used internally, sold, licensed or entrepreneurial activity



Use x owner per Gi

G1

chi2(3) = 10.4712
Pr = 0.015

G2

chi2(3) = 2.0020
Pr = 0.572

G3

chi2(3) = 1.5375
Pr = 0.674

Technological importance

		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
a	G1, Nat. Pub.fund. TTO	1															
b	G2, Mixed pub. Fund. No TTO	-0.4	1														
c	G3, Industry fund. No TTO	-0.4	-0.5	1													
d	Academic ownership	0.38*	0.08*	-0.44	1												
e	Joint ownership	-0	0.04	-0.08	-0.25	1											
f	Business ownership	-0.3	-0.2	0.51*	-0.75	-0.25	1										
g	Other ownership	-0.1	0.08	-0.05	-0.21	-0.08	-0.22	1									
h	Used internally	-0.2	-0.1	0.25*	-0.23	-0.01	0.22*	0.03	1								
i	Licensed	0.21*	-0.01	-0.24	0.25*	0.06	-0.26	-0.03	0.03	1							
j	Sold	-0.01	-0.04	-0.09	-0.01	-0.03	0.00	0.05	0.14*	0.20*	1						
k	Entrepreneur	0.01	-0.05	-0.11	0.05	-0.02	-0.08	0.09*	0.19*	0.28*	0.29*	1					
l	Citations recvd. in 7 years	0.05	-0.07	0.04	0.00	-0.07	0.05	-0.02	0.10*	0.04	0.00	0.02	1				
m	Family size	0.08	-0.1	0.03	-0.07	0.06	0.06	-0.04	0.03	0.13*	0.11*	0.05	-0.02	1			
n	Granted	-0.01	-0.02	0.04	-0.03	-0.06	0.07	-0.01	0.04	0.01	0.02	-0.01	0.09*	0.41*	1		
o	Renewals	0.06	-0.03	-0.05	0.02	-0.09	0.02	0.03	0.05	0.14*	0.04	-0.02	0.20*	0.42*	0.60*	1	
p	Claims	0.03	0.02	-0.08	0.01	0.12*	-0.09	0.04	-0.01	0.08*	0.15*	0.02	-0.01	0.12*	-0.1	0.03	1

Patent quality indicators, by cluster

Group means	Citations received in 5 years	Citations received in 7 years	Patent references	NPL references	Number of claims	Family size	Renewal	Granted
G1, National public funding with TTO	0.42	0.69	4.50	6.77	18.56	7.11	6.94	0.38
G2, Mixed public funding without TTO	0.33	0.48	3.72	5.33	18.38	5.96	6.42	0.38
G3, Industry funding without TTO	0.47	0.68	4.32	4.23	15.98	6.74	6.34	0.42
All	0.40	0.61	4.16	5.38	17.60	6.58	6.54	0.39

Family size and renewals are (weakly) significantly different across groups:

- Family size: Pearson chi2(48) = 65.2856 Pr = 0.049
- Renewal: Pearson chi2(38) = 54.1566 Pr = 0.043

But there is no significant pairwise comparison (Tukey HSD)

Technological Importance, negative binomial regression

	Cits received in 5 years		Cits received in 7 years	
	(1)	(2)	(4)	(5)
G2, Mixed public funding without TTO	-0.239		**-0.396***	
G3, Industry funding without TTO	0.0126		-0.157	
Academic&Industry Co-owned		**-0.789***		**-0.758***
Industry Owned		0.0214		-0.0496
Other ownership		-0.486		-0.319
Claims, NPL, references, fields	yes	yes	yes	yes
Constant	-0.821**	-0.962**	-0.175	-0.466
pseudo R2	0.0184	0.0224	0.0139	0.0147
Log likelihood	-431.68951	-429.92332	-541.62709	-541.15573
Prob>Chi2	0.0634	0.0322	0.0844	0.0944
ln(alpha)	0.455**	0.418*	0.780***	0.773***
	(0.224)	(0.228)	(0.159)	(0.160)
Observations	531	531	531	531
*** p<0.01, ** p<0.05, * p<0.1				

Technological Importance, negative binomial regression (with interactions)

	Cits received in 7 years	
	(1)	(2)
G2, Mixed public funding without TTO	-0.852	
G3, Industry funding without TTO	**-0.900***	
Academic&Industry Co-owned		**-3.015***
Industry Owned		-0.519
Other ownership		**-2.323***
Claims, NPL, references, fields	yes	yes
Clusters * fields	yes	
Ownership * fields		yes
Constant	-0.102	-0.150
ln (alpha)	0.565***	0.546***
Log likelihood	-524.95843	-521.01842
Prob > chi2	0.0128	0.0212
Pseudo R2	0.0442	0.0514
Observations	531	531

*** p<0.01, ** p<0.05, * p<0.1

Conclusions

- **Commercialisation models?**
  - Publicly funded nationally tends to be academic owned and rely on licensing model
  - Privately funded are mostly company-owned and used internally
  - Publicly funded via mixed sources (national & international) have some academic, some business owned. Less likely to be used than the rest, and more frequently jointly owned (consortia).

- **Technological importance?**
  - Citations received correlated with used internally.
  - In regressions without interactions, mixed public funding sources and jointly owned associated with less citations (more transaction costs). Effect of clusters only visible for longer citation window.
  - Interactions show that field composition matters, but jointly owned are less cited in general.

- *Next step: add personal and institutional characteristics of respondents*

Thanks.

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We thank Marisol Ruiz Solis for the IT implementation of the questionnaire, as well as Reyes Valle, Kenedy Alva for their help to distribute it.

Living Factories

LIVING FACTORIES:
Synthetic Biology for a Sustainable Bioeconomy (LiF)

Emerging ecosystems, innovation policies and socio-economic transitions: the case of synthetic biology

Toni Ahlqvist, Mikko Dufva & Kaisa Oksanen

The 2015 Annual Conference of the EU-SPRI Forum, 10–12 June 2015, Helsinki

VTT Technical Research Centre of Finland Ltd

Structure of the presentation

- Theoretical setting and motivation
- The notion of emerging ecosystem
- The case study: synthetic biology (a work in progress)
  - Living Factories project
  - Analytical structure
  - Socio-technical perspectives on synthetic biology
  - Perspectives towards the emerging ecosystem in synthetic biology
- Conclusions

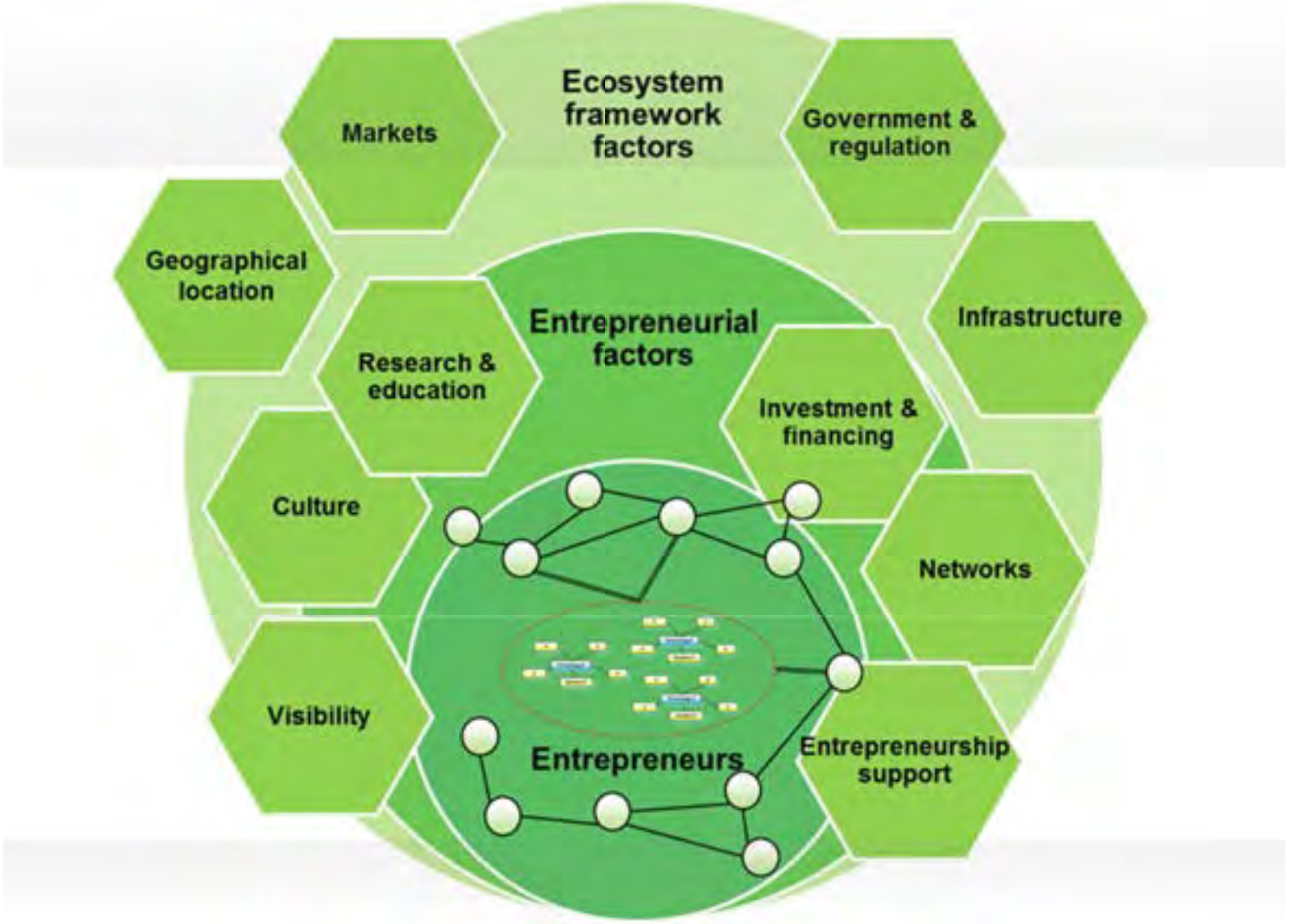
Theoretical backgrounds

- Innovation systems and regional innovation systems (RIS) literature
  - The existing literature on innovation systems and ecosystems has mainly been focused on established systems, or on systems that are relatively well-defined in their scope and orientation (Lundvall 1992; Hekkert et al. 2007)
  - RIS (e.g. Cooke et al. 1997) and Triple Helix (e.g. Etzkowitz & Leydesdorff 2000)
- Foresight literature
  - “Wiring up” an innovation system (Martin & Johnston 1999)
  - Anticipation of developments in more traditional industrial sectors (Andersen et al. 2014)
- Systemic transitions literature
  - Transition management and sustainability transitions (e.g. van den Bergh et al. 2011; Geels 2002)

On emerging ecosystem…

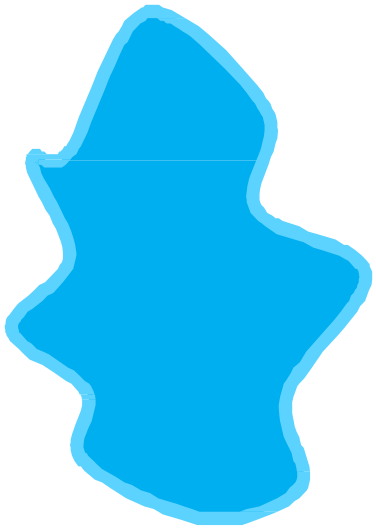
- In the paper we outline a theoretical and methodological approach for a future-oriented emerging ecosystem analysis
- The research questions are:
  1. How to anticipate the existing, emerging and converging technologies, knowledge and actors that are changing the market and innovation landscape towards a new ecosystem
  2. What economic, environmental, and social changes are driving and will drive innovation development in the chosen new field
  3. How these activities and actors are positioned in the arising ecosystem?
- Emerging ecosystem in synthetic biology as a case study
  - A work in progress

Ecosystem model applied in the analysis



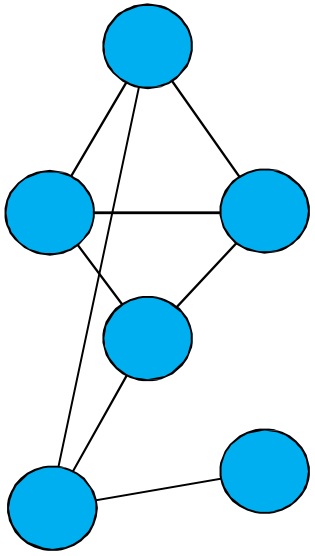
Analysing “emergence” in an ecosystem context

Incubation



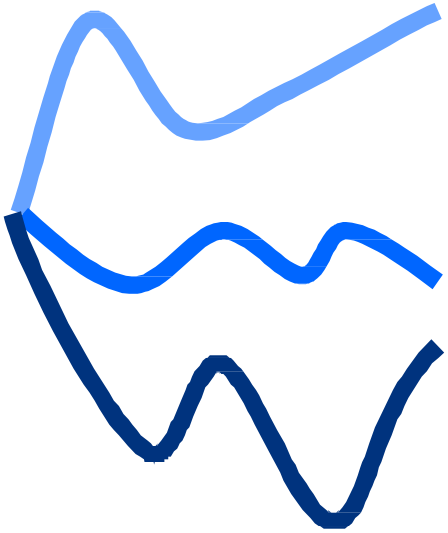
Step 1
Building an ecosystem

Emergence



Step 2
Analysing the ecosystem

Alternative future pathways



What is synthetic biology?

- Fast and cheap genome sequencing and DNA synthesis
- Computer-based design and automated cell construction
- Biology as an engineering science

Human design of standardised modular biological parts and devices that can be assembled in desired combinations to functional controllable systems. (i.e. Living Factories)

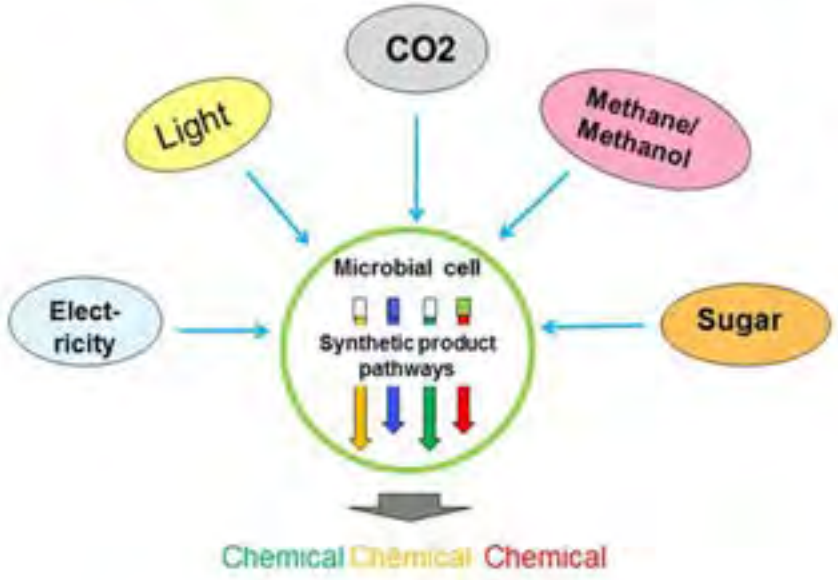
"What I can not build,
I can not understand"

Physicist Richard Feynman

The Living Factories project: Synthetic Biology for a Sustainable Bioeconomy (LiF)

- A large strategic opening financed by Tekes
  - ~ 4 million € for first 2.5 years
  - Option for additional 2.5 years after evaluation
- Develop the **tools and concepts of Synthetic Biology that make biology engineerable** and the generation of high performance Living Factories, cell factories, predictable and fast.
- Combat climate change and resource scarcity by developing **synthetic cells, which can efficiently produce fuels and chemicals from renewable raw materials and C1 carbon sources.**
- Contribute in creation of an internationally competitive research-business-education environment that supports courageous initiatives in research and in application of biological functions in industrial production and new business operations.

Plug-and-play living factories - tailor-made for desired use



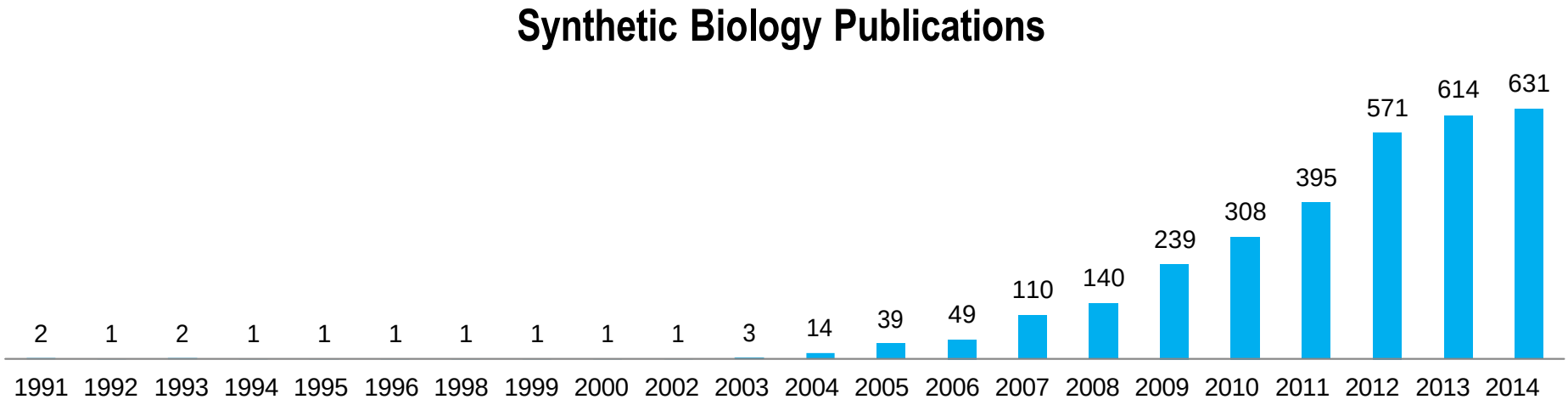
Partners

VTT (coordinator): Prof. Merja Penttilä
Aalto University
University of Turku

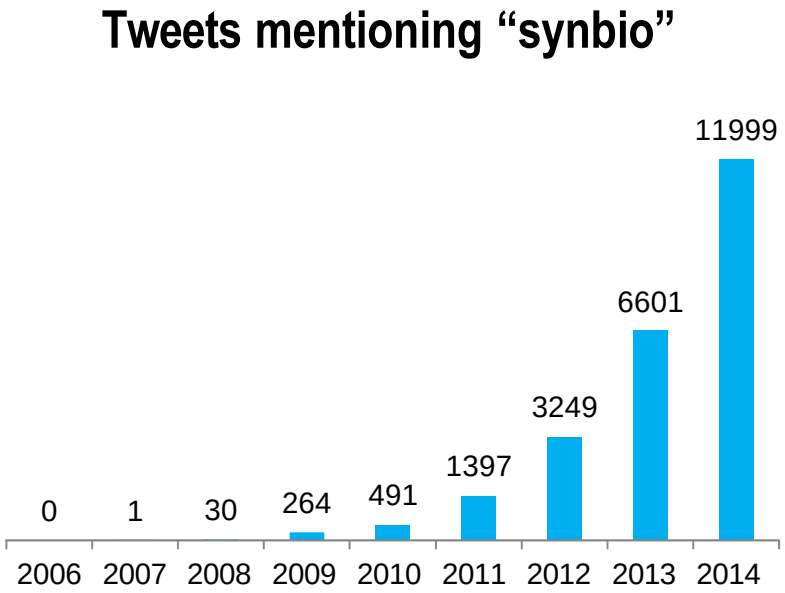
Contact

Merja Penttilä, merja.penttila@vtt.fi
Anu Koivula, anu.koivula@vtt.fi

Synthetic biology is an emerging field and topic of societal discussion



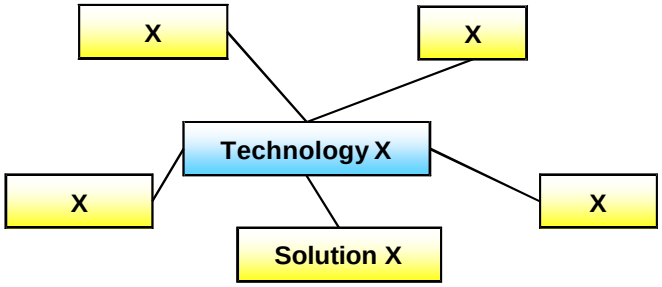
Data: Thomson Reuters Web of Science

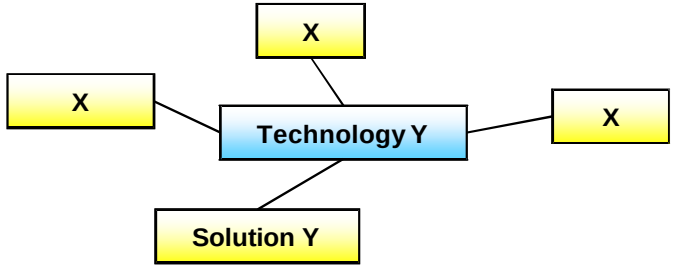


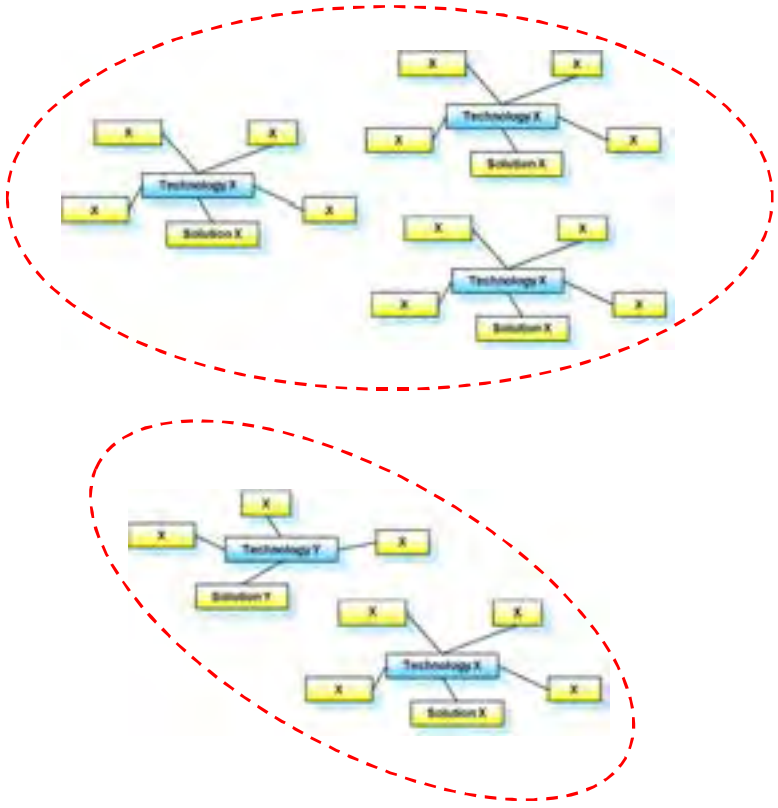
Data: Twitter

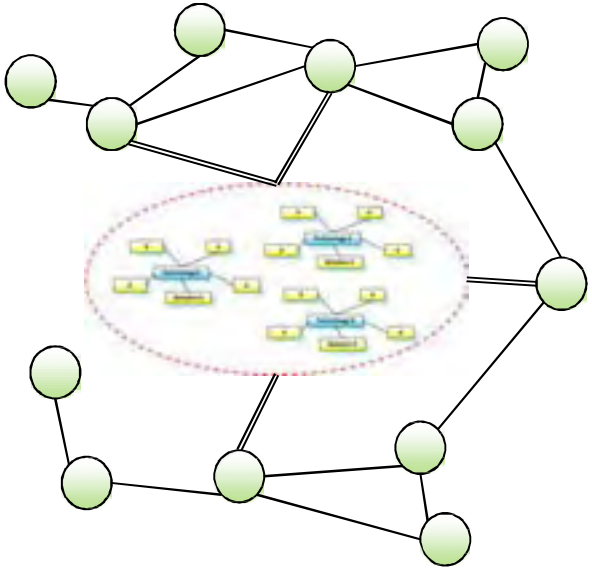
Future-oriented assessment of key technologies

Phase I	*Phase II*	*Phase III*
Mapping technologies and solutions	**Combining technologies to build visionary solution fields**	**Outlining potential actor ecosystems for the solution fields**



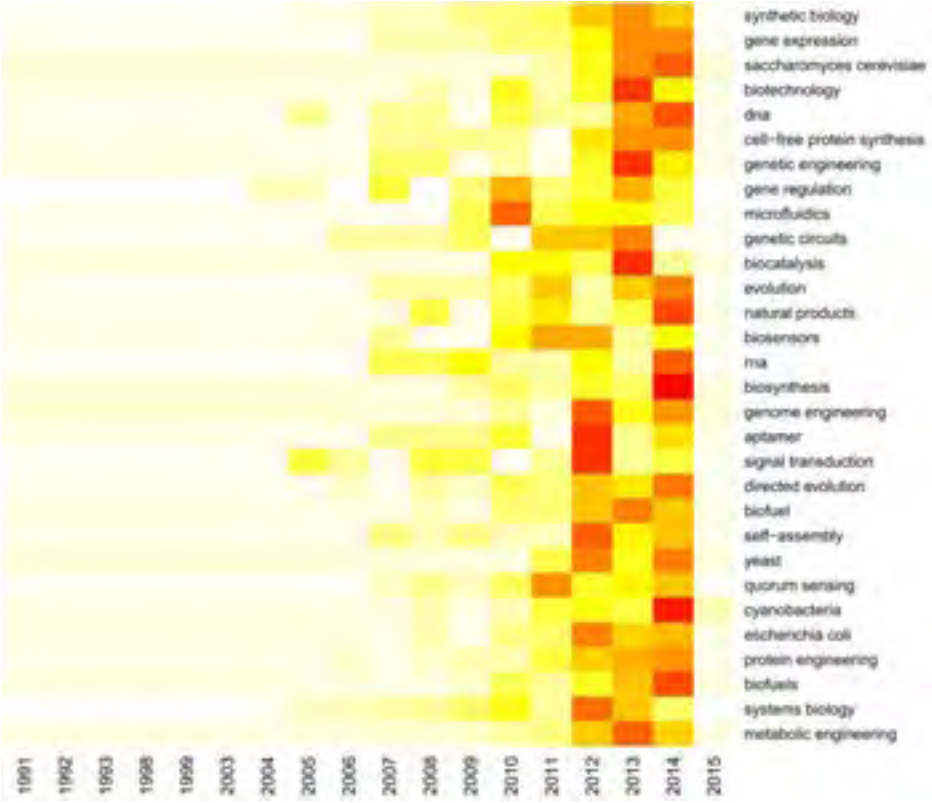


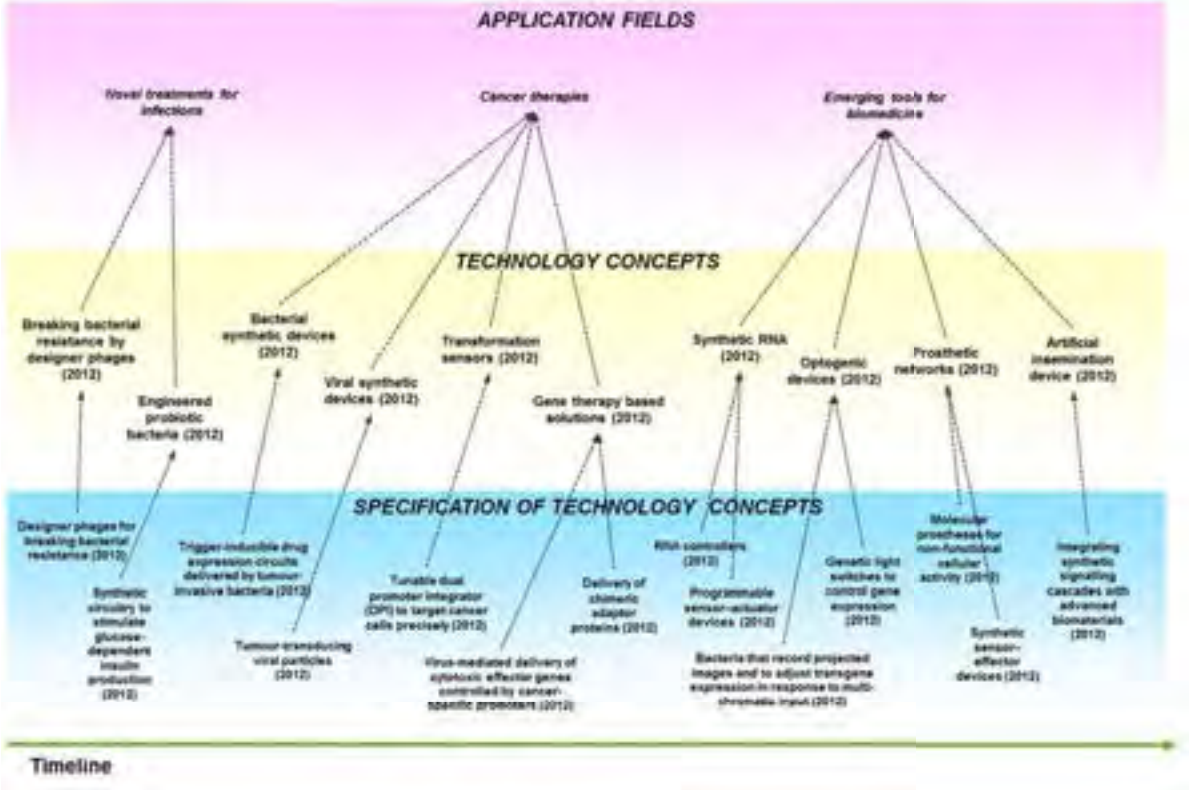




Integrating scientometrics and qualitative technology mapping

- Aim is to construct a robust perspective for mapping enabling technologies in the roadmaps



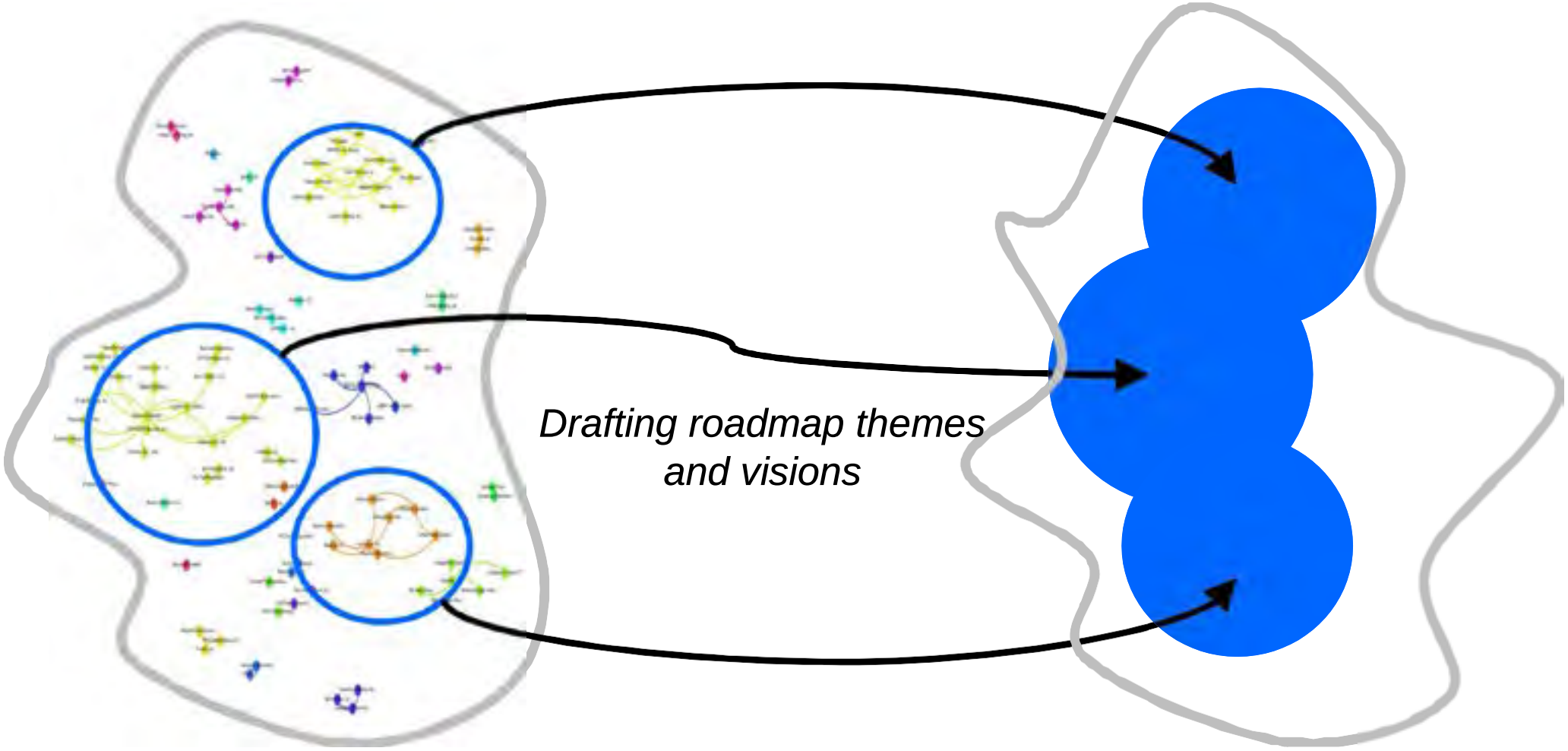

APPLICATION FIELDS
Novel treatments for infections
Cancer therapies
Emerging tools for biomedicine
TECHNOLOGY CONCEPTS
Breaking bacterial resistance by designer phages (2012)
Engineered probiotic bacteria (2012)
Bacterial synthetic devices (2012)
Viral synthetic devices (2012)
Transformation sensors (2012)
Gene therapy based solutions (2012)
Synthetic RNA (2012)
Optogenic devices (2012)
Prosthetic networks (2012)
Artificial insemination device (2012)
SPECIFICATION OF TECHNOLOGY CONCEPTS
Designer phages for breaking bacterial resistance (2012)
Synthetic circuitry to stimulate glucose-dependent insulin production (2012)
Trigger-inducible drug expression circuits delivered by tumour-invasive bacteria (2012)
Tumour-transducing viral particles (2012)
Tunable dual promoter integrator (DPI) to target cancer cells precisely (2012)
Virus-mediated delivery of cytotoxic effector genes controlled by cancer-specific promoters (2012)
Delivery of chimeric adaptor proteins (2012)
RNA controllers (2012)
Programmable sensor-actuator devices (2012)
Bacteria that record projected images and to adjust transgene expression in response to multi-chromatic input (2012)
Genetic light switches to control gene expression (2012)
Molecular prostheses for non-functional cellular activity (2012)
Synthetic sensor-effector devices (2012)
Integrating synthetic signaling cascades with advanced biomaterials (2012)
Timeline

Idea for integrating ecosystems and roadmapping

Emerging ecosystem of synthetic biology

Roadmaps

Future ecosystem



Drafting roadmap themes and visions

Mapping the emerging ecosystem

Refining the roadmaps

Living Factories

PERSPECTIVES ON SYNTHETIC BIOLOGY MARKETS AND COMPANIES

EXTREMELY HIGH SHORT TERM GROWTH EXPECTATIONS

"The global synthetic biology market is expected to reach ***$5,630.4 million in 2018*** from $1,923.1 million in 2013, growing at a ***CAGR of 24%***." (Markets and markets, 2014)

"Synthetic biology market was worth 1,537.5 million in 2011 and it is expected to reach ***$16,745 million by 2018***, growing at a ***CAGR of 41,1%*** from 2010." (Transparency Market Research, 2013)

- **FROM WHERE IS THEGROWTH EMERGING?**
- **WHY THE ESTIMATES ARE SO DIFFERENT?**
- **WHAT IF IT IS JUST ANOTHER HYPE?**
- **WHERE ARE THE ACTUAL BUSINESS OPPORTUNITIES IN SHORT AND LONG TERM?**

SYNTHETIC BIOLOGY COMPANIES AS GLOBAL PLAYERS

LARGE GLOBAL COMPANIES	GLOBAL SME COMPANIES	START-UP AND MICRO COMPANIES
Chemical, IT, agro, defence, medical sectors, e.g.: AMYRIS, DUPONT, ROYAL DSM, BRASKEM, NOVOZYMES, THERMO FISHER, AUTODESK, BP, DOW, GSK, MONSANTO, RAYTHEON, LOCKHEED MARTIN	Metabolic engineering, synbio tools, e.g.: BIOMAX INFORMATICS, CONAGEN, EVOLVA, INTREXON, GENOMATICA, SYNTHETIC GENOMICS, DNA 2.0, BLUE HERON BIOTECHNOLOGY, GENEART (CODON DEVICES, closed)	"Born global early stage companies" providing synbio tools and high-risk solutions, e.g.: BENCHLING, ENEVOLV, GINKGO BIOWORKS, LYGOS, KALION INC, LANZATECH, PIVOT BIO, BENTHIC LABS, REVOLUTION BIOENGINEERING

- **WHAT ARE "THE ACTUAL" SYNTHETIC BIOLOGY COMPANIES?**
- **WHAT IS THEIR BUSINESS MODEL?**
- **WHAT DRIVES THE BUSINESS DEVELOPMENT?**

SYNBIO START-UP SCENE – High risk investments but are there profits and revenue in sight?

From GREEN MINING to GLOWING TREES and COWLESS MILK

"Since 2004 investors have poured at least $1.84-billion into synthetic-biology start-ups; the government has added many more millions in research dollars. But more recently, the hype has died down. Most of those companies have made grinding progress, not breakthroughs." *(P. Voosen. Synthetic Biology Comes Down to Earth. The chronicle of higher education, March 4, 2013)*

FUNDING	ACCELERATION	ENTREPRENEURS
- Crowdfunding, e.g. Kickstarter; Glowing plants - Early stage seed funds - VC funds	- Accelerator programmes (Synbio Axlr8r / Indie.Bio) - Incubation - Education (iGEM, Lean launch pad)	- From scholars to DIY synthetic biologists

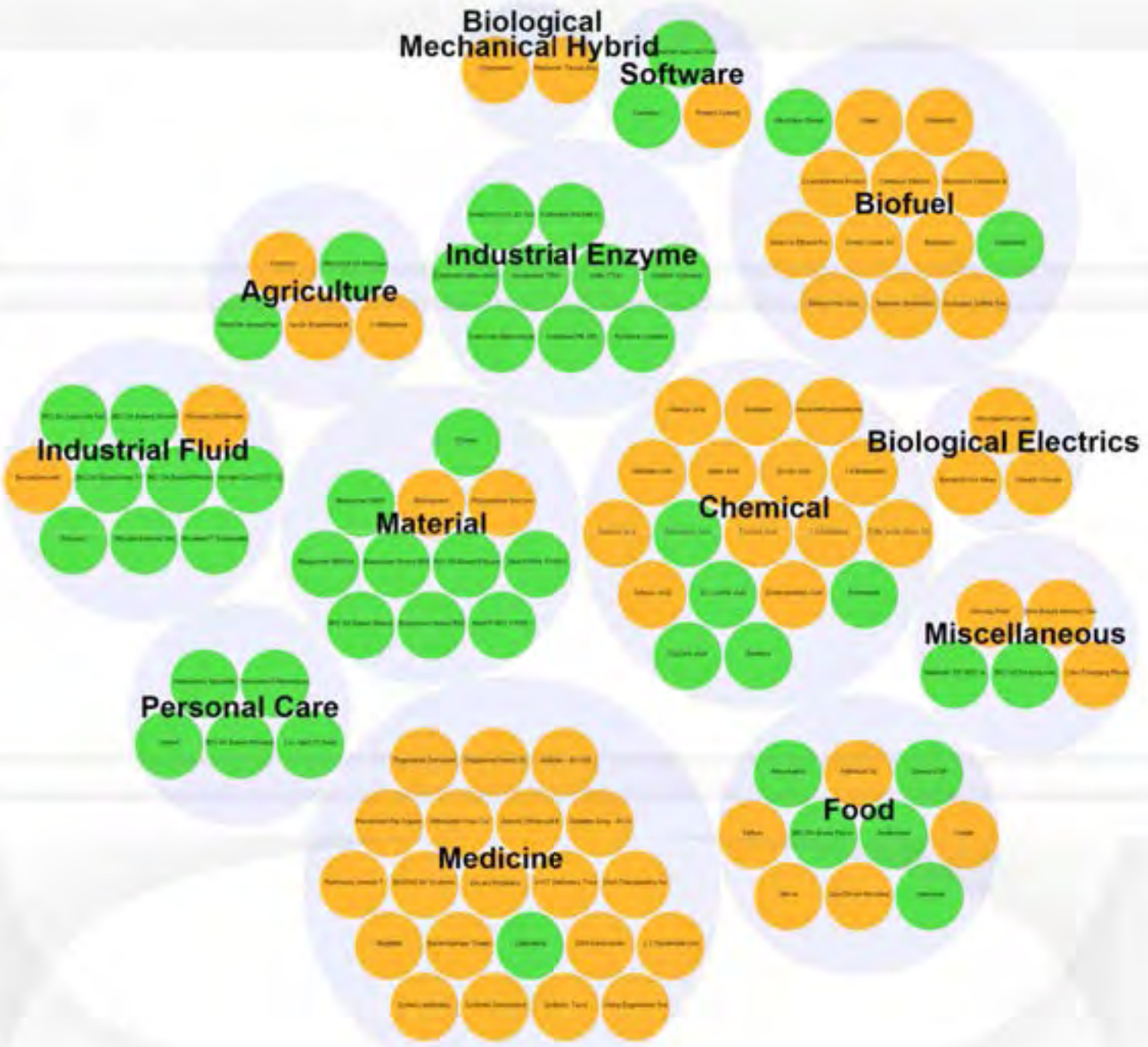
- **WHAT ARE THE KEY SUCCESS FACTORS? WHAT COULD WE LEARN FROM SUCCESS & FAILURE?**

Socio-technical tensions…

Approaches of interviewed US companies towards synbio

- **The companies have different interpretations of synthetic biology**
  - ***Position 1***: “It is a revolution in biotechnology and we are a synthetic biology company”
  - ***Position 2***: “We use synthetic biology for making our technology and processes more efficient”
  - ***Position 3***: “We think that synthetic biology is a continuation of genetic and metabolic engineering, but we will use the term if is necessary and beneficial”
  - ***Position 4***: “We avoid using the term, because it is not really a well defined and coherent set of methods”
  - ***Position 5***: “We don’t use the term because of the potential public backlash”

Understanding emerging ecosystems I: New products

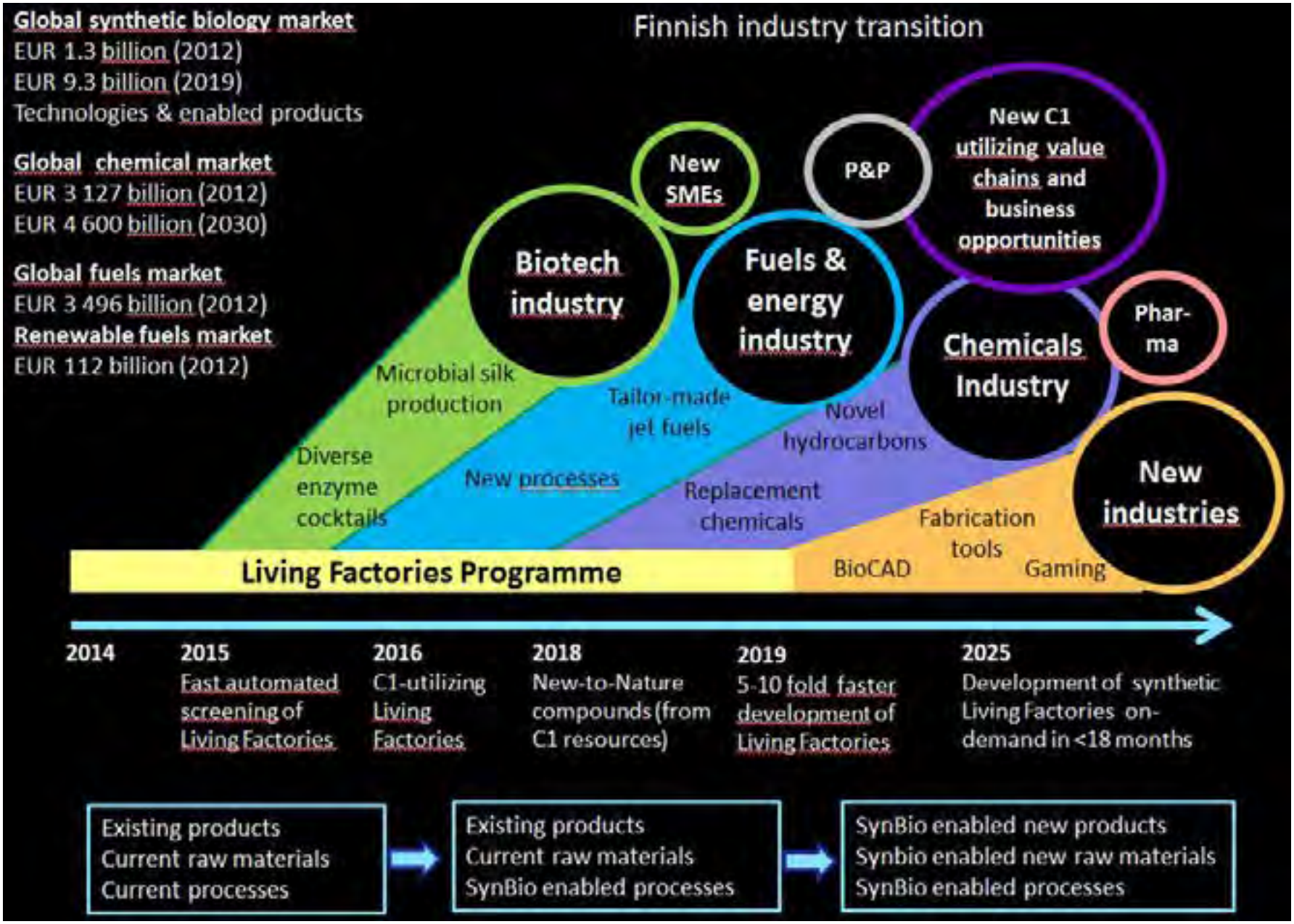


Product on the Market (or close to market)

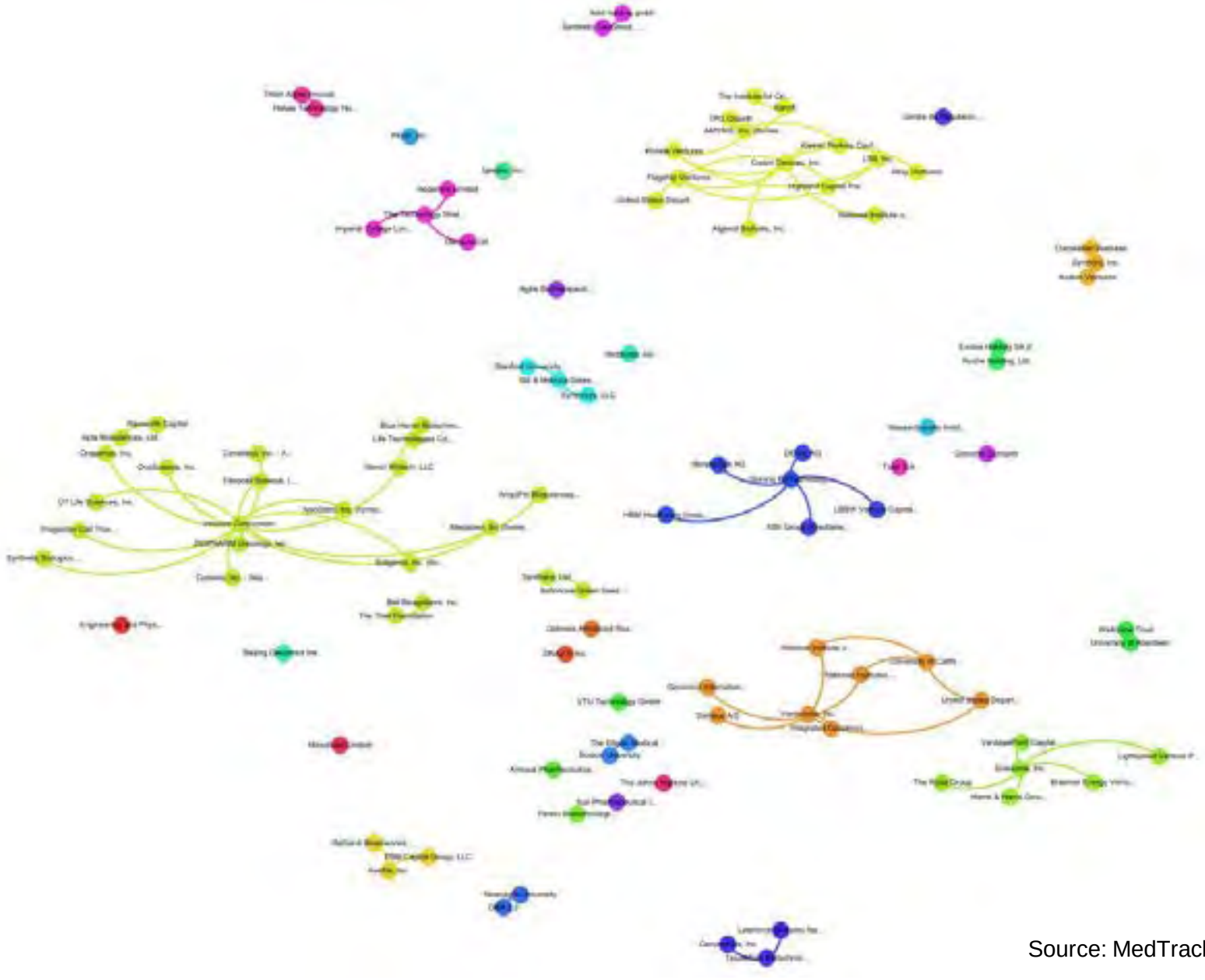
Product on the Horizon

Source: Synthetic Biology Products and Applications Inventory http://www.synbioproject.org/cpi/ accessed 18.5.2015

Understanding emerging ecosystems II: New possibilities rising from the research activities

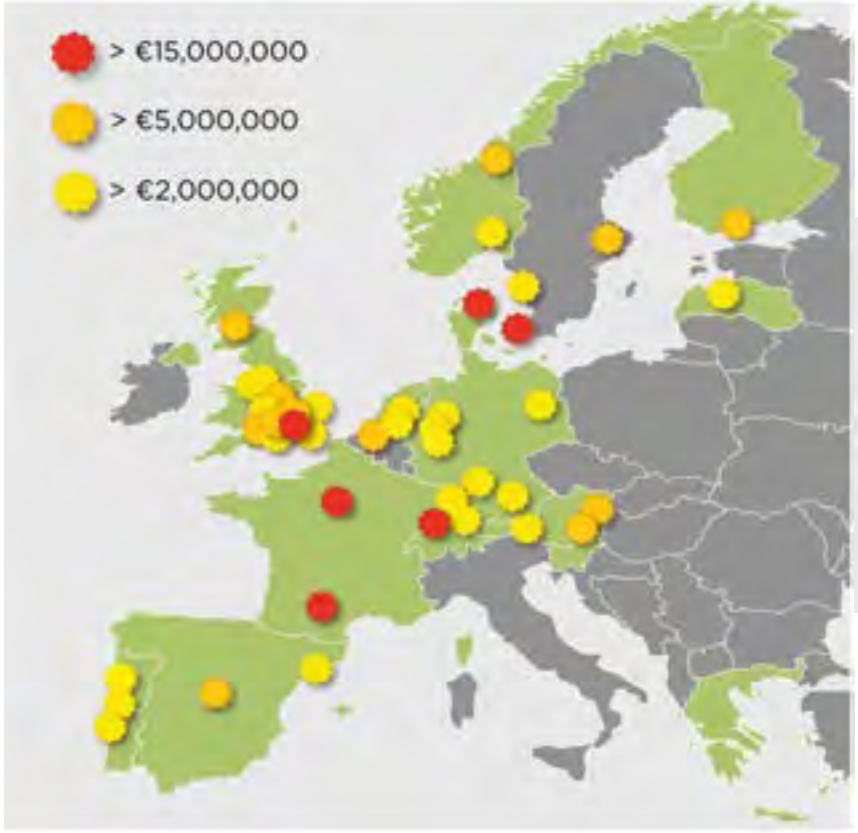


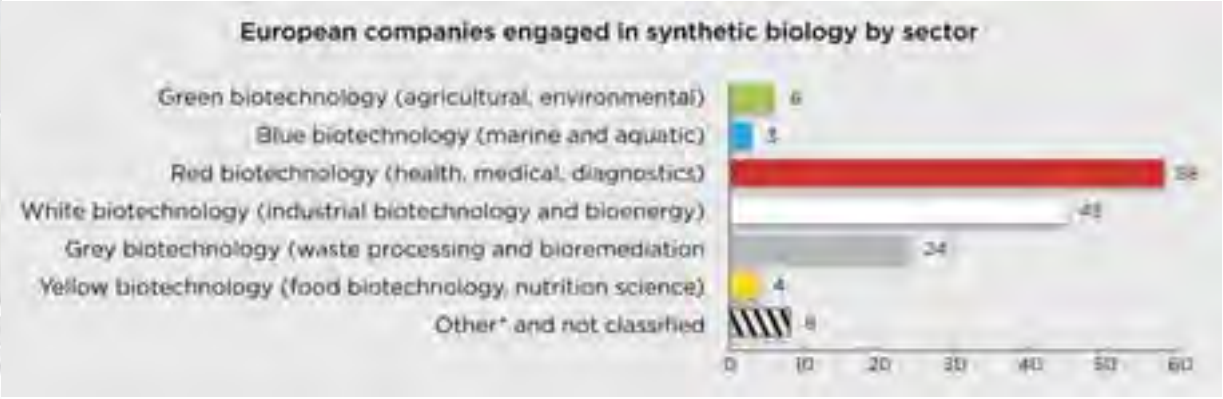
Understanding emerging ecosystems III: Mapping actor relationships



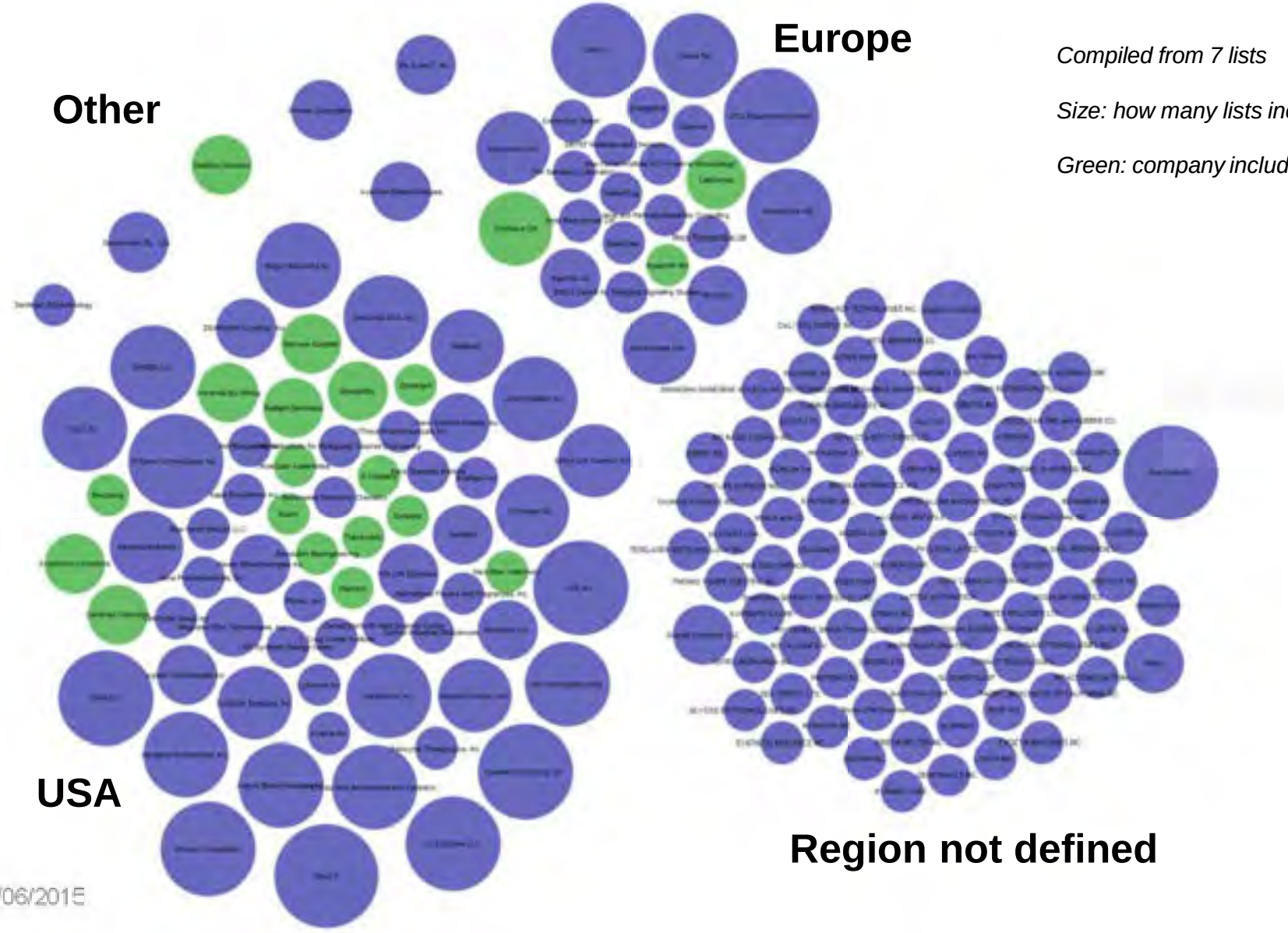
Source: MedTrack deals

Understanding emerging ecosystems IV: Sites of major European public investment in synthetic biology





Understanding emerging ecosystems V: Economic geographies of synbio companies



Compiled from 7 lists

Size: how many lists include the company

Green: company included in AngelList; StartUps

Conclusions

- A work in progress
- Aim is to construct a viable forward-looking process to analyse emerging ecosystems
- However, the ecosystem analysis is challenging in a rapidly evolving socio-technical field
- Integrating ecosystem analysis with a foresight process that includes key stakeholders (companies, policy actors, researchers)
- The idea of the LiF project is to advance the synbio ecosystem in Finland through industry visions created together with the companies
- Catalysing new synthetic biology competencies in Finland both in existing industries and potentially through new synbio start-ups

Thank you for your attention!

EU-SPRI 2015 Conference, Helsinki

11-06-2015

Coordination, timing and scale in policy mixes for sustainable transitions: the pulp and paper industry in Sweden

Lisa Scordato, Antje Klitkou*, Lars Coenen*'***

*NIFU Nordic Institute for Studies in Innovation, Research and Education
** CIRCLE, Lund University/NIFU

NIFU

Outline of presentation

- Introduction- aim and background of the paper
- Theoretical framework
- Data and methods
- Empirical case and findings
- Discussion

Source: www.caslab.com

The paper has two aims:

- To identify which policy instruments have been effective in inducing innovation that improves both environmental sustainability and economic competitiveness in the Swedish pulp and paper industry.

- To assess to what extent these instruments have interacted to accelerate a sustainability transition in the industry and determine the importance of timing, scale and coordination in this policy mix.

Introduction: What is the background of the paper?

- We use data from a study on the role of policy instruments to improve environmental sustainability and economic competitiveness in the pulp and paper industry in Sweden.

- Funded by the Swedish Agency for Growth Policy Studies (Tillväxtanalys), and part of a government commissioned assignment analysing “Prerequisites for green structural change”.

- The study uses results from literature reviews (economic and innovation systems literature) on the development of the industry, analysis of grey literature such as reports, interviews with industrial actors conducted by the Agency and economic studies conducted by colleagues at Umeå University in Sweden.

Theoretical framework: *sustainability transitions*

- Sustainability transitions*: long term, multidimensional & co-evolutionary transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption* (Smith et al. 2005).
- Key concepts in transitions research: socio-technical regime, regime shifts (transitions), landscape, niches.
- Conceptual approaches: *strategic niche management, multilevel perspective, transition management, technological innovation systems*
- The TIS framework identifies functions, or key processes that need to be in place in a well performing innovation system.
- Important in TIS analysis is the identification of drivers and barriers to innovation and to inform policymaking.

Key processes/functions of innovation system's

1. Entrepreneurial experimentation
2. Knowledge development and diffusion
3. Guidance of the search
4. Market formation
5. Resource mobilisation
6. Creation of legitimacy

- Method: an analysis of strength and weaknesses in the system and identification of key blocking mechanisms…

- Critique on the narrow focus on the creation of novelty, in the context of sustainability transitions (Kivimaa and Kern, 2015)

Categories for regime destabilisation (destructive functions)

1. Control policies
2. Significant changes in regime rules
3. Reduced support for dominant regime technologies
4. Changes in social networks, replacement of key actors

An analytical framework to map and identify the mix of policy instruments that have the potential to drive sustainability transitions

(Kivimaa and Kern, 2015)

Source: www.pspipe.com

Policy instrument mix for sustainability transitions (adapted from Kivimaa and Kern, 2015)

Influence on creation of novelty	Policy instruments
Entrepreneurial experimentation (C1)	Policies stimulating entrepreneurship and diversification of existing firms, advice systems for SMEs, incubators, low-interest company loans, venture capital
Knowledge development and diffusion (C2)	R&D funding schemes, innovation platforms and other policies aiming to increase knowledge creation and diffusion through networking; subsidies for demonstrations; educational policies, training schemes, coordination of intellectual property rights, reference guidelines for best available technology
Guidance of the search (C3)	Goals set and framing in strategies, targeted R&D funding schemes, regulations, tax incentives, foresight exercises, voluntary agreements
Market formation (C4)	Regulation, tax exemptions, market-based policy instruments such as certificate trading, feed-in tariffs, public procurement, deployment subsidies, labelling
Resource mobilisation (C5)	Financial: R&D funding, deployment subsidies, low-interest loans, venture capital. Human: educational policies, labour-market policies, secondment of expertise
Creation of legitimacy (C6)	Innovation platforms, foresight exercises, public procurement and labelling to create legitimacy for new technologies, practices and visions.

Cont.

Influence/regime destabilisation	Policy instruments
Control policies (D1)	Policies, such as taxes, import restrictions, and regulations. Control policies, for example, may include using carbon trading, pollution taxes or road pricing to put economic pressure on current regimes. Banning certain technologies is the strongest form of regulatory pressure (e.g. phase out of fluorescent light bulbs).
Significant changes in regime rules (D2)	Policies constituting, for example, structural reforms in legislation or significant new overarching laws. Historical examples of major rule changes include the privatisation and liberalisation of electricity markets in the 1990s which completely changed the selection environment within which utilities were operating
Reduced support for dominant regime technologies (D3)	Withdrawing support for selected technologies (e.g. cutting R&D funding, removing subsidies for fossil fuel production or removing tax reductions for private motor transport).
Changes in social networks, replacement of key actors (D4)	Balancing involvement of incumbents for example in policy advisory councils with niche actors; formation of new organisations to take on tasks linking to system change

Our approach

- We apply the function framework combining processes important for creation of novelty with destabilising functions
- We make a more detailed analysis of a limited set of instruments, their development over time, coordination and we include the importance of scale
- The analysis especially focusses its attention on the importance of climate and energy policy instruments and less on RD&I instruments
- We used interview with target group actors to assess how they interpret the importance of the effectiveness of the policy instruments and how they have shaped their strategies

Data and methods

- Data sources:
  - Literature reviews on the development of the PPI in Sweden (Scordato et al., 2013),
  - Document analysis,
  - Interviews conducted by the agency,
  - Economic studies conducted by our colleagues at Umeå University in Sweden (Bergquist & Andersson, 2013),
  - IEA databases on climate change and energy efficiency policies and measures.

- Distinguish between sector specific policies, climate and energy policies with relevance for the specific industries, and more generic innovation policies
- Assess the development of the policy mix over time and at different levels, both for niche creation and for regime destabilisation.
- Historical narrative of the transition towards environmental sustainability of the PPI in Sweden from the 1960's until today.
- Apply stepwise the theoretical framework on the analysis of how the policy mix has influenced the transition process.
  - Firstly, we categorized the different functions of the policy instruments in the transition process
  - Secondly, we assessed the intended and unintended effects of the different policy instruments and their overall role in the transition process.

Sustainability transitions in the Swedish pulp and paper industry

- A key industry for the Swedish economy
- the world's second largest exporter of paper, pulp and sawn timber
- The industry is dominated by few actors
- Traditionally the competitiveness based on low energy prices, skilled work force, high quality forest resources, efficient transportation infrastructure and efficient product and process development
- An example of a industry, which has gone through a successful greening process
- A serious polluter in the 1960s; largely a sustainable industry today
- In an international perspective, the Swedish pulp and paper industry has the lowest carbon emissions per tonne of product in the world followed by Norway, Finland and Canada, (IEA, 2007)

Policy mixes for sustainability transitions

Policy instrument	Goals/Intended effects	Role in transition
Environmental legislation and requirement for individual licences (1969)	Control policies (D1)	The regulatory policy initiated an extensive transition in the forest industry. Success criteria: clearly defined binding goals, flexible implementation and competent, solution-oriented dialogue between industry and the regulatory authorities.
National energy policies (in the ’70 and ’80)	Guidance of the search (C3); Knowledge development and diffusion (C2); Resource mobilisation (C5).	The oil crises and the redirection of the Swedish energy system away from fossil fuels in the 70’ and 80’ represent important historical dynamics that accelerated the transition.
Energy Research programme (1975)	Knowledge development and diffusion (C2); Resource mobilisation (C5).	Provided R&D knowledge base and R&D resources for introduction of new technology.
Biofuel programme (1992)	Knowledge development and diffusion (C2); Resource mobilisation (C5).	Provided R&D knowledge base and R&D resources for introduction of new technology.
NO_x charge (1992)	Control policies (D1)	The NOX charge has contributed to lowering nitric oxide emissions from energy producers
Carbon dioxide and sulphur tax (1991)	Control policies (D1)	The CO2 tax has played some part in the transition.

Cont.

Policy instrument	Goals/Intended effects	Role in transition
Deregulation of the electricity market (1996)	Guidance of the search (C3); Significant changes in regime rules (D2).	Rising electricity prises had an important effect on energy efficiency investments.
Electricity Certificate System-ECS (2003)	Market formation (C4); Entrepreneurial experimentation (C1).	The ECS had an important effect in terms of investments in electricity production based on biomass. But limited effect in terms of innovation. It was a driving force for investments in new turbines in chemical pulp mills and in wind energy.
Programme for Energy Efficiency in energy intensive industries- PFE (2005)	Guidance of the search (C3); Knowledge development and diffusion (C2); Control policies (D1).	The PFE has led to increased investments in energy efficiency measures. Process innovations at the mills were fostered by the introduction of the Swedish Standard for Energy Management Systems (EMS), which is an important part of the PFE.
EU-Emission Trading Scheme – EU-ETS (2005)	Control policies (D1)	Limited effect on the transition (concerning a greening of the industry and developing low carbon solutions).

Discussion

- Destabilising policies (D1-2) have been crucial for accelerating the transition process of the industry
- The introduction of environmental legislation and requirements for individual licences in 1969 represents an essential control policy in the transition process.
- Combinations of changes in the landscape (climate change and increased international competition), reduced support for dominant regime technologies (D3) combined with instruments influencing the direction of search (C3) were of fundamental importance.
- Policy instruments introduced after the 1990s have only had some part in the transition
- The sector has nevertheless continued to invest in energy efficiency measures and in green electricity production, mainly as a cost- reduction strategy due to volatile and increasing electricity prices

Cont.

- The deregulation of the Swedish electricity market, introduced in 1996 was induced significant changes in regime rules (D2) and had important effects on energy efficiency investments and on other investment patterns.
- After the 1990s, the policy mix was characterised by generic instruments (mainly taxes and charges) with a clear climate policy focus- no significant impact
- In terms of guiding the search (C3) and of creating a market (C4) the Programme for Energy Efficiency in energy intensive industries (PFE) and the Electricity Certificate System (ECS) appear to have had a certain impact.
- National policies appear to have been significantly more effective than the supranational once
- The instruments included in our analysis have to a less extent had an effect on innovation in the sector,
- Important exogenous factors: price of oil and national policy for oil independence, rising electricity prices, environmental concern of consumers and society

Observations on the importance of *timing, scale and coordination*

- No single policy instrument is capable of achieving a transition
- Destabilizing policies seem to be needed prior to novelty creation policies in order for 'innovation policy instruments' to be effective.
- Such destabilisation policies often target the industry as a whole: initially introduced at the national level, but since entry to EU increasingly at the European level.
- More specific instruments, targeting particular functions of the innovation systems (e.g. PFE and carbon tax), require 'on-the-ground' policy intelligence and benefit from close coordination and interaction with industry.

Thank you for your attention!

Contact: lisa.scordato@nifu.no

Source: www.meltwater.com

The impact of the German policy mix on technological and structural change in renewable power generation technologies

GRETCHEN
policy mix for renewables

Do policy mix characteristics matter for (eco-)innovation?

A survey-based exploration for manufacturers of renewable power generation technologies in Germany

Presentation at the 5th EU-SPRI conference
Helsinki, June 10-12, 2015

Session 5C: Changing Innovation Policy and Governance for Sustainability

Karoline S. Rogge (Fraunhofer ISI, SPRU - University of Sussex)
Joachim Schleich (Fraunhofer ISI, Grenoble Ecole de Management)

Federal Ministry of Education and Research

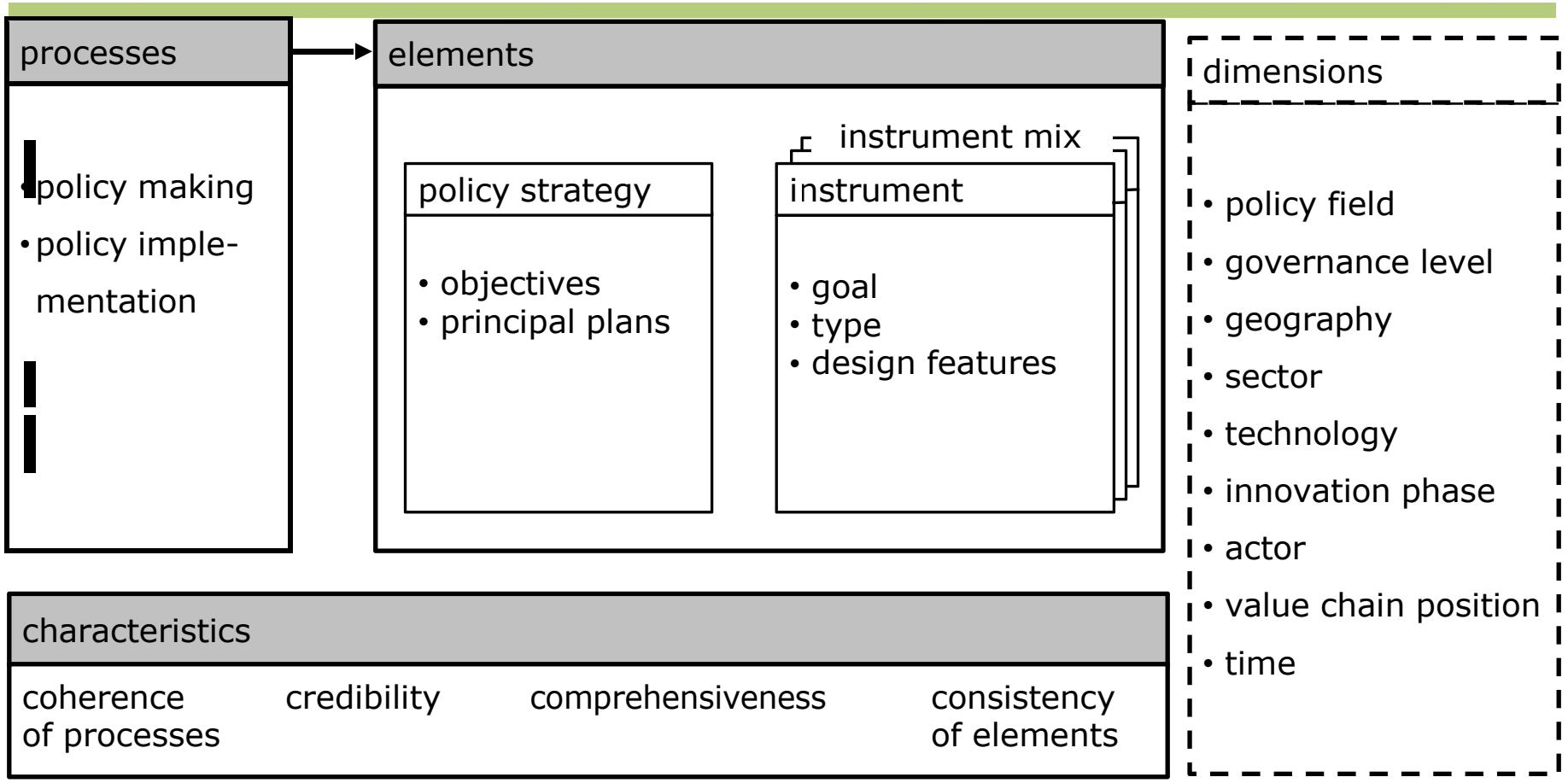
Fraunhofer ISI

gws

Motivation

- Eco-innovations one requirement of sustainability transitions
  (del Río González 2009a, Markard et al 2012, Quitzow 2015)
- But: multiple market, system and institutional failures
  (Lehmann 2010, Weber and Rohracher 2012)
- Calls for a policy mix
  - Climate and environmental policy (OECD 2007, Matthes 2010, IEA 2011a)
  - Innovation policy (Nauwelaers et al. 2009, Flanagan et al. 2011, Wieczorek and Hekkert 2012, Borras and Edquist 2013, Magro and Wilson 2013)
- Focus on instrument interactions in literature
  (del Río González 2009b; Boekholt 2010; de Heide 2011; IEA 2011b; Guerzoni, Raiteri 2015)
- But: redirecting innovation towards environmental objectives suggests need for broader policy mix concept
  (Schmidt et al 2012; Rogge and Reichardt 2013, 2015)

Integration of different streams to comprehensive policy mix concept



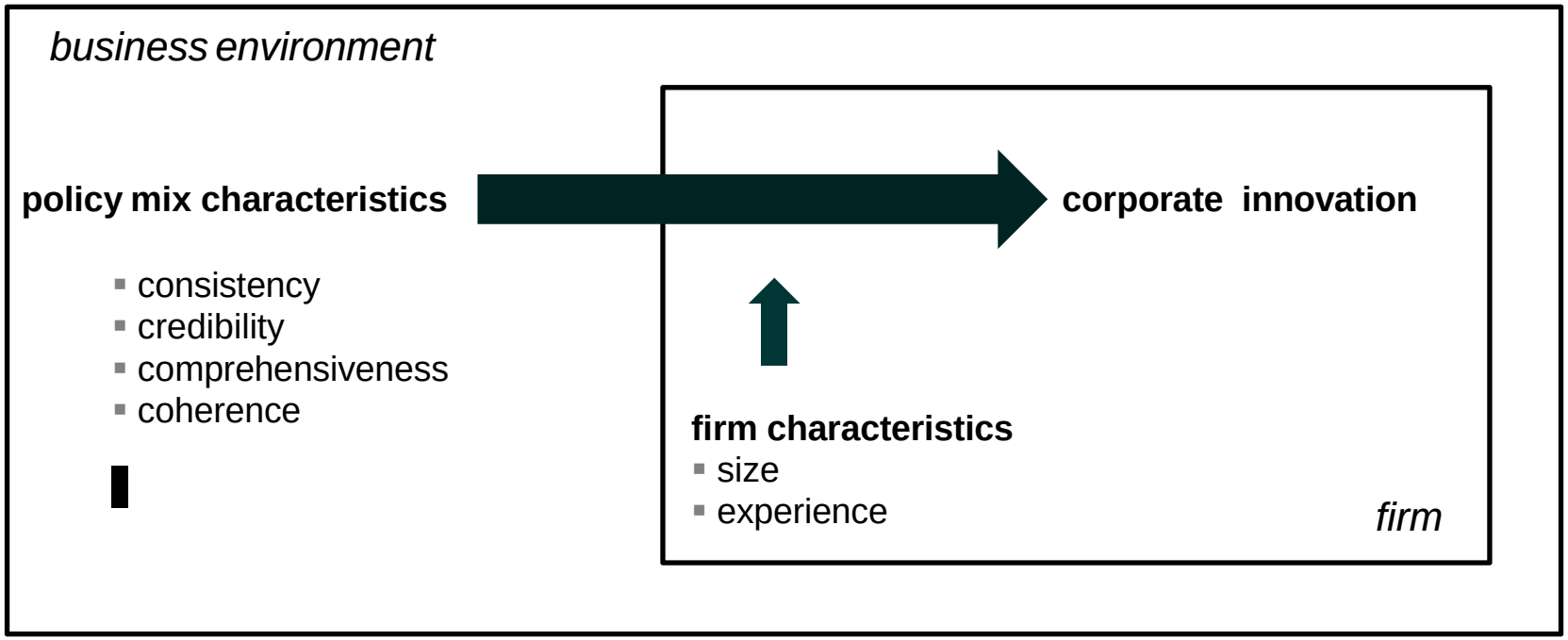
Source: Rogge and Reichardt (2015), www.gretchen-project.de

Agenda

① Motivation and policy mix
② Research question and hypotheses
③ Research case
④ Method
⑤ Results
⑥ Conclusion

Research question

- How do policy mix characteristics impact firm-level innovation activities?



Hypotheses:
Positive links b/w 4C & innovation

GRETCHEN
policy mix for renewables

H1: CONSISTENCY

The higher the *consistency* of the policy mix, the higher a firm's innovation expenditures.

H2: CREDIBILITY

The higher the *credibility* of the policy mix, the higher a firm's innovation expenditures.

H3: COMPREHENSIVENESS

The higher the *comprehen-siveness* of the policy mix the higher a firm's innovation expenditures.

H4: COHERENCE

The higher the *coherence* of the policy mix, the higher a firm's innovation expenditures.

d

Agenda

① Motivation and policy mix
② Research question and hypotheses
③ Research case
④ Method
⑤ Results
⑥ Conclusion

Research case: climate change challenge, energy transition, inno

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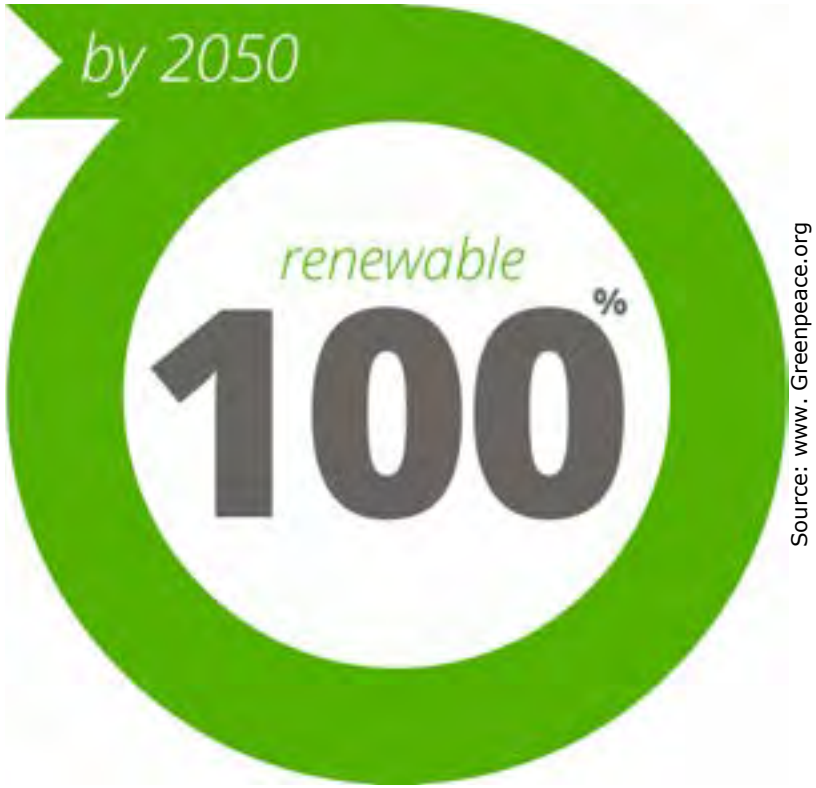
policy mix for renewables

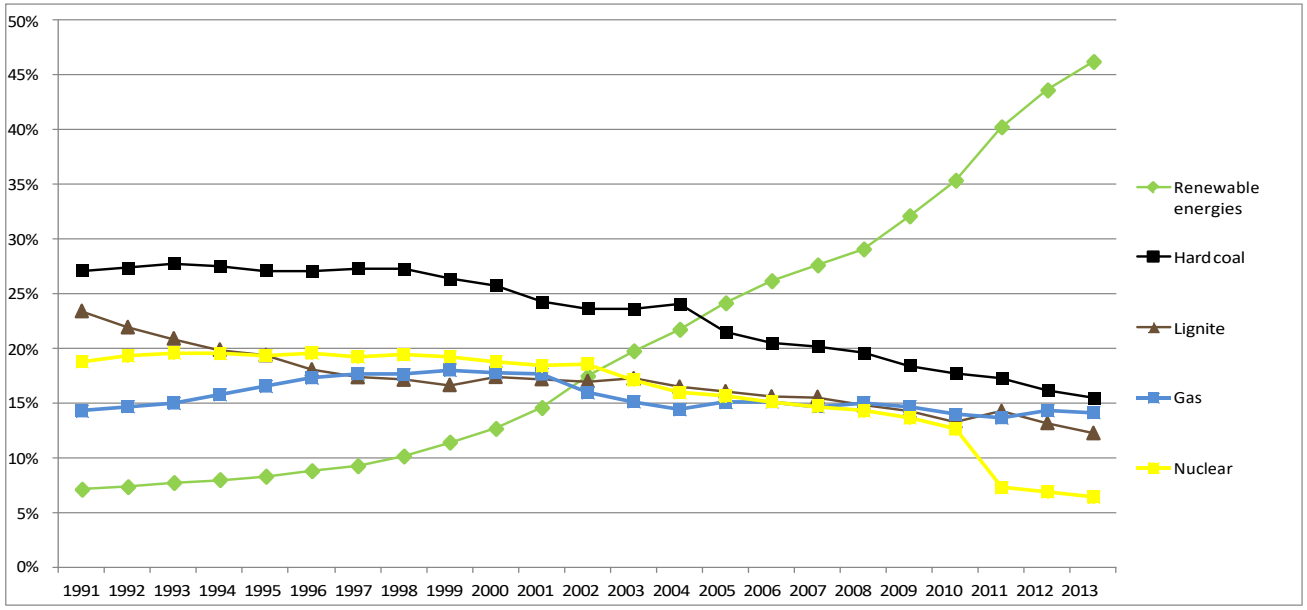
- Decarbonization of energy system to address climate change
- Key role of renewables
  → requires redirecting and accelerating technological change
- Focus on manufactures b/c supplier dominated sector
  (Pavitt 1984)



Source: www. Greenpeace.org

Research Case: German *Energiewende*

Development of technologies' shares of electricity generating capacities in Germany



Source: BMWi, 2014d, Fig. 4.5 (own translation)

- Target: 80% RES generation by 2050 (ca. 25% in 2014)
- Rich policy mix

Agenda

① Motivation and policy mix
② Research question and hypotheses
③ Research case
④ Method
⑤ Results
⑥ Conclusion

METHOD:
Company innovation survey

- Questionnaire builds on CIS:
  - Adjusted for research case
  - New questions for policy mix
- Creation of database of manufacturers offering equipment, components, and final products for renewable power generation
- Pilot: expert consultation, initial test
- In the field: April 9 – Juli 22, 2014
- CATI, interview duration: ca. 30 min
- Response rate: ca. 36% (n=390)

METHOD: Regression analysis

- Bivariate Tobit model to estimate R&D expenditures equations for 2014 and 2015 (Greene 2012)
- Captures possible correlations between R&D expenditures in different years
- Simulated maximum likelihood estimations with STATA 13 (Barslund 2009)

Agenda

① Motivation and policy mix
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Technology push and demand pull: Regression results (base model)

VARIABLES	*base model* R&D exp. 2014	R&D exp. 2015
technology push (domestic & EU)	0.290***	0.270**
	(0.002)	(0.012)
demand pull (global)	2.399***	4.396***
	(0.006)	(0.000)
firm size	0.637***	0.693***
	(0.001)	(0.002)
firm experience	1.088*	1.347*
	(0.065)	(0.053)
wind	2.804***	2.306**
	(0.003)	(0.045)
constant	-7.428**	-10.637**
	(0.033)	(0.012)
Observations	215	215

Robust pval in parentheses; *** p<0.01, ** p<0.05, * p<0.1

- Highly significant positive correlation between TP and DP and R&D expenditures
- R&D expenditures higher for larger firms (with more experience in RE)
- Significant difference in level of R&D expenditures b/w wind and non-wind firms

Consistency: Overarching definition

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DEFINITION

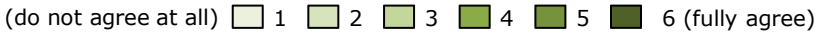
"Consistency captures how well the elements of the policy mix are aligned with each over, thereby contributing to the achievement of policy objectives. It may range from the absence of contradictions to the existence of synergies within and between the elements of the policy mix." (Rogge and Reichardt 2015, p. 15)

Consistency can be analyzed at three levels:
1st level: consistency of the policy strategy
2nd level: consistency of the instrument mix
3rd level: consistency of the instrument mix with the policy strategy

2nd level consistency: definition and operationalisation

"The instruments in an instrument mix are consistent when they reinforce rather than undermine each other [..] and inconsistent when they work against each other and are counterproductive."
(Rogge and Reichardt 2015, p. 16)

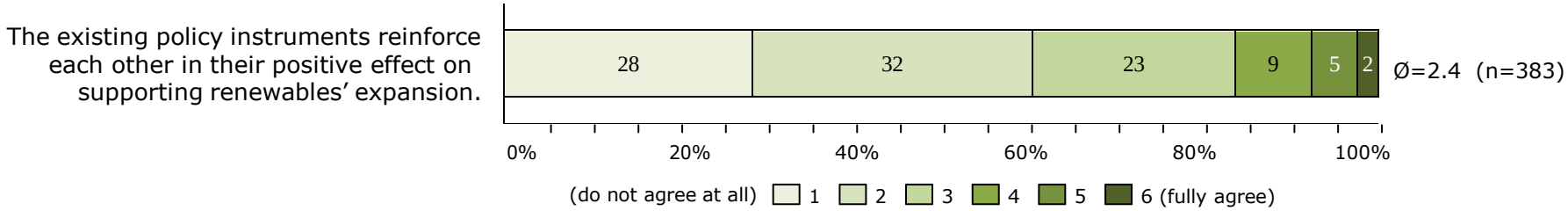
- Operationalisation



  - The existing policy instruments reinforce each other in their positive effect on supporting renewables' expansion.

2nd level consistency: Descriptive results

The following question refers to the policy instruments to promote renewable electricity generation in Germany and is with regard to your RE branch.



- Majority of companies see no synergies between instruments

2nd level consistency: Regression results

VARIABLES	*instrument mix consistency* R&D exp. 2014	R&D exp. 2015
technology push (domestic & EU)	0.309***	0.306***
	(0.002)	(0.008)
demand pull (global)	2.438***	4.318***
	(0.006)	(0.000)
firm size	0.640***	0.678***
	(0.001)	(0.003)
firm experience	1.030*	1.305*
	(0.077)	(0.054)
wind	2.356**	1.647
	(0.012)	(0.147)
2nd level consistency (IM)	1.664	2.745**
	(0.142)	(0.046)
Constant	-8.429**	-12.070***
	(0.020)	(0.005)
Observations	213	213

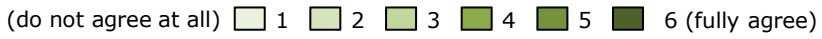
Robust pval in parentheses; *** p<0.01, ** p<0.05, * p<0.1

- Lends support for H1.2: positive link between perceived synergies in the instrument mix and R&D expenditures (2015)
- Other variables remain significant with positive sign (largely true for all other models, too)

1st level consistency: definition and operationalisation

> Consistency of the policy strategy suggests that objectives can be achieved simultaneously without any significant trade-offs, that principal plans ought to be free of contradictions or mutually supportive, and that these plans should be consistent with policy objectives. (Rogge and Reichardt 2015, p. 16)

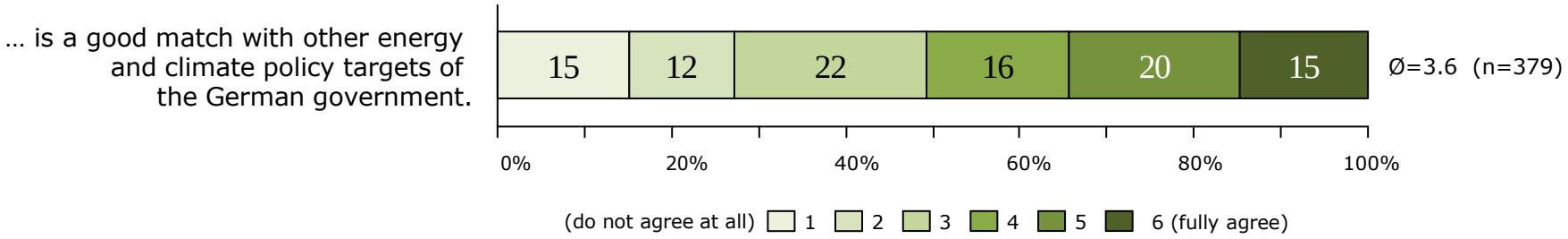
- Operationalisation



  - The planned expansion target for renewable energies in Germany up to 2025 is a good match with other energy and climate policy targets of the German government.

1st level consistency: Descriptive results

The planned expansion target for renewable energies in Germany up to 2025 …

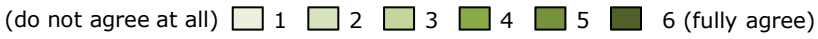


- Very different perceptions on consistency of targets, but on average relatively high

3rd level consistency: definition and operationalisation

"Third level policy mix consistency addresses the interplay of the instrument mix and the policy strategy. This overall policy mix consistency is characterized by the ability of the policy strategy and the instrument mix to work together in a unidirectional or mutually supportive fashion (Howlett, Rayner 2013), thereby contributing to the achievement of policy objectives."
(Rogge and Reichardt 2015, p. 16)

- Operationalisation

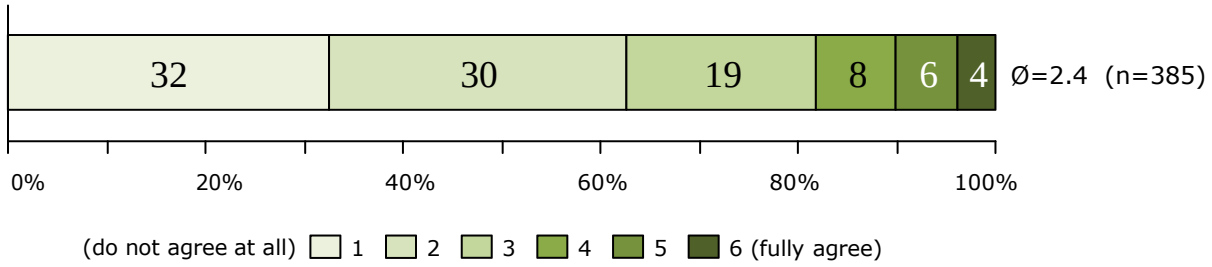


  - The planned expansion target for renewable energies in Germany up to 2025 can be achieved with the help of existing policy instruments and measures.

3rd level consistency: Descriptive results

The planned expansion target for renewable energies in Germany up to 2025 …

… can be achieved with the help of existing policy instruments and measures.



- Majority of companies see mismatch of instrument mix and ambitious targets

Adding 1st and 3rd level consistency: Regression results

VARIABLES	*consistency_1_2_3* R&D exp. 2014	R&D exp. 2015
technology push (domestic & EU)	0.288***	0.263**
	(0.004)	(0.020)
demand pull (global)	2.287***	4.165***
	(0.010)	(0.000)
firm size	0.628***	0.659***
	(0.001)	(0.002)
firm experience	1.044*	1.385**
	(0.075)	(0.041)
wind	1.962**	1.065
	(0.038)	(0.345)
1st level consistency (PS)	0.377	-0.039
	(0.728)	(0.975)
2nd level consistency (IM)	0.731	1.460
	(0.568)	(0.338)
3rd level consistency (PS-IM)	1.790	3.103**
	(0.142)	(0.032)
Constant	-8.860**	-12.813***
	(0.011)	(0.002)
Observations	208	208

Robust pval in parentheses; *** p<0.01, ** p<0.05, * p<0.1

- Lends support for H1.3: positive link between overal policy mix consistency and R&D expenditures (2015)
- However, no more support for H1.2: instrument mix consistency insignificant
- H1.1 not supported: perceived fit of targets without effect on R&D expenditures

Credibility: definition and operationalisation

Credibility refers to "the extent to which the policy mix is believable and reliable (Newell, Goldsmith 2001), both at an overall level and at the level of its elements and processes." (Rogge and Reichardt 2015, p. 18)

Operationalisation

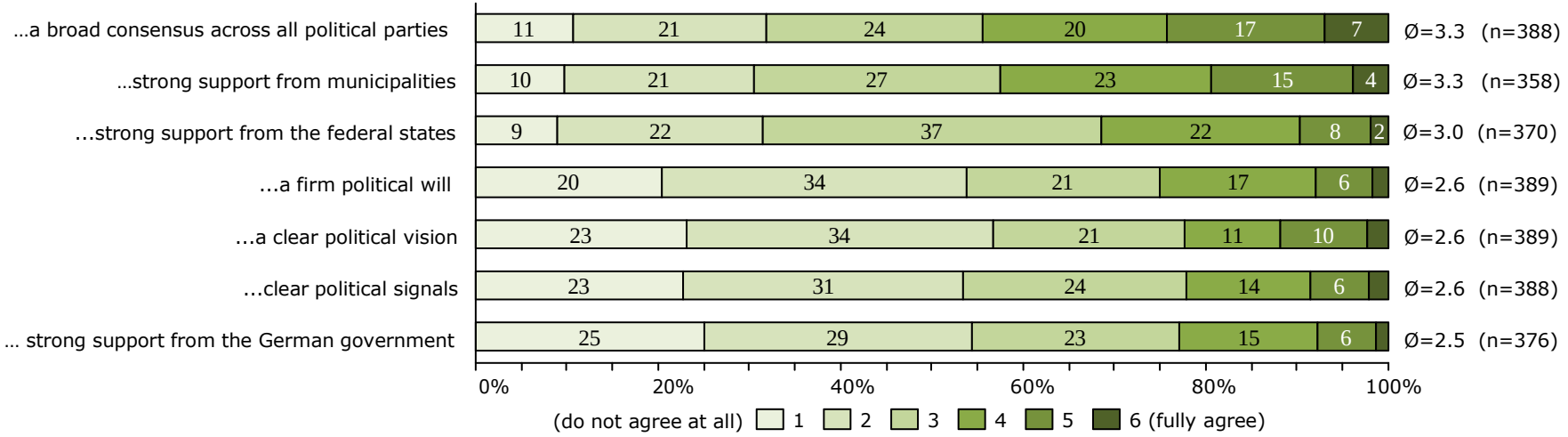
(do not agree at all) 1 2 3 4 5 6 (fully agree)

Concerning the increase of electricity generation from renewable energies in Germany, there is …

- a broad consensus across all political parties
- a clear political vision
- a firm political will
- clear political signals
- strong support from the German government
- strong support from Federal States
- strong support from municipalities

Credibility: Descriptive results

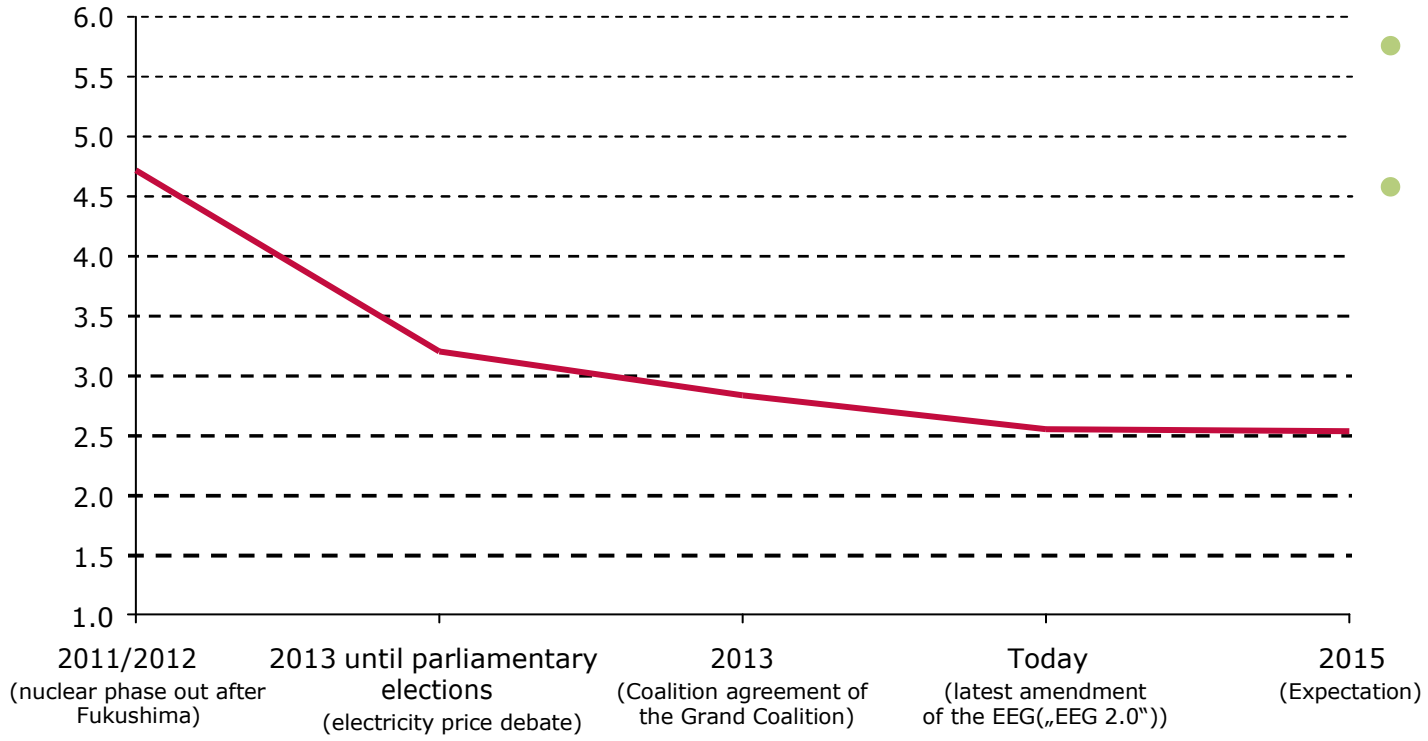
Please say how much you agree with the following statements about the policy framework conditions for supporting renewable energies in Germany at the present time.
Concerning the increase of electricity generation from renewable energies in Germany, there is ...



- Cross-party consensus and support on a local level stand out
- Fairly low level of perceived policy mix credibility

Credibility:
Change in perceived political will

How strong do you think the political will was/is of the respective German government at the following points in time regarding the promotion of renewable electricity generation?



- Peak around Fukushima
- Stabilization in 2014 / 2015, but on a low level

Credibility:
Principal component factor analysis

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F1: national credibility

- a broad consensus across all political parties
- a clear political vision
- a firm political will
- clear political signals
- strong support from the German government

F2: regional credibility

- strong support from Federal States
- strong support from municipalities

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Credibility: Regression results (basic model)

VARIABLES	*credibility* R&D exp. 2014	R&D exp. 2015
technology push	0.300***	0.327***
	(0.001)	(0.005)
demand pull	2.550***	4.524***
	(0.007)	(0.000)
firm size	0.604***	0.738***
	(0.001)	(0.002)
firm experience	1.024*	1.600**
	(0.086)	(0.040)
wind	2.039**	1.652
	(0.038)	(0.203)
national credibility	2.611*	3.832*
	(0.098)	(0.070)
regional credibility	1.247	1.716
	(0.345)	(0.327)
constant	-9.472**	-16.710***
	(0.010)	(0.001)
observations	204	204

Robust pval in parentheses; *** p<0.01, ** p<0.05, * p<0.1

- Weak support for H2: significant positive correlation of policy mix credibility at national level with R&D expenditures
- However, clear support when accounting for interplay with 3rd level consistency!

Dependency of credibility and consistency: regression results

VARIABLES	*credibility_consistency 2*		*credibility_consistency 3*	
	R&D exp. 2014	R&D exp. 2015	R&D exp. 2014	R&D exp. 2015
technology push	0.309***	0.305***	0.298***	0.270***
	(0.001)	(0.006)	(0.001)	(0.009)
demand pull	2.273**	4.130***	2.106**	4.090***
	(0.011)	(0.000)	(0.019)	(0.000)
firm size	0.666***	0.710***	0.624***	0.664***
	(0.000)	(0.001)	(0.001)	(0.001)
firm experience	0.949	1.203*	1.065*	1.362**
	(0.103)	(0.071)	(0.066)	(0.038)
wind	2.266**	1.552	2.094**	1.233
	(0.015)	(0.169)	(0.023)	(0.262)
2nd level consistency (IM)	3.036	4.678		
	(0.261)	(0.136)		
3rd level consistency (PS-IM)			4.669**	8.305***
			(0.049)	(0.004)
national credibility	4.341*	5.437**	4.706*	7.015**
	(0.051)	(0.044)	(0.078)	(0.032)
regional credibility				
consistency 2 - nat. credibility	-3.572	-4.697		
	(0.290)	(0.230)		
consistency 3 - nat. credibility			-4.797	-8.105**
			(0.129)	(0.033)
constant	-10.585***	-14.805***	-10.734***	-15.986***
	(0.004)	(0.001)	(0.004)	(0.000)
observations	213	213	214	214

Robust pval in parentheses; *** p<0.01, ** p<0.05,

H5: CRED-CONS

Impact of credibility depends on level of consistency.

- No support for H5 for consistency of instrument mix
- Support for H5 for PM-IM consistency (2015)
- And: consistency 3 and nat. credibility with higher significance level

Comprehensiveness: definition and operationalisation

The comprehensiveness of an instrument mix "is determined by the degree to which the instrument mix addresses all market, system and institutional failures, including barriers and bottlenecks."
(Rogge and Reichardt 2015, p. 18f.)

Operationalisation

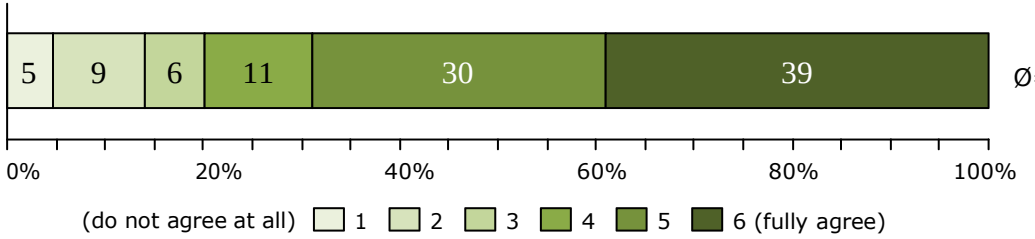
(do not agree at all) 1 2 3 4 5 6 (fully agree)

- Important flanking policy regulations are missing that push the expansion of renewables (e.g. on power market design or for grid expansion).

Comprehensiveness: Descriptive results

The following question refers to the policy instruments to promote renewable electricity generation in Germany and is always with regard to your RE branch. Please evaluate the following statements from today's perspective using a scale from 1 (do not agree at all) to 6 (fully agree).

Important flanking policy regulations are missing that push the expansion of renewables (e.g. on power market design or for grid expansion).



- More than two thirds of firms see gaps in the instrument mix

Comprehensiveness: Regression results

VARIABLES	*comprehensiveness* R&D exp. 2014	R&D exp. 2015
technology push	0.286***	0.259**
	(0.002)	(0.014)
demand pull	2.431***	4.429***
	(0.005)	(0.000)
firm size	0.636***	0.694***
	(0.001)	(0.002)
firm experience	1.099*	1.382**
	(0.063)	(0.046)
wind	2.797***	2.277**
	(0.003)	(0.047)
comprehensiveness	0.434	1.168
	(0.667)	(0.342)
constant	-7.745**	-11.523***
	(0.030)	(0.007)
Observations	215	215

Robust pval in parentheses; *** p<0.01, ** p<0.05, * p<0.1

- No support for H3: no significant positive correlation with R&D expenditures

Coherence: definition and operationalisation

Coherence refers to "synergic and systematic policy making and implementation processes contributing – either directly or indirectly – towards the achievement of policy objectives." (Rogge and Reichardt 2015, p. 17)

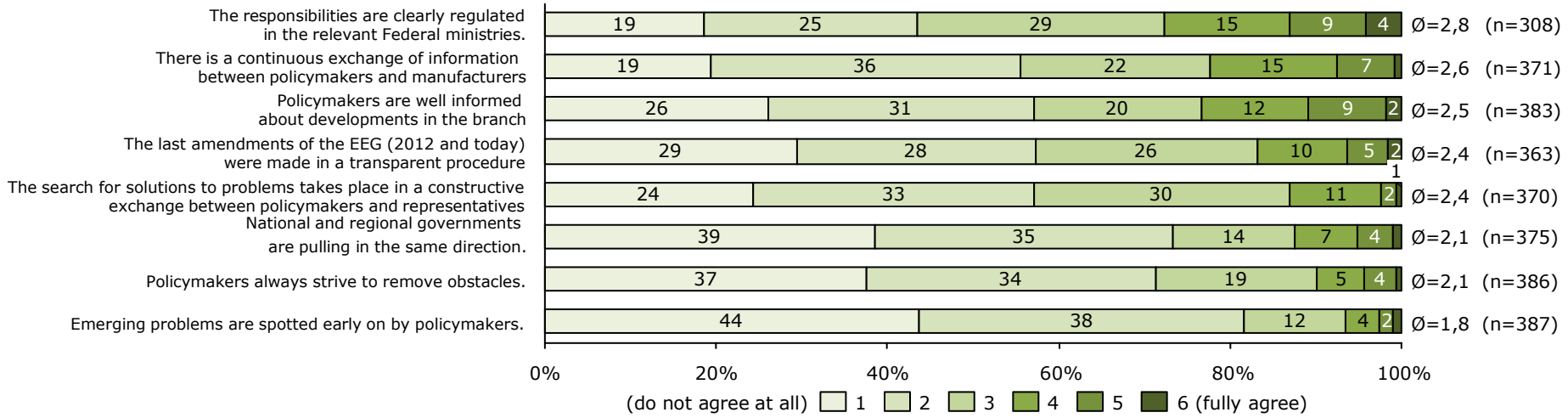
Operationalisation

(do not agree at all) 1 2 3 4 5 6 (fully agree)

- There is a continuous exchange of information between policymakers and manufacturers.
- Policymakers are well informed about developments in the branch.
- Emerging problems are spotted early on by policymakers.
- Policymakers always strive to remove obstacles.
- The search for solutions to problems takes place in a constructive exchange between policymakers and representatives of the RE branch.
- The last amendments of the EEG (2012 and today) were made in a transparent procedure.
- The responsibilities for the branch are clearly regulated in the relevant Federal ministries.
- National and Federal State governments are pulling in the same direction.

Coherence: Descriptive results

Please say how much you agree with the following statements at the present time.



- Majority of companies rather dissatisfied
- Criticism: problems not spotted early on, obstacles not always removed, lack of constructive and mutual problem solving, intransparency of EEG amendment procedure, unclear responsibilities, national-regional coordination issues

Coherence:
Principal component factor analysis

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F1: informational coherence

- There is a continuous exchange of information between policymakers and manufacturers.
- Policymakers are well informed about developments in the branch.
- Emerging problems are spotted early on by policymakers.
- Policymakers always strive to remove obstacles.
- The search for solutions to problems takes place in a constructive exchange between policymakers and representatives of the RE branch.

F2: procedural coherence

- The last amendments of the EEG (2012 and today) were made in a transparent procedure.
- The responsibilities for the branch are clearly regulated in the relevant Federal ministries.
- National and Federal State governments are pulling in the same direction.

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Coherence: Regression results

VARIABLES	*coherence* R&D exp. 2014	R&D exp. 2015
technology push	0.292***	0.271**
	(0.002)	(0.011)
demand pull	2.228**	4.115***
	(0.015)	(0.000)
firm size	0.607***	0.644***
	(0.001)	(0.003)
firm experience	1.294**	1.625**
	(0.028)	(0.016)
wind	2.752***	2.243*
	(0.004)	(0.055)
informational coherance	0.987	1.609
	(0.556)	(0.419)
procedural coherance	1.838	2.599
	(0.268)	(0.193)
constant	-9.309***	-13.281***
	(0.007)	(0.001)
observations	213	213

robust pval in parentheses; *** p<0.01, ** p<0.05, * p<0.1

- No support for H4: neither informational nor procedural coherence show significant positive correlation with R&D expenditures

Summary: policy mix consistency and credibility matter for innovation

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policy mix for renewables

H1: CONSISTENCY ☑

The higher the *consistency* of the policy mix, the higher a firm's innovation expenditures.

H1.1: PS consistency ☒

H1.2: IM consistency (☑)

H1.3: PS-IM consistency ☑

H2: CREDIBILITY ☑

The higher the *credibility* of the policy mix, the higher a firm's innovation expenditures.

H3: COMPREHENSIVENESS ☒

The higher the *comprehen-siveness* of the policy mix the higher a firm's innovation expenditures.

H4: COHERENCE ☒

The higher the *coherence* of the policy mix, the higher a firm's innovation expenditures.

d

Agenda

① Motivation and policy mix
② Research question and hypotheses
③ Research case
④ Method
⑤ Results
⑥ Conclusion

Contribution

- Explorative study
- Operationalizations for policy mix characteristics
- Suggests policy mix consistency and credibility matter for innovation
- But: data limitations (one country, one sector)

Implications

- Research implications - deepen empirical insights:
  - Cross-country survey
  - Explore relevance beyond energy

- [redacted]licy implications for transformative innovation policy:
  - consistent overarching policy mix important (i.e. not only consistent instrument mix)
  - Recognize importance & understand formation of credibility

[redacted]

Thank you!

Looking forward to your comments and questions!

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Learning from demonstration projects in sustainable energy and transport

- a work-in-progress

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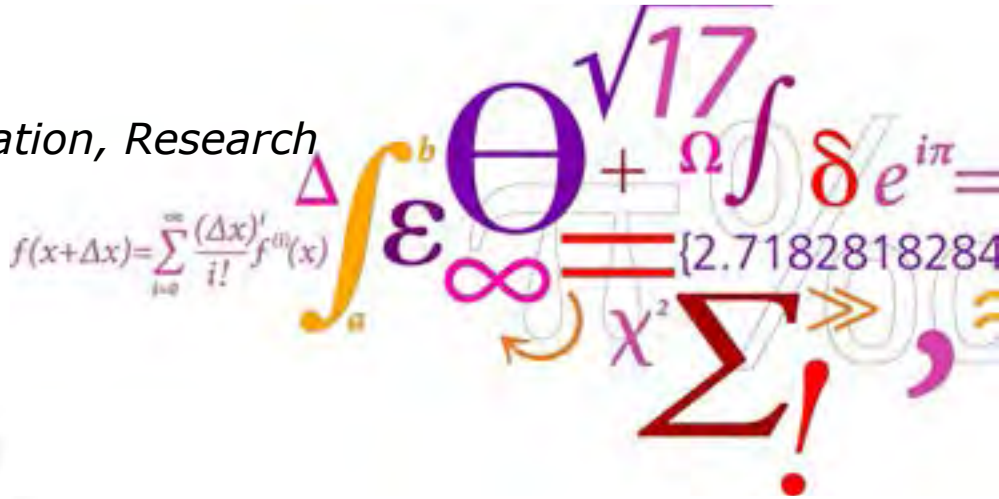


DTU Management Engineering
Department of Management Engineering

- Background – demonstration projects in energy and transport
- Demonstration, innovation and learning
- Towards our aim
- Empirical foundation and the cases
- Some findings
- Acknowledgement

Background

The InnoDemo project

demonstration projects' and trials' role in the transition towards more sustainable energy and transport systems

- important role in the sustainable transition of socio-technical systems (Brown, Vergragt, Green, Berchicci 2004; Geels, 2005; Geels, Schot 2010)
- shorten the time from development of a technology to widespread adoption by industrial and commercial users (Lefevre, 1984).
- one way to bridge 'valley of death' between research in new technologies and dissemination of these technologies at a market (Weyant, 2011).

Background

- Early examples of public funds available for technological field trials are said to be found in the 1970s in the US (Macey & Brown, 1990)

- Demonstration and trail projects and programmes have played a central role in the development and dissemination of energy technologies for over a century

Background

1890's:

- A well-documented example is Poul la Cour's facility for wind turbines,
- Experiments with the technology
- Demonstration of practical feasibility
- Training of practitioners
- Dissemination to widespread use of electricity producing wind turbines two decades later (Arnfred, 1964).

Background

1970's:

- Test stations for renewable energy technologies (e.g. wind turbines)
- Development, demonstration and information programs for renewable energy
- Also well described in literature

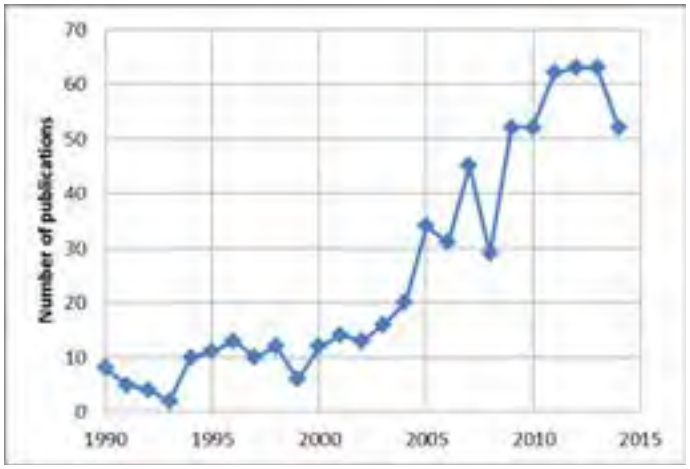
Background

'Recently':

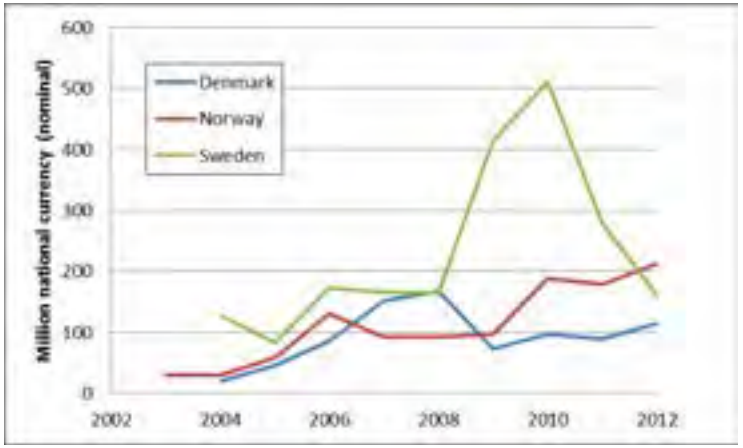
- Growing interest in academia and policy in the role of demonstration projects

- Governmental expenditures on demonstration projects was in 2003 added to the original Frascati Manual typology of the IEA/OECD's data collection on R&D indicators

- Increase in expenditure (?)



Number of publications in SCOPUS with 'energy policy' and 'demonstration' in title, abstract or keyword. Raw data !!



Development in governmental expenditures on 'Demonstration' according to IEA's RD&D Statistics

Demonstration, innovation and learning

- Learning and the flow of knowledge between the actors are central issues in the innovation systems approach (e.g. Lundvall, 1992, Freeman, 1996)

- The innovation literature has a rich conceptual framework for the relationship between innovation, learning and knowledge; e.g.

  - Tacit and codified knowledge (e.g. Polanyi 1967, Nonaka & Takeuchi 1995)

  - Learning by doing, learning by using, learning by searching, learning by interacting (e.g. Arrow, 1962, Rosenberg, 1982, Andersen & Lundvall 1988, Johnson 1992, Garud, 1997)

  - Policy learning (e.g. Mytelka & Smith 2002)

Towards our aim

- A large literature on demonstration and trail projects in sustainable energy and transport. However, analyses most often have the perspective of 'achievement of goals' rather than 'lessons learned' (Hendry, Harborne, Brown, 2010)

- Only few empirical studies of the learning from demonstration and trail projects in sustainable energy and transport – e.g.:
  - A study from Utrecht (Kamp, Smits, Andriesse, 2004) – only secondary data
  - Studies at Cass Business School (Brown & Hendry, 2009; Harborne & Hendry, 2009; Hendry & Harborne, 2011; Hendry, Harborne, & Brown, 2010)

- This paper aims to contribute to this research gab

Empirical foundation

The analysis is based on three sources of empirical data

- database of 433 projects started in the period 2002-2012
  - Denmark (224 projects)
  - Norway (107 projects)
  - Sweden (102 projects)

- survey mailed to 370 project leaders of which 80 responded and only between 46 and 62 answered the individual questions (12% - 17% response rate).

- 26 interviews with project managers and project participants involved in 17 (15) of the projects

Database - What did we collect

Project data

- Project title
- Start and end year
- Total project budget and program subsidy
- Organisational setup
- Demonstration site (incl. NUTS codes)
- Project/data URL
- Project objective (assessment based on project description)
- type of technology (IEA Codes)
- Project leader and collaborating partners; incl. organisation type and size, geographical information (incl. NUTS codes), etc.
- Etc.

Data availability
- national differences

Denmark

- Data are available and easy to access – also in English (energiforskning.dk)

Sweden

- Data are available – if you can find them (no central registration)

Norway

- Data are available and relatively easy to access – but they are confidential and (as far as I understand) only available for Norwegians

As a consequence we have two databases

Projects in the database

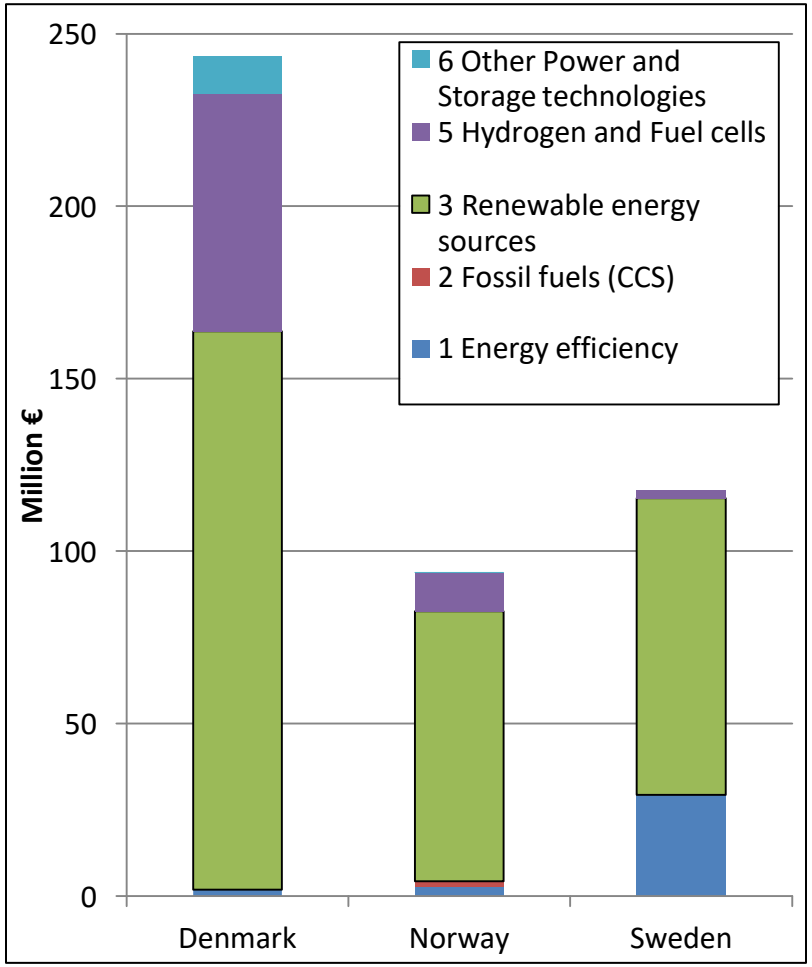
433 demonstration and trail projects in the database in total

- Denmark: 224, incl. 7 EU projects
- Norway: 107 projects
- Sweden: 102 projects

<u>Transport technologies</u>

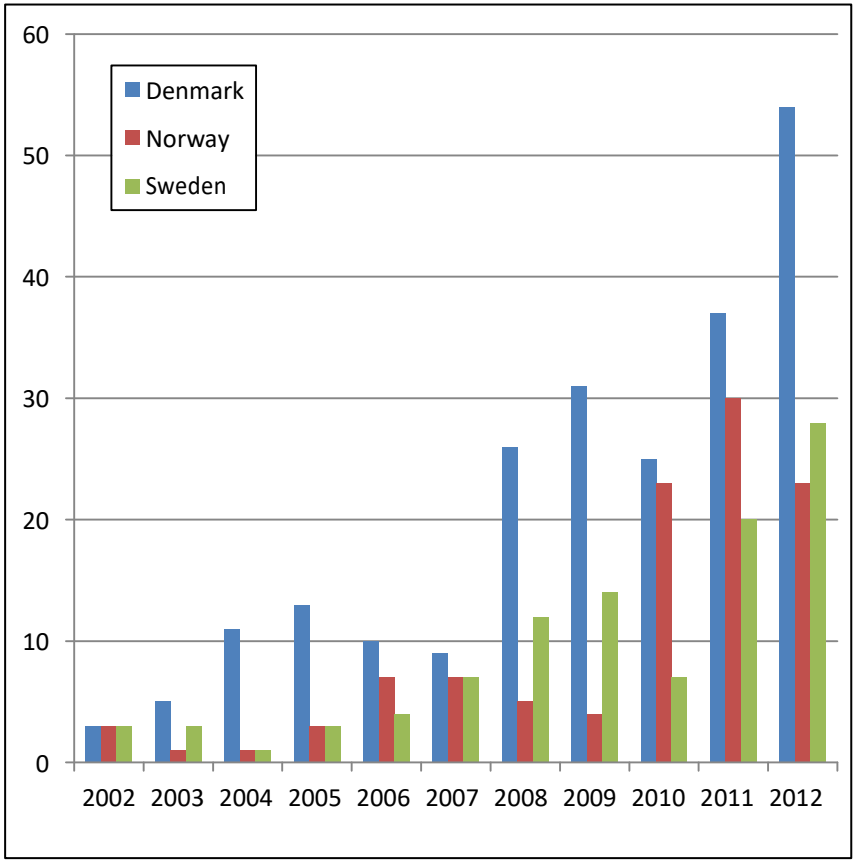
- 97 projects (22%) were concerned with transportation
  - electrical mobility
  - biofuel/biogas

Energy technologies – IEA codes

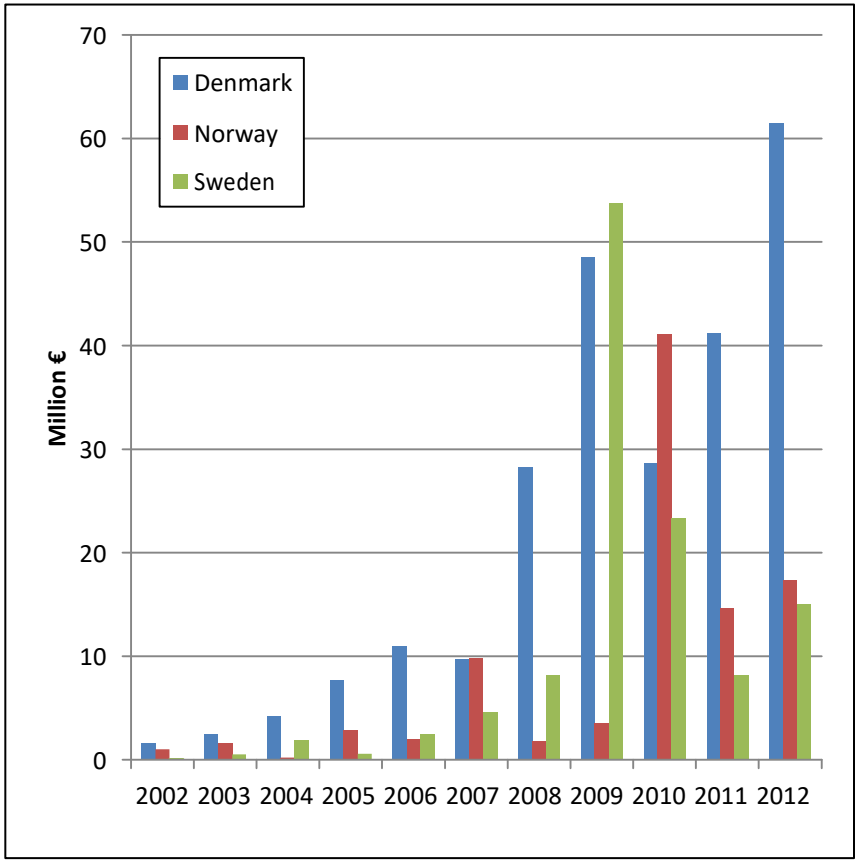


Projects in the database
- increase of demonstration and trail projects during the period

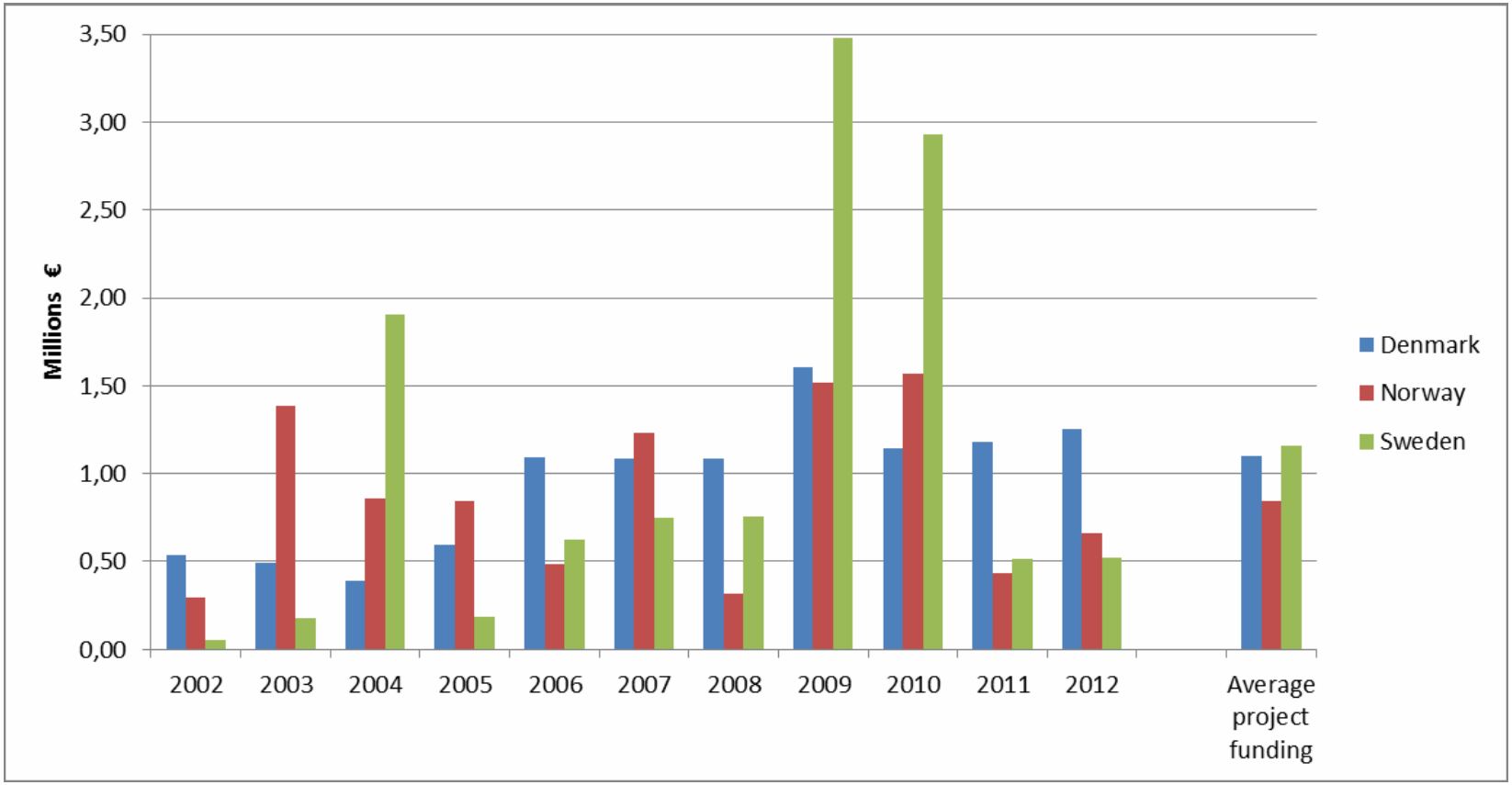
Number of projects



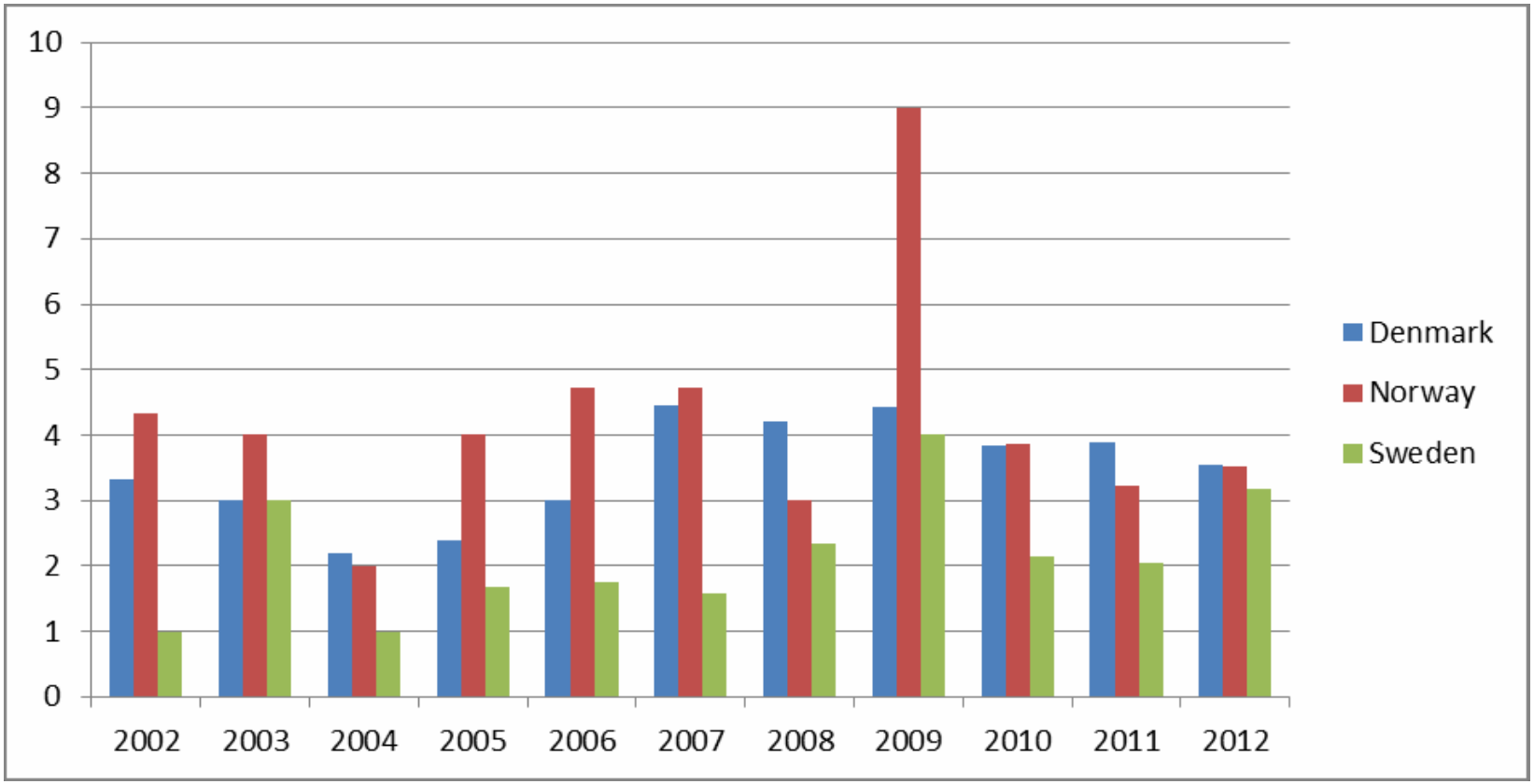
Funding of projects



Projects in the database
- average public funding of each project (current prices)



Projects in the database
- average number of partners in each project



What types of learning appears in the projects?

From different perspectives literature has discussed possible aims of demonstration and trail projects (e.g. Magill & Rogers, 1981; Lefevre, 1984; Macey & Brown, 1990; Clark & Guy, 1998; Sagar & Gallager, 2004; Raven 2005 Hellsmark, 2011; Harborne/Hendry/Brown in different combinations 2007-11)

Classical aims:

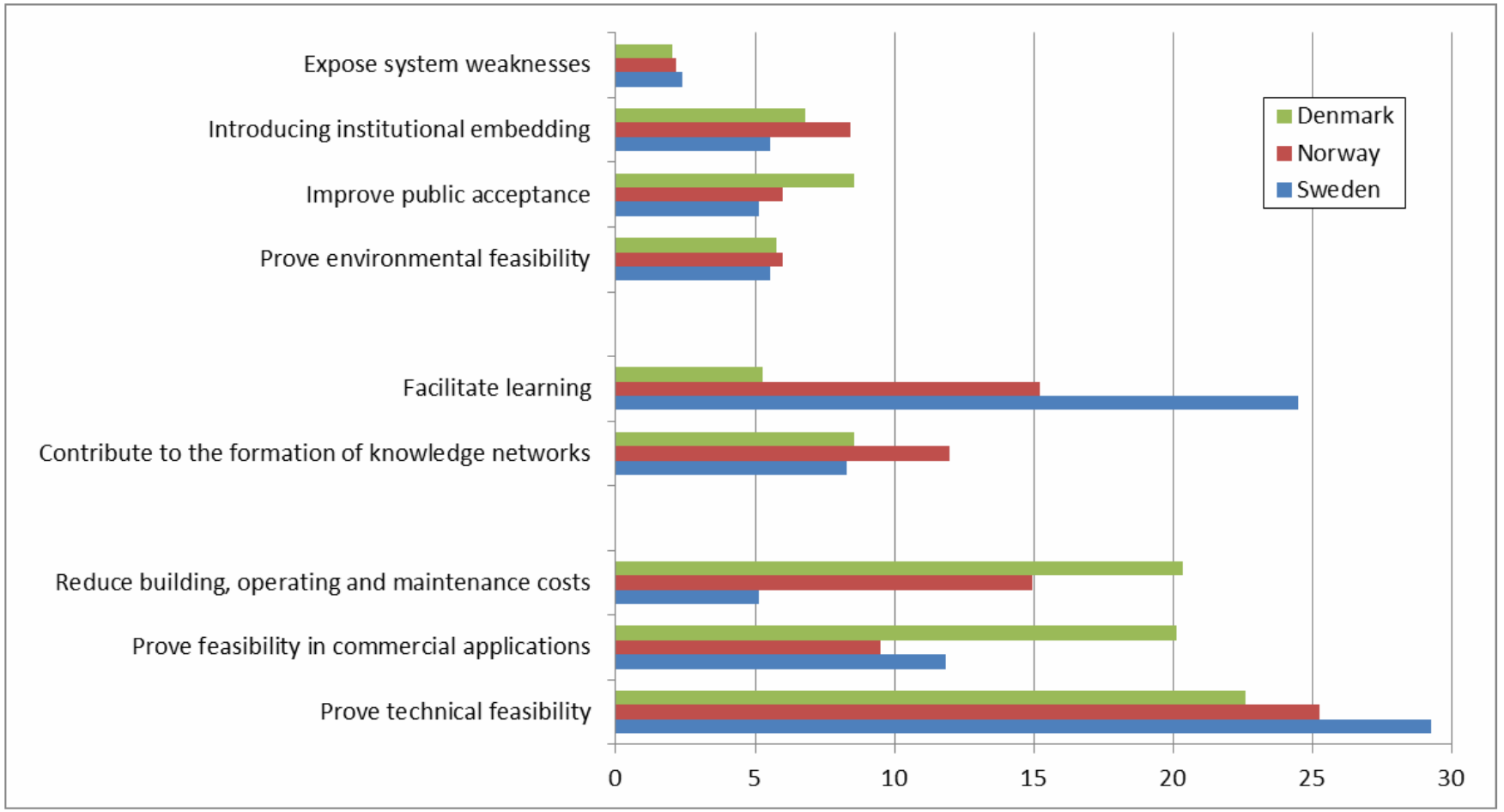
- Prove technical feasibility
- Prove feasibility in commercial applications
- Reduce building, operation and maintenance costs
- Contribute to the formation of knowledge networks
- Facilitate learning

Newer additions:

- Prove environmental feasibility
- Improve public acceptance
- Introducing institutional embedding
- Expose system weaknesses

Project aims

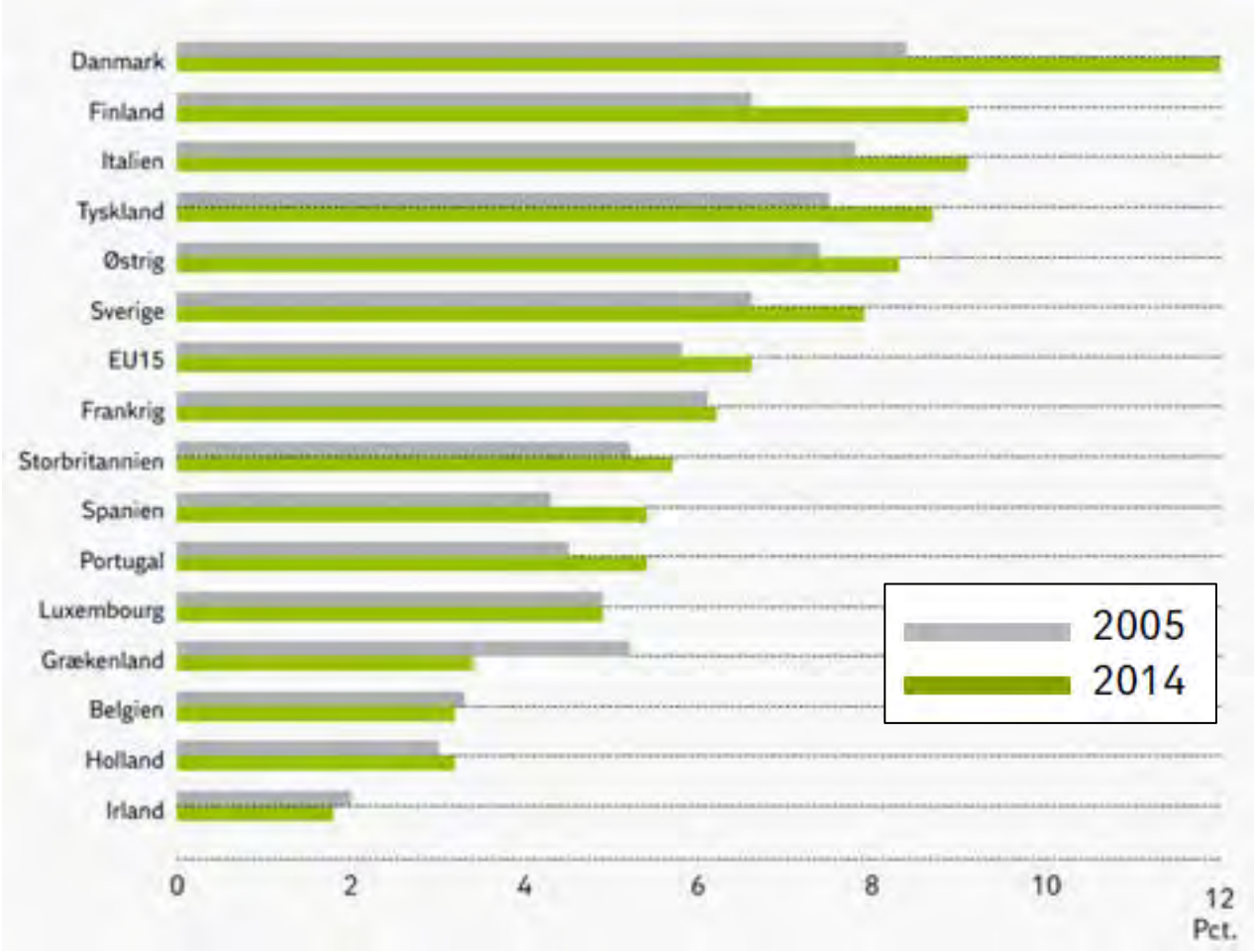
- multiple aims possible, percentage (normalized) within each country



Observations

- Danish projects have fewer aims than Swedish and especially Norwegian
- Facilitating learning is a relatively popular aim in Norwegian and Swedish projects but less popular in Danish projects
- Technical feasibility, commercial feasibility and cost reduction are equally popular aims in Denmark
- Technical feasibility is a more popular aim than cost reduction in Norway and Sweden – indicating focus on less mature technologies

Reflecting differences in commercial focus?
- energy technology's share of national export of goods (EU15)*



*) Excl. oilrigs

http://www.danskenergi.dk/Aktuelt/Arkiv/2015/April/15_04_30A.aspx

15 cases studies in the intersection of sustainable energy and transport

Denmark	Norway	Sweden
D1. Electrical cars (Clever) D2. Electrical busses (Movia) D3. Production of biofuels (Biogasol)	N1. Biogas fuelled vehicles (TINE) N2. Electrical taxis (Municipality of Trondheim) N3. Roaming for electrical vehicles (EV-Power) N4. PEM electrolyser for energy storage (REELYPEM) N5. Conversion of bio-methane to H2 and electricity (ZEG Power) N6. Fast-charging stations for electric vehicles (Zero)	S1. Diesel-Methane-mix for trucks (Volvo) S2. Electric vehicles (Innovatum) S3. H2 fuelling stations for busses (city of Stockholm) S4. Charger station for busses (Hybricon) S5. Ethanol production integrated in pulp&paper production (Innventia) S6. Gasification of black liquor (Cemrec)

Sources of information:

- Project database
- Reports and homepages for each project
- Interviews with 26 persons – typically project leaders

Interview questions on learning

- Q18: learning in general
- Q19: learning in relation to technology
- Q20: learning in relation to users and market
- Q21: learning in relation to environmental impact or safety
- Q22: learning in relation to manufacturing
- Q23: learning in relation to policy and regulation

Some observations

Expected:

- Technological learning is often limited to the expected challenges
- Learning about manufacturing was limited (due to selection of cases?), focused on supplier strategies +´challenging small sub-suppliers
- Limited learning in relation to environmental issues

Unexpected:

- Learning in relation to users and markets concerns the importance of staff (e.g. buss drivers role in dissemination, ergonomics)
- Learning related to policy and regulation. Testing/provoking existing regulation and traditions, e.g.
  - Can municipalities invest in demonstration projects?
  - Regulation on cars/busses do not fit new technologies
  - Lack of standards
- In several projects learning related to business model and access to private investments (venture capital) are very important

Towards some learnings

- **Absorptive capacity of (public) institutions**: 'Fuld scale' demonstration projects test & provoke the whole (innovation) system around a new technology – in particular existing standards and regulation as well as financial institutions (e.g. venture capital, business angles)
  - Policies towards adaption/innovation of standards and regulation must be supported – future needs must be foreseen
  - Financial institutions' learning included in early stages of demonstration projects – not added afterwards

Individual actors: Entrepreneurial persons and 'ordinary' staff key to success and dissemination (e.g. bus drivers and R&D engineers)

Methodological issues: The project emphasizes – again – that actors are fed up with questionnaires

  - We need to develop other sources of information. E.g. text mining in media coverage and social media

Acknowledgement

- Data collected and preliminary analysis carried out in the project InnoDemo funded by the **Research Council of Norway**
- Further analyses and elaboration carried out in the project Energy Innovation Systems funded by the **Danish Strategic Research Council**

- Thanks to InnoDemo key partners: **Antje Klitkou** (NIFU) and **Lars Coenen** (CIRCLE, Lund)
- Thanks to interviewers and colleagues in the three countries: **Meta B. Dam** and **Mads Borup** (Denmark), **Arne Fevolden** (Norway), **Teis Hansen** and **Alexandra Nikoleris** (Sweden)

- Thanks to the many individuals in Denmark, Norway and Sweden spending time on filling in questionnaires and giving interview.

Thank you for your attention

European Forum for Studies of Policies for Research and Innovation

INoS

DIMENSIONS OF SOCIAL INNOVATION AND THE PROMOTION OF LOCAL ECONOMIC DEVELOPMENT IN THE BRAZILIAN SEMIARID

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INoS : Grupo de Pesquisa em Inovação e Sustentabilidade
Universidade Federal do Ceará

HELSINKI, FINLAND - 2015

INTRODUCTION

This study **proposes**, holding as reference the table* presented by Tardif and Harrison (2005),

to identify the **existing and emerging dimensions for social innovation**

by studying the
Agência de Desenvolvimento Local
(ADEL – Agency of Local Development in Portuguese) and its main programs.

*The table was chosen as a tool to investigate the dimensions of social innovation due to its analytical reach regarding many previous studies, and once the work comes from the ***Centre de Recherche sur Les Innovations Sociales*** (CRISES), a Canadian institution renowned worldwide for its efforts on social innovation.

SOCIAL INNOVATION

Quoting CRISES (2012),
"social innovation is a process initiated by actors
driven to respond to a social aspiration,
to fulfil a need,
to offer a solution or
to seize an opportunity to **change social relations**,

transforming a scenario or providing new cultural guidance for improving well-being and life conditions for communities."

Moulaert et al. (2013) understand
social innovations as
"progressive acceptable **solutions to problems** related to
exclusion, depravation, alienation, lack of welfare
and to actions that contribute positively and meaningfully for human progress"

DIMENSIONS OF ANALYSIS FOR SOCIAL INNOVATION

To reach our objectives,
the classification presented by Tardif and Harrisson (2005)
was highlighted and
was produced based on the selection of 49 articles published by CRISES' members.
They presented the table named
"CRISES' Conceptual Encyclopaedia of Social Innovation"
in which they defined
5 analytical dimensions for identifying social innovations.
These main categories were

Transformations,
Innovative Character,
Innovation,
Actors and
Processes.

DIMENSIONS OF ANALYSIS FOR SOCIAL INNOVATION

Dimension TRANSFORMATION	Dimension INNOVATIVE CHARACTER	Dimension INNOVATION	Dimension ACTORS	Dimension PROCESS
Micro-context • Crisis • Rupture • Discontinuity • Structural modifications **Economic** • Emergence • Adaptation • Labour relations/ relations of production and consumption **Social** • Re-composition • Reconstuction • Exclusion/ Marginalization • Practice • Change • Social Relations	**Model** • Work • Development • Governance • Quebec **Economy** • Knowing/ Knowledge • Mixed • Social **Social Action** • Trials • Experiments • Policies • Programs • Institutional arrangements • Social regulations	**Scale** • Local **Types** • Technical • Socio-technical • Social • Organizational • Institutional **Purpose** • Common good • General interest • Collective interest • Cooperation	**Social** • Movements • Cooperative/ Communities • Civil Society • Unions **Organizations** • Companies • Social economy organizations • Collective organizations • Recipients **Institutions** • State • Identity • Values and norms **Intermediaries** • Committees • Social networks/ of alliance/ of innovation	**Mode de coordenation** • Assessment • Participation • Mobilization • Learning **Means** • Partnerships • Integration • Negotiation • Empowerment • Difusion **Restrictions** • Complexity • Uncertainty • Resistance • Tension • Commitment • Institutional inflexibility

METHODOLOGICAL PROCEDURES

This study was exploratory and descriptive. Furthermore, our research is qualitative and adopted the case study as investigation strategy.

Eight (8) in deep interviews were carried out:
Five (5) with members from the *Agência de Desenvolvimento Econômico Local* (ADEL), in charge for activities' direction, organization, coordination and execution;
two (2) with benefitted youngsters, and
one (1) with a family farmer who was a beneficiary in one of the programs developed by the organization

The data codification was operationalized via the software **Nvivo 10** for qualitative analysis. Each dimension in table was analysed based on the collected sources.

The *Agência Desenvolvimento Econômico Local*
(ADEL – "Agency" of Local Economic Development in Portuguese), founded in 2007, located in the city of Pentecoste – Ceará is a

non-governmental organization (NGO)

that works with

family agriculture and

youth entrepreneurship,

(now) operating in communities (rural cities) and territories in the Ceara state.

The initiative is a result of joint interests from local actors to change the paths of development in the state semiarid.

Short term History: After graduating from university, ADEL's founders, started talking about the semiarid region particularities and questioning how they could contribute through an action that would have greater impact on the lives of people living in the communities they had been born. From the ideas and restlessness shared with representatives of social movements as well as other organizations working with local development, they decided to return to their communities and found the NGO, with the objective to socialize knowledge in order to fulfil regional demands.

ADEL's activities were based on structured actions and programs:

Programa Jovem Empreendedor Rural (PJER – Young Rural Entrepreneur in English), which targets the social and economic inclusion of youngsters inhabiting rural communities, awakening entrepreneurial capacities to encourage them to stay in their communities.

In addition to PJER, the

Programa Soluções Rurais (Rural Solutions Program in Portuguese, formerly known as Josué de Castro Program for Local Development), has the goal of organizing family farmers to aggregate value to their activities and to the productive chains they belong, besides developing their rural enterprises, increasing profitability and productivity.

BRAZIL

The “semiarid”:
Hot, dry, not constant productive, One of the poorest part of Brazil!

Fortaleza:
2.572 million inhabitants (2014)

Ceará 8,6 Mi.

Pentecoste:
36, 611 000 inhabitants (2014)

PENTECOSTE

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RESULT ANALYSIS

After the identification of the three distinct social innovations

ADEL (itself)

the Rural Solutions Program and

PJER

as components of the greater case studied, it was sought to track a similar path to the one covered by Tardif and Harrison (2005).

Emerging Variables

Considering the components sheltered within the *Transformation* dimension, it was verified the appearance of "**Climatic conditions**" as an emerging variable. Another emerging Variable in the same dimension is linked with the "Social" subcategory and it was entitled "**Discovery**".

Inside the *Innovative Character* dimension, among the variables comprised in the analytical angle Social Action, it was understood as necessary the inclusion of the term "**Formation of networks**".

In regards to the analytical angle Purpose, presented in the *Innovation* dimension, the analysis disclosed that "**Local Development**" appears as

RESULT ANALYSIS

Emerging Variables (cont)

Considering the *Actors* dimension,
among the variables in the
Social subcategory, the term "**Family Units**" was inserted.
The second term included in the dimension related to the
Organizational subcategory and it is "**University**".

The last variable added to this dimension was inserted within the Institutional actors and is related to "**Fails/Flaws**", especially the ones connected with State actions.
Interviewees frequently mentioned these fails and, in the scenarios exhibited in the videos where the climatic issue was stressed. The accounts reported the governmental negligence or fails on the struggle against droughts and other restraining regional factors.

In the *Process* dimension,
two more variables were inserted in the subcategory Modes of coordination; they are "**Mediation**" and "**Search for recognition**".

Dimension TRANSFORMATION	Dimension INNOVATIVE CHARACTER	Dimension INNOVATION	Dimension ACTORS	Dimension PROCESS
Micro-context • Crisis • Rupture • Discontinuity • Structural modifications • **Climatic conditions** **Economic** • Emergence • Adaptation • Labour relations/ relations of production and consumption **Social** • Re-composition • Reconstuction • Exclusion/ Marginalization • Practice • Change • Social Relations • **Discovery**	**Model** • Work • Development • Governance • Quebec **Economy** • Knowing/ Knowledge • Mixed • Social **Social Action** • Trials • Experiments • Policies • Programs • Institutional arrangements • Social regulations • **Formation of networks**	Scale • Local Types • Technical • Socio-technical • Social • Organizational • Institutional Purpose • Common good • General interest • Collective interest • Cooperation • **Local development**	**Social** • Movements • Cooperative/ Communities • Civil Society • Unions • **Family Units** **Organizations** • Companies • Social economy organizations • Collective organizations • Recipients • **University** **Institutions** • State • Identity • Values and norms • **Flaws/Fails** **Intermediaries** • Committees • Social networks/ of alliance/ of innovation	**Mode of coordination** • Assessment • Participation • Mobilization • Learning • **Mediation** • **Search for recognition** **Means** • Partnerships • Integration • Negotiation • Empowerment • Difusion **Restrictions** • Complexity • Uncertainty • Resistance • Tension • Commitment • Institutional inflexibility

CONCLUDING REMARKS

We intended, along this article, to disclose the social importance, especially in the semiarid of Ceará, of the efforts carried out by Adel.

We verified, by analysing the codifications,
that the dimensions of social innovation proposed by Tardif and Harrison (2005) were applicable to the study.

The identifications performed also permitted **the emergence of specific variables** linked with the context explored.

This research **intends to contribute** with the academic production in the social innovation field by presenting initiatives that improve life quality in social and economic contexts impaired by several factors.
In addition, we intend to foster in the field other case studies presenting initiatives to apply the CRISES' table, making possible the emergence of variables from different contexts not only in Brazil, but also over the world.

THANK YOU!

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https://www.facebook.com/groups/165443003558140/

2015, Annual Conference EU-SPRI Forum, Helsinki

Innovation Policies for Economic and Social Transition

Reflections on the Democratization of Knowledge Generation in Research Partnerships for Sustainable Development

Cordula Ott

CDE, University of Bern

Cordula Ott: Reflections on the Democratization of Knowledge Generation in Research Partnerships for Sustainable Development

Presented at the EU-SPRI 2015 Conference, Helsinki, 10–12 June:

- A paper intended to analyse the Eastern and Southern Africa Partnership Programme (ESAPP, 1999–2014), a transdisciplinary North–South partnership network engaging in research on sustainable land management and sustainable regional development against the background of global governance approaches and an emerging sustainability science.
- The paper contributes to several focus areas considered for *Track 4: Innovation Collaboration to Tackle Societal Challenges and Promote Development*
- Specifically, it identifies cornerstones of an enabling environment for research for sustainable development, as ESAPP's innovative programme structure and steering approach are ideally suited to enhance equity and innovation within and beyond the partnership.

Overview

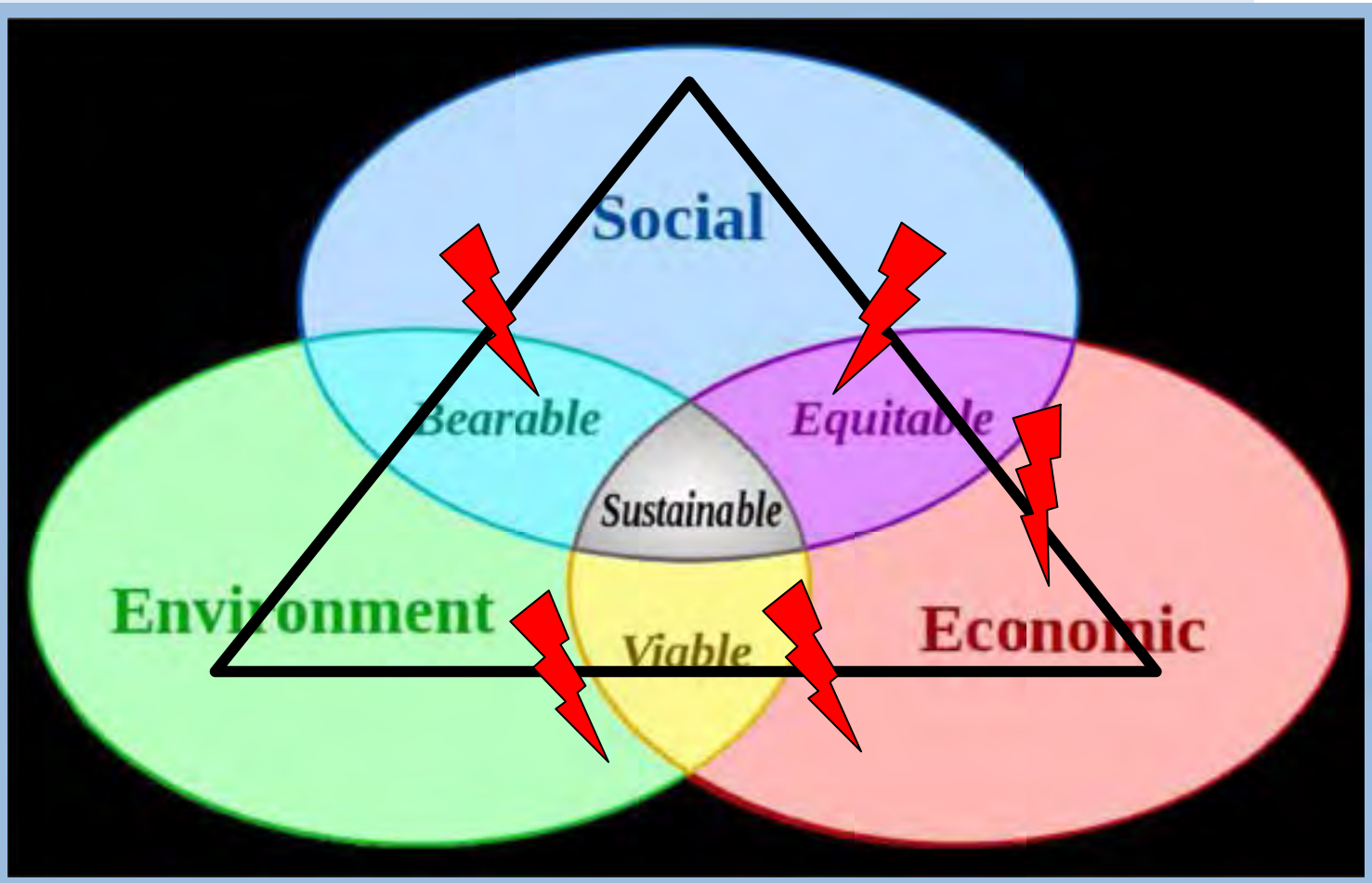
Reflections on the Democratization of Knowledge Generation in Research Partnerships for Sustainable Development

1. The normative implications of the SD paradigm for poverty-oriented development efforts

2. Democratising knowledge generation in the Eastern and Southern Africa Partnership Programme (1999–2014)

➔ SD as a powerful concept for equity-based development research and collaboration

Starting point:
Trilemmas in Sustainable Development



1. The normative implications of SD for poverty-oriented development efforts

Three basic implications (not fully taken into account!):

1. Interdependency and interplay between ecology, society, and economy ('magic triangle of SD')

➔ *The 'one-fits-it-all' approach of the economic sector and the predominance of the paradigm of growth are destructive!*

2. An intrinsic link between development and equity

➔ *No real progress in development can be achieved without intra- and intergenerational equity!*

3. Science-society interaction to realise a shared vision of a sustainable future ('transdisciplinary exchange')

➔ *Sustainable development cannot be defined through scientific investigation alone!*

1. The normative implications of SD for poverty-oriented development efforts

…we are on the verge of overstepping planetary boundaries!

- **Sustainability Transformation is necessary!**
- **Science itself has to undergo a transformation!**

SD questions the traditional role, power, and contributions of scientist and researchers!

1. The normative implications of SD for poverty-oriented development efforts

- **Ethical attitude**: Instead of a 'value-free, objective, neutral' fact producer become a reflective, responsible advocate for SD
- **New role**: Give up primacy in the domain of knowledge und act as knowledge broker in integrating actors and knowledge systems into societal co-production of knowledge
- **New contribution**: Double role of generating new knowledge and strengthening civil society through human and institutional capacity development in the realm of SD

Scientists and researchers can contribute to SD transformation by means of organising

more democratised access to knowledge and knowledge generation!

1. The normative implications of SD for poverty-oriented development efforts

SD is an emancipatory and transformative concept!

➔ SD addresses structural causes of disparities in the access to resources, knowledge and power

➔ SD allocates everybody a just share of global resources and an equal voice in shaping the future

… SD enthusiastically taken up as **guiding paradigm for addressing poverty alleviation and global change**

… SD replacing concepts of delivering aid and technology and knowledge transfer by concepts of development partnerships!

- *But SD more a buzzword than reality!*
- *Our world has become neither more sustainable nor more equitable!*

1. The normative implications of SD for poverty-oriented development efforts

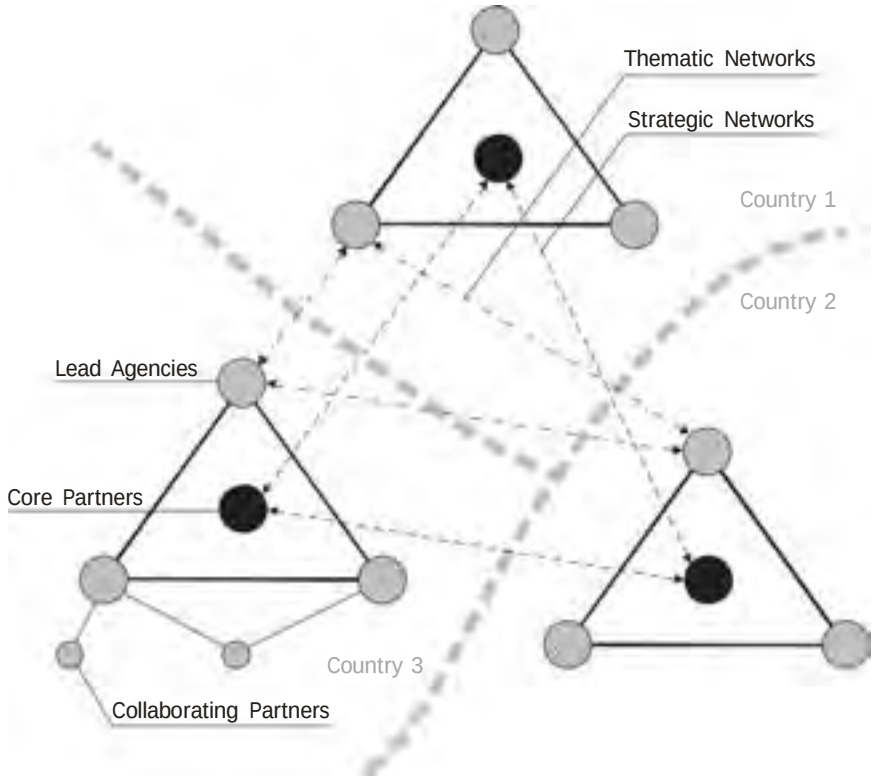
SD did not succeed in establishing itself as robust alternative to the previous paradigms of growth and transfer!

Persistence of the economic paradigm, the dominance of the Northern countries, the monopoly of Western science, the technocratic and transfer solutions, …

- Realising more equitable, just, and inclusive development turns out to be (too?) challenging…
- Perception and role of scientists as 'value-free' fact producers endure …
- Science-society interaction remains experimental, instrumental and power-driven…
- …

➔ *An emerging **Sustainability Science** community proposes to learn from practice and build on successful experiences!*

ESAPP
Eastern and Southern Africa Partnership Programme 1999-2014



2. Democratizing knowledge generation in the Eastern and Southern Africa Partnership Programme (1999–2014)

An innovative project when it started in 1999…

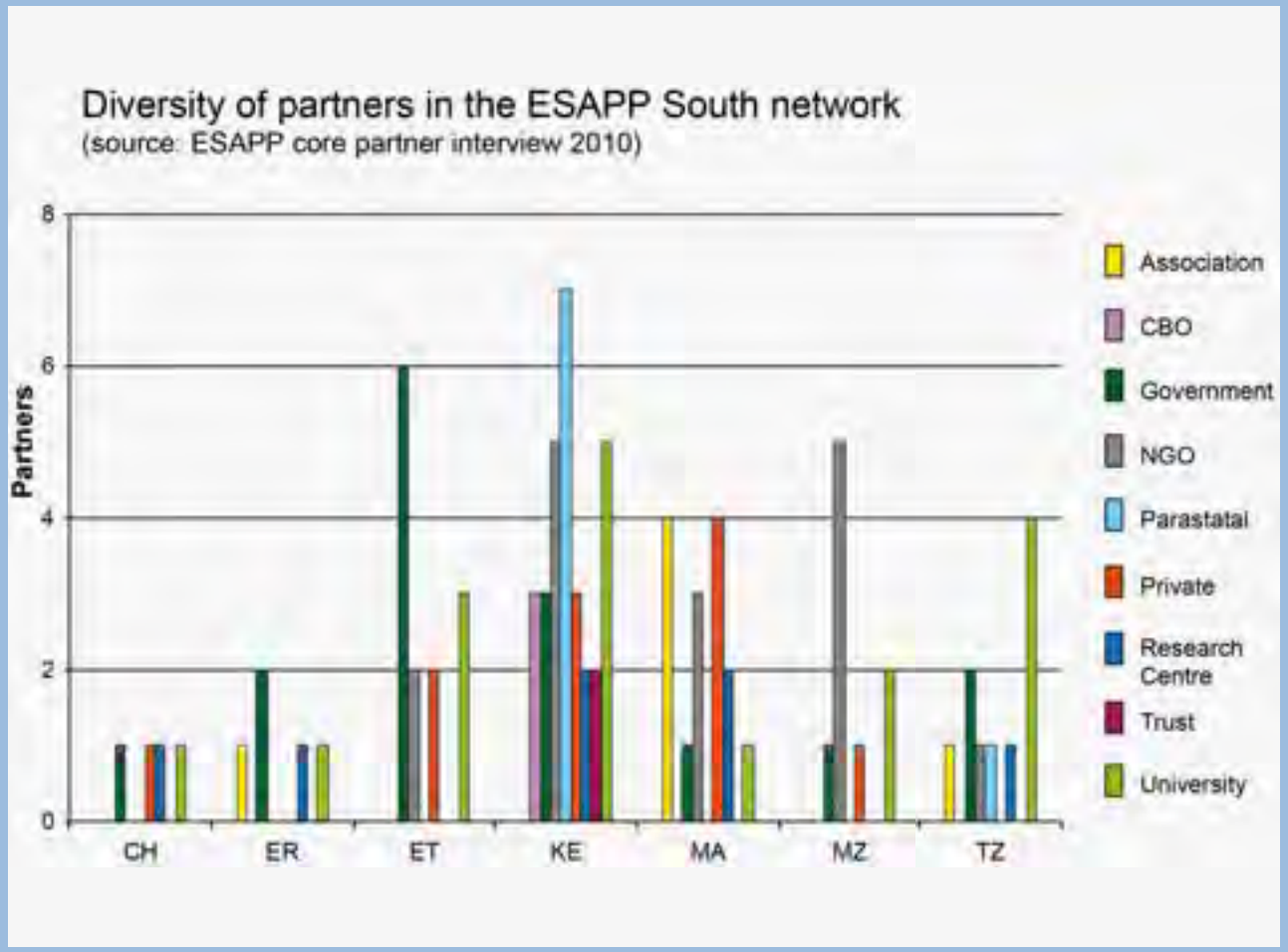
ESAPP Foundation*:*

- Transdisciplinary research partnerships for SD
- Equity-orientation in all programme aspects
- Long-term North-South collaboration

ESAPP Focus: Research for Sustainable Land Management and Regional Development
(comprising Switzerland and 6 countries in the Eastern and Southern Africa)

ESAPP Goal: Coherently address complex challenges of inter-and transdisciplinary research for sustainable development

Integration of actors



2. Democratizing knowledge generation in the Eastern and Southern Africa Partnership Programme (1999–2014)

Implementing a transdisciplinary partnerships in a North-South research context is challenging and experimental!

- To-do list is just to long to present…
- Short version: …. *'managing complexity and chaos while at the same time producing evidence-based impact for SD'*

ESAPP's success is based on strong guidance by:

- Mission-orientation and strategic goals
- Concept on Actors as agents of change
- Concept of an adaptive, learning programme implementation
- Established networks with trust and strong personal ties

Example ESG framework: Challenges in inter- and transdisciplinary research programmes for SD

Source: www.earthsystemgovernance.org / Science plan

2. Democratizing knowledge generation in the Eastern and Southern Africa Partnership Programme (1999–2014)

Strategic goals:

(± UNESCO 2005: *Development of Knowledge Societies*)

- Societal (transdisciplinary) **co-production of knowledge** for SD: system knowledge, target knowledge and transformation knowledge
- Bringing together scientific and societal partners in **contextualised knowledge** generation and learning
- **Human and institutional capacity development** within and beyond the partnership
- **Balancing unequal power structures** within the North-South partnership and strengthening South ownership
- Establishing and sharing context-specific long-term **data and information bases**

2. Democratizing knowledge generation in the Eastern and Southern Africa Partnership Programme (1999–2014)

Three mutually linked, adaptive implementation approaches:

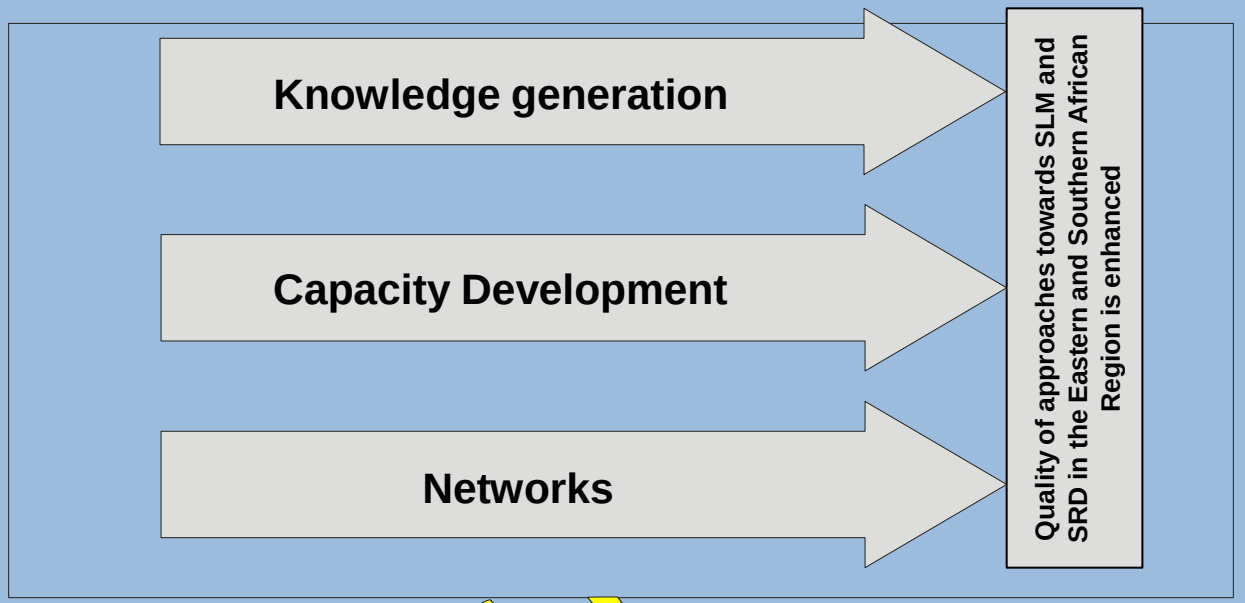
- ✓ An active **adaptive programme approach** provided stability and flexibility for increasing partners' joint steering of the programme
- ✓ A **dual structure approach** allowed to navigate a South-driven action research component through supportive capacity development and basic research
- ✓ **A contextuality approach** consolidated place-based thematic research and spatial foci, and kept research and solutions consistent with the conditionality and needs at local to global levels

➔ ***Increased coherence** among local to global SD approaches!*

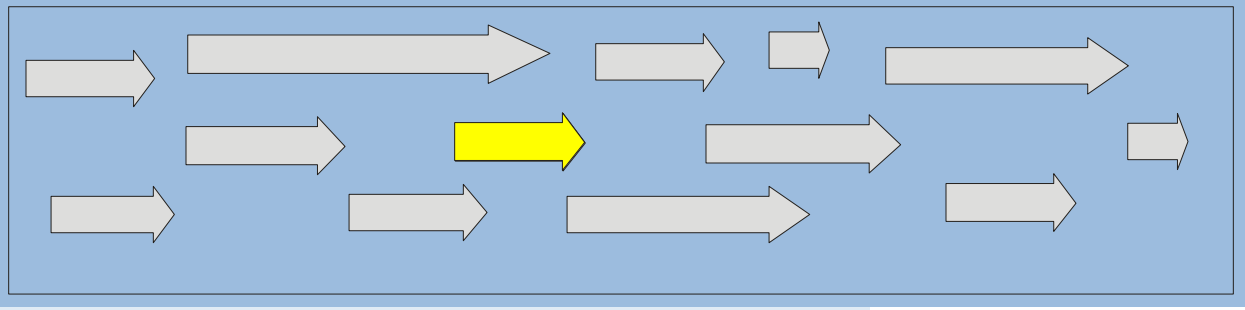
➔ ***Increased ownership and capacity** of South governments and institutions, partner networks and actors!*

ESAPP:
Dual approach and adaptive management
(adapted)

SD requirement driven
Conceptual Mandate
→ Supportive to
Action Research component



Bottom-up, demand driven
200 Action Research Projects
→ Focus on co-production of knowledge and innovation



ESAPP Contextuality: Shared responsibility in steering thematic and place-based research within SLM/SRD

ESAPP Thematic and regional foci	Ansebe catchment	Simen Mountains	Amhara Region	Mount Kenya Region	Eastern Kenya ASALs	Pangani Basin	Lake Rukwa	Cabo Delgado	Mananara / Manompana	Toliara Region
	ER	ET	ET	KE	KE	TZ	TZ	MZ	MA	MA
Food security, agricultural and rural development	Leading site		Key partner		Participating site					Participating site
Climate change, access to energy, land use management		Participating site			Key partner				Participating site	Leading site
Water resources management, sanitation and irrigation	Participating site		Participating site	Leading site		Key partner				
Biodiversity conservation, participatory management of protected areas		Leading site					Participating site	Participating site	Key partner	
Local governance, devolution of power, conflict mitigation				Participating site		Participating site	Leading site	Key partner		

Summary:
A programmes view on the impact

Impact:

Policy influence, Innovation, Education, Products, Publications, Conferences, new local institutions, etc.
➔ a broad range of outputs and outcomes

Overall assessment:

ESAPP successfully supported innovative research and evidence-based South-driven rural development through:

- Investments in human and institutional capacity development
- Investments in a democratisation of knowledge production and access to knowledge
- Investments in equal power and decision-making structures and more South-determined programme steering

Conclusion: a view beyond ESAPP

Impact goes beyond the programme's lifetime!

- New bottom-up and network-driven institutions for SD on all levels (state down to field level)
- Institutional and human capacity and south determination for SD
- Local Networks as base for scaling up of innovation
- Long-term knowledge base and local observatories for SD

Sustainable development and equity-orientation provide a sound foundation for transdisciplinary research endeavours!

Experimental procedure not possible without :

➔ … institutional support and advocates in scientific and governmental institutions!

➔ … long-term equity-based partnership approach (co-evolution?)

THANK YOU!

“Ethics
is the result of our pursuit
to systematically reflect on, analyse, and question
the norms and values
that guide human action”

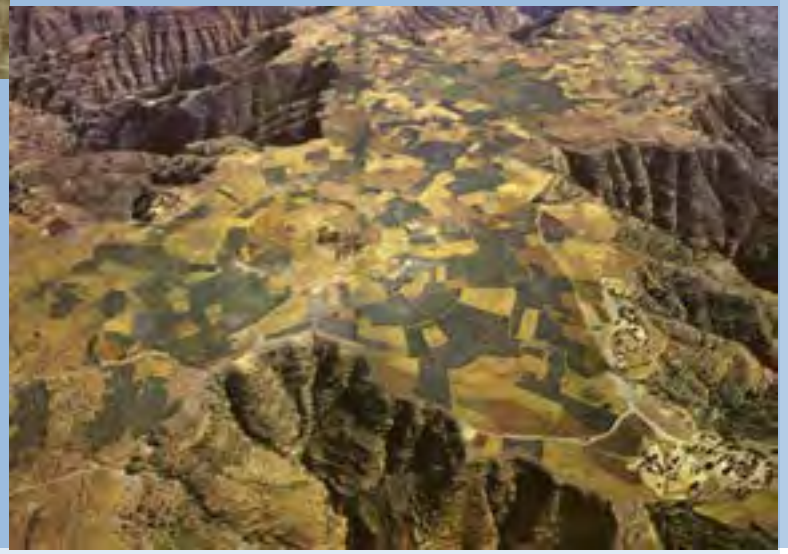
Göran Hermerén,
President of the European Group on Ethics (EGE), 1989

Centre for Development and Environment (CDE)

University of Bern, Switzerland

- Inter-/transdisciplinary approach in research and education
- Working in global/regional partnerships and networks
- Long-term cross-national and global North-South research programmes
- 16 disciplines/80 persons

- Founded in 1989 as a Centre of Competence in SLM/SRD
- Advice and support to the Swiss Development Agency in implementing the Rio Conventions
- Core: more then four decades of research in Ethiopia and Kenya
- Since 2010: *Interdisciplinary Research Centre for SD and Environment*



A market for green patents? Analysis of ownership changes in environmental technologies from Spain.

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Annual Conference of EU-SPRI Forum. 10-12 June 2015- Helsinki

Index

1. Introduction
2. Spanish context
3. Links to the existing literature
4. Data and Methodology
5. Main Results
6. Conclusions

1. Introduction

Aim

Analyze the current situation of environmental innovation and the market for environmental technologies in Spain.

1. Introduction

Definition of technological eco-innovation

Alternative product or process innovations with a lower environmental impact than available technology (Carrillo-Hermosilla et al, 2009)

1. Introduction

Definition of transfer of technology

Formal and informal transmission of knowledge, skills and technology between organizations that allows the local context to get adapted to the demands of the environment by absorbing and spreading that knowledge, both within and between countries (Roessner, 2000; Chung, 2001; Kanyak 1985).

1. Introduction

Indicators to measure eco-innovation processes

Several indicators

Focus on patents

"Green patents" to designate patents in environmental-related technologies

1. Introduction

Contribution of the study

1. Use of patent registers to assess to what extent environmental technologies have experienced changes of ownership
2. Focus on green technology transfer within a developed country
3. Preliminary analysis of the behaviour of green patent owners in Spain
4. Providing a first statistical light on the market for green patents of Spanish origin

2. Spanish context

In Spain…

Renewable energy technology segment increased considerably from 2000 to 2009 because of regulation (REN21, 2013)

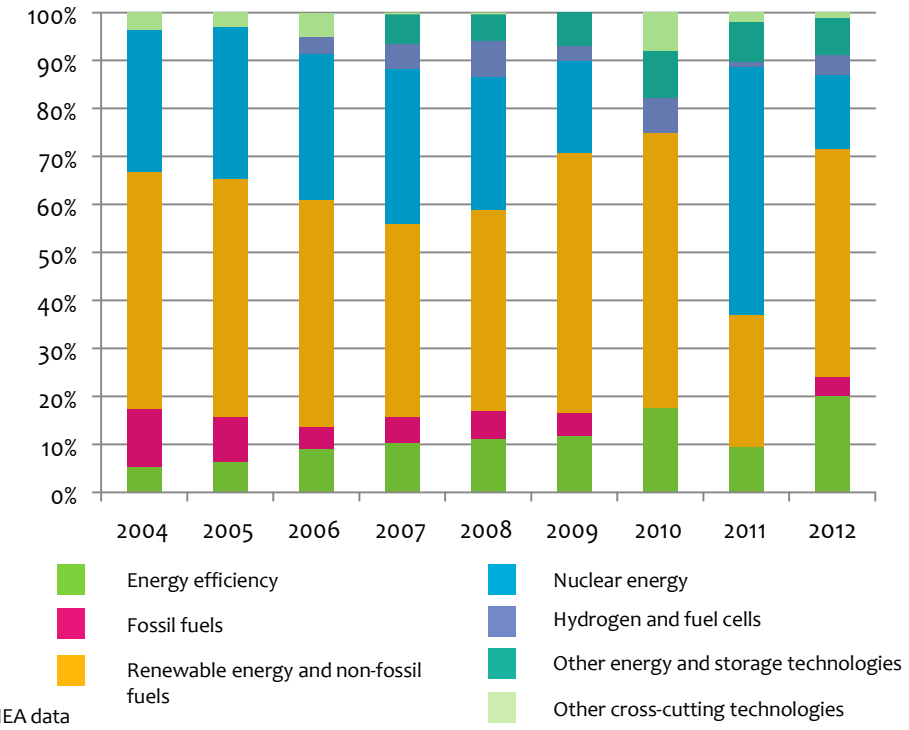
Patents applications of Spanish residents in this field represented 0,9 % in 2000 and 3,9 % in 2009 (OEPM, 2010)

Spain ranks fifth in the world ranking of countries with renewable energy technology patents applications (OEPM, 2013)

Spain situation is good mainly in solar-thermal and wind energy technologies

In the last decade companies have exceed individual inventors as main generators of innovation in green technologies in Spain (Casado and Calles, 2010)

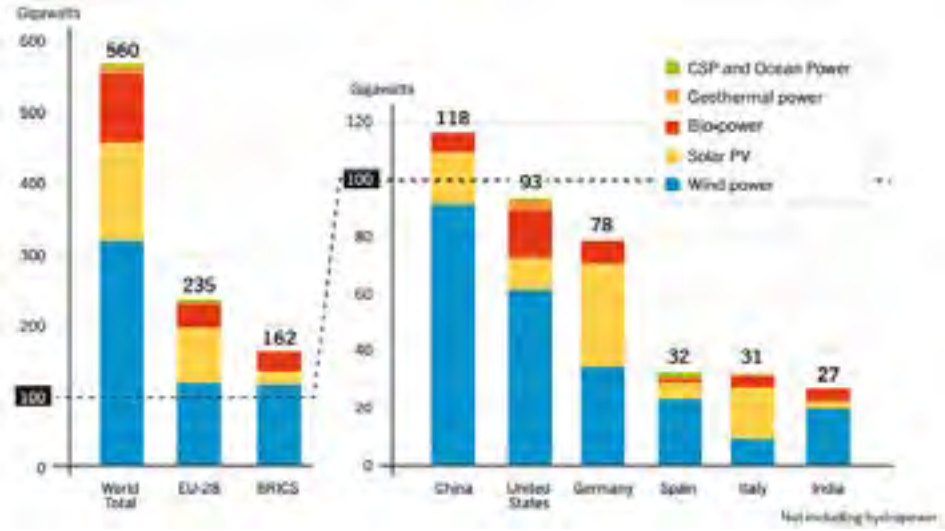
Share of total R & D budget in the Spanish energy sector.



Source: Own elaboration using IEA data

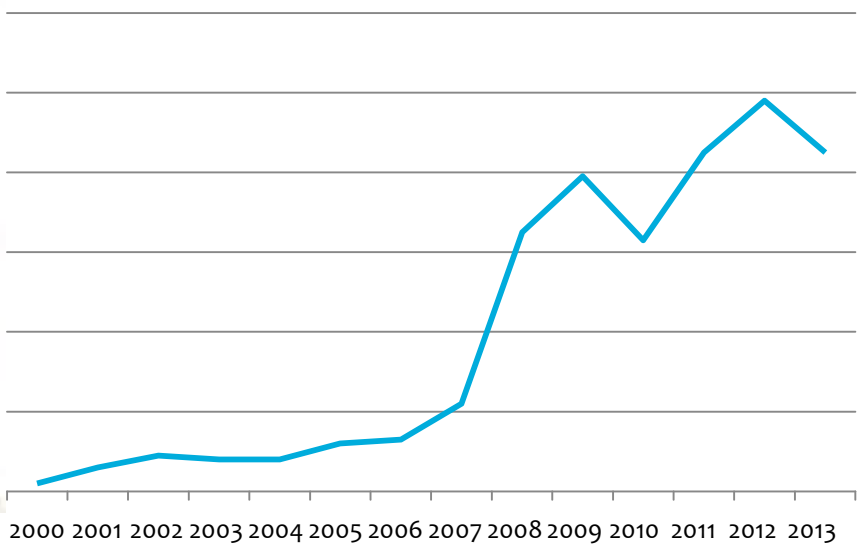
2. Spanish context

Renewable Power Capacities in World, EU-28, BRICS, and Top Six countries, 2013



Source: REN21, 2014

European renewable energy patent applications of Spanish origin published in the period 2000-2013



Source: Own elaboration using OEPM data

2. Links to the existing literature

Technology plays a relevant role in the reduction of environmental impacts and costs derived from mitigation and adaptation actions (Albino et al, 2014)

Ensuring the efficient allocation of environmental technology ownership is important to society in order to get the maximum diffusion to fight against environmental problems

The concept of "technology markets" is receiving increasing attention among researchers in economics and management of innovation (Meniere et al., 2012)

Transfer of green technology is influenced not only by IPR but also by regulation, human assests, networks and knowledge institutions among others (Johnson and Libecker, 2009)

2. Links to the existing literature

Serrano (2006,2008,2010)

- Analysis, from an economic and econometric perspective, of technology transfer using national registries for US patents.
- Individual inventors and SMEs sell patents to a greater extent than big companies.
- Reallocation of technology from innovative small companies to big ones with complementary assets
- Pr (patent trade) depending on several factors like the age and citations of the patent among others.
- Patent transfer varies with the technology field and the type of ownership

Meniere et al. (2012)

- Analysis of patent market in France. French origin patents in INPI and EPO. Transfer of patents represent relatively low volumes, but with a strong increase 1997-2009. They show a higher quality than the average.
- Prevalence of patent portfolios transfers between companies and intra-group transactions

Dechezlepretre et al. (2011)

- Patented inventions in Climate Change Mititagion (CCM) technologies and their transfer from 1978-2005
- Quantitative despcription of geographic distribution and temporal trend of invention and diffusion of CCM technologies at global level
- Technology transfer- high in the political agenda. Up to date , green tech. transfer mostly between developed countries

Patents

Green patents

2. Links to the existing literature

Environment-related technology transfer

Legal links between companies

Technological field

Applicant typology

Reallocation of property rights

Market of property rights/Real transfer

Administrative transfer

- Administrative changes or changes of name
- Transfer between companies with parent-subsidiary relationships
- Transactions between applicants of the same patent

Commercial transfer

3. Data and methodology

a) The data

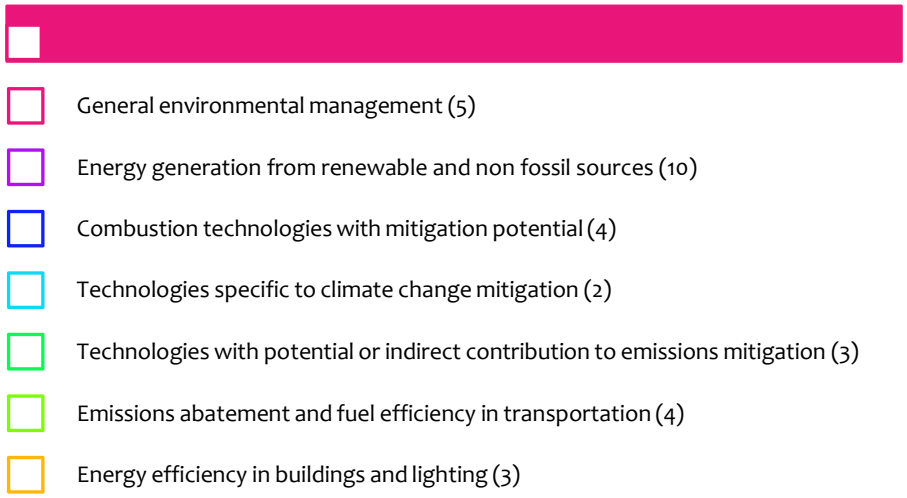
PATSTAT- April 2014	Patent applications filed from Spain related to the environment (Green patents)	Resulting dataset: 1276 environmental EPO patent applications	52% are green patents in energy generation from renewable and non-fossil sources	Period: 1979-2013

3. Data and methodology

a) The data

31 environmental technologies after grouping some categories of OECD's classification

Environmental related technologies classification



3. Data and methodology

b) The Methodology

- Number of requests for environmental patents filed by Spanish applicants at EPO between 1979 and 2013
- Property changes recorded in EPO on applications for environmental patents of Spanish origin
- Typology of property changes registered using BvD SABI on Spanish firms, corporate reports and internet searches and classification of environmental technology areas
- Type of environmental patent applicants in Spain
- Patent characteristics: granted, claims…

3. Data and methodology

b) The Methodology

1. Transfer of green patents: administrative vs. Real transactions
2. Transfer of green patents across type of patentees
3. Transfer of green patents across technology fields
4. Green patent characteristics and the transfer of green patents

Descriptive analysis | Probit model

4. Main results

The patent registry documents provide insight into the types of applicants. Of the 1276 green patent applications, 22.81% have been granted to date

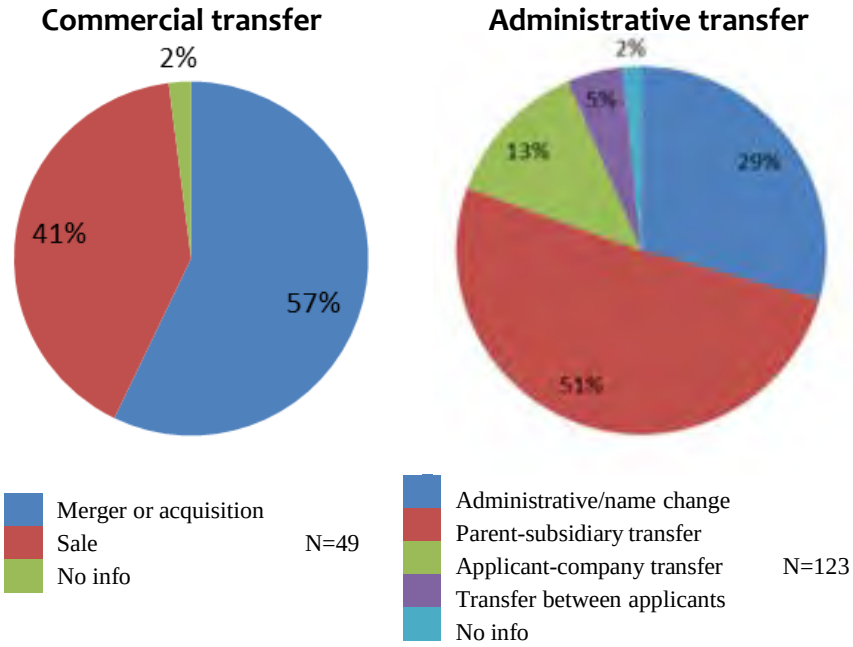
Only 13% of patented environmental technologies have registered changes in ownership. 46.5% have been granted to date

Just over a quarter of these changes can be considered truly business transactions (commercial transfer)

4. Main results

Transfer of green patents: Administrative vs. Commercial transactions

Green technology transfer distribution by typologies (Commercial vs. Administrative)



Truly transactions are mainly due to mergers and acquisitions

Administrative transfers are mainly due to transactions between parent and subsidiary companies

Source: Own elaboration using PATSTAT information

4. Main results

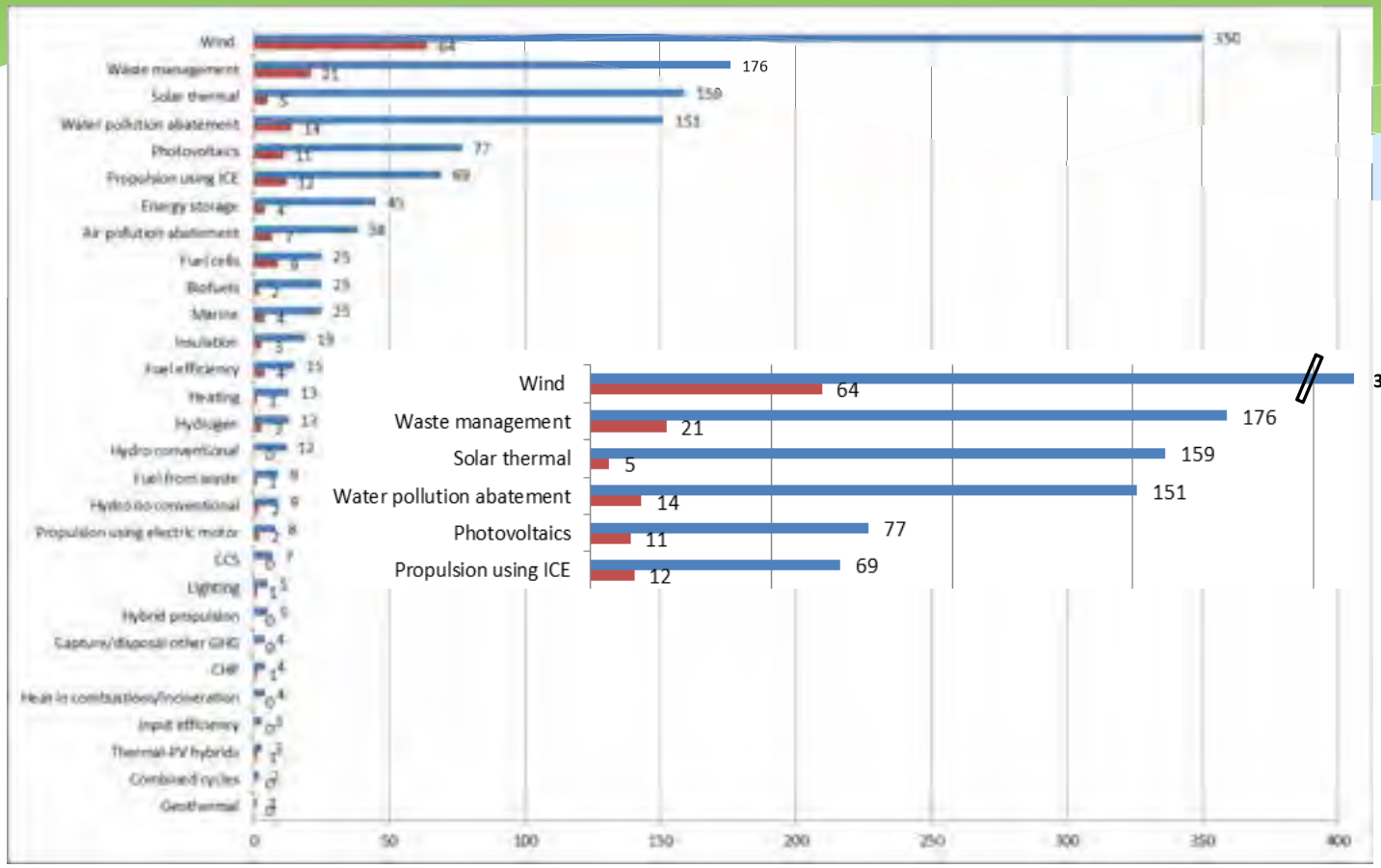
	Green patents with commercial transfer	Green patents with administrative transfer	Green patents without registered transfer	Total
1. Administrative change/Name change	0	36	0	36
2. Parent-Subsidiary transfer	0	63	0	63
3. Applicant-company transfer	0	16	0	16
4. Transfer between applicants	0	6	0	6
5. Merger or acquisition	28	0	0	28
6. Sale	20	0	0	20
Without specific info	1	2	0	3
Without registered changes	0	0	1104	1104
Total	49	123	1104	1276

Source: Own elaboration using PATSTAT information

- Although they are not commercial transfers, changes of ownership between companies in the same group represent 37% of registered changes.
- Conclusions of some studies demonstrate the importance of the subsidiaries as a driver of innovation (Tsai and Wen, 2009), but regarding intra-country transfers, we must consider the high probability that these intra-group transfers occur because of either institutional, economic or fiscal strategic reasons that have nothing to do with an intended acquisition of knowledge flows (De Vicente et al., 2010)

4. Main results

Transfer of green patents across technology fields

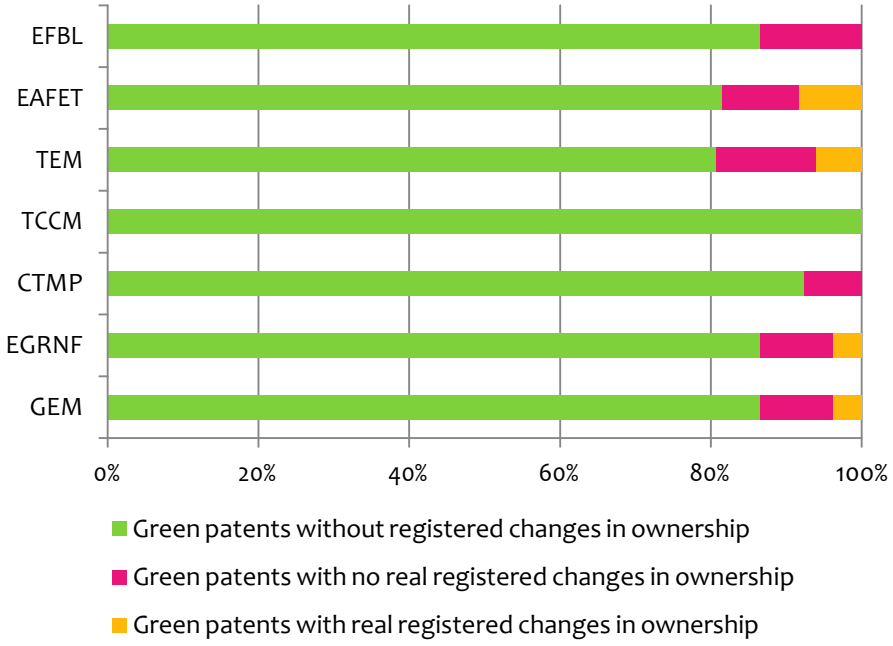


Environmental patent applications in Spain included in the sample and registered changes of ownership by technology

Source: Own elaboration using PATSTAT information

4. Main results

Analysing in which green technologies transfer is more dynamic...

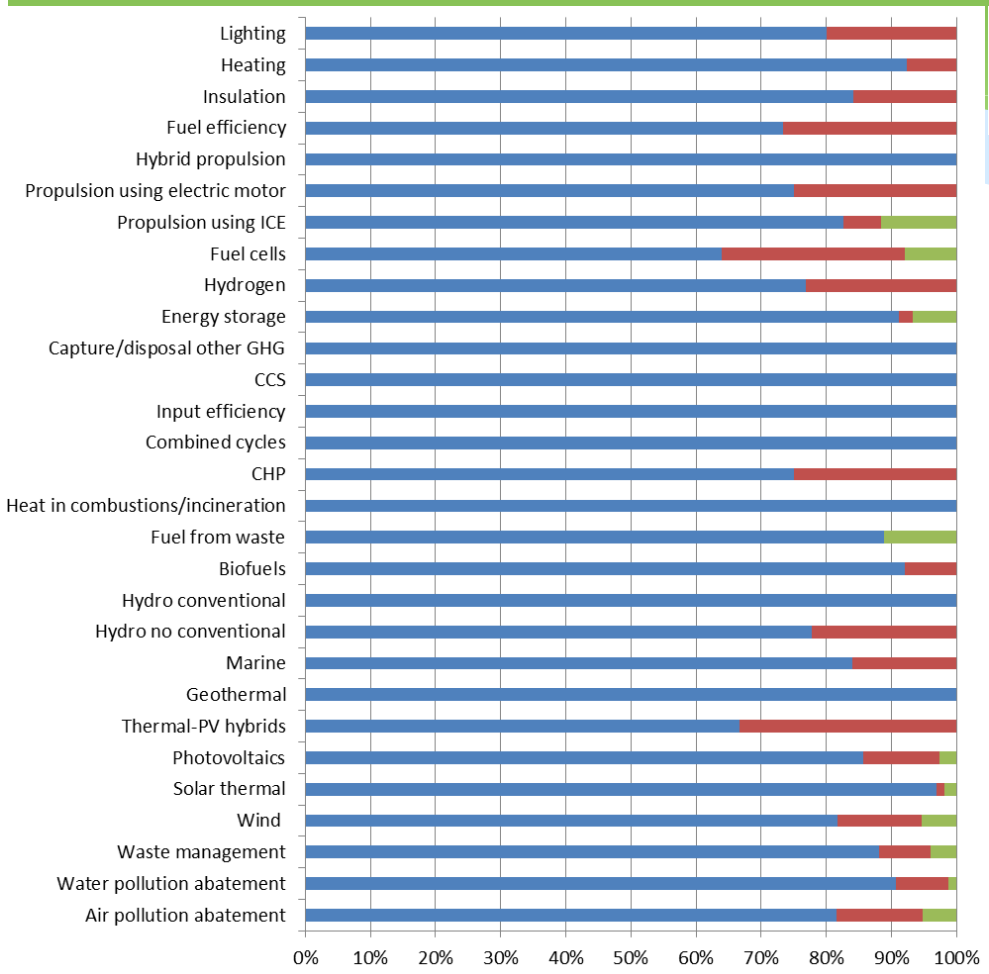


Source: Own elaboration using PATSTAT information

GREEN TECHNOLOGIES	Env. Managem	Renewable / non-fossil	Comb. Miti.	Clim.Chang Miti	Emis. Miti	Trans-port	Build-ings	TOTAL
Green patents with commercial transfer	22.91%	52.08%	0%	0%	10.42%	16.67%	0%	49 (100%)
Green patents with administrative transfer	25%	52.42%	0.81%	0%	8.87%	8.06%	4.03%	123 (100%)
Green patents without registered transfer	29.26%	52.54%	1.09%	1%	6.07%	7.16%	2.90%	1104 (100%)

Renewable energy and non-fossil generation technologies: the most dynamic/ Also IPR in these techs have been the most easily transferred in terms of total changes of ownership.

4. Main results



Source: Own elaboration using PATSTAT information

In relative terms compared to the total number of green patents in each field, specific technologies for propulsion using internal combustion engines (11,5%) and those for generating fuels from waste (11,1%) are both the categories which have registered more real ownership changes.

Although by groups in absolute terms renewable energy technologies are the ones with a higher number of commercial transfers, category by category, the largest transfer of technology can be seen in the group for reducing emissions and fuel efficiency for transport.

4. Main results

Transfer of green patents across type of patentees

26% individual applicants among Spanish green patents applicants

74% others →
85% companies/15% universities or research centers

Green innovation in Spain is quite atomized. There is no a main agent

Gamesa with a 8,94% of the total green patent applications is the leader

Applicant	Typology of applicant	%	Typology of green patents
Gamesa	Business group	8.94%	Wind/ Hybrid propulsion
Alstom	Business group	6.17%	Wind/ Solar PV
Abengoa	Business group	3.41%	Waste management/ Solar Thermal/ PV/ Hybrid/ Hydrogen/ Fuel cells
Consejo Superior de Investigaciones Científicas (CSIC)	Research Center	2.56%	Air pollution abatement/ water pollution abatement/ Waste management/Solar Thermal/ PV/ Biofuels/ CCS/ Hydrogen/ Fuel cells/ Propulsion using ICE/ Isolation
Acciona	Business group	2.41%	Air pollution abatement/ Wind/ PV/ Hydrogen/ Propulsion using ICE
Ingeteam	Business group	1.92%	Wind/ PV/ Hydrogen/ Hybrid propulsion
Exide Technologies	Business group	1.63%	Energy storage
Universidad Politécnica de Madrid (UPM)	University	1.28%	Water pollution abatement/ Wind/ Solar Thermal/ PV/ Non-conv. Hydro/ Energy storage/ Isolation

4. Main results

	Company	Univ/RC	Individual	Total
Commercial transaction	45	1	3	49
	3,53%	0,08%	0,24%	3,84%
Administrative transaction	95	10	18	123
	7,45%	0,78%	1,41%	9,64%
No transaction	724	113	267	1104
	56,74%	8,86%	20,92%	86,52%
Total	864	124	288	1276
	67,71%	9,72%	22,57%	100%
Pearson chi2(4) = 20,776 Pr = 0,000 Cramér's V = 0,091				

There is a substantial difference in the rates of transfer across types of patentees.

Universities and Research Centers are the ones who show the lowest rate of transfer

Results of the probit model (Marginal effects)

	1	
	Change	**Real Change**
Grant	0,1385*** (0,025)	-0,0245 (0,090)
Claims	0,0046 (0,016)	0,1054 (0,066)
Family_size	0,0053 (0,021)	0,1476* (0,082)
Bwd_citations	-0,0001 (0,017)	0,0760 (0,057)
Applicant (ref: Firms)		
Univ/PRO	-0,0881*** (0,028)	-0,2615** (0,113)
Individuals	-0,0913*** (0,022)	-0,1931* (0,106)
Green technology field (ref: Renew/non-foss)		
Env. Management	-0,0536** (0,024)	0,0247 (0,097)
Combustion mitigation potential	-0,1066* (0,060)	---
Climate change mitigation	---	---
Emission mitigation	0,0176 (0,047)	0,0698 (0,147)
Efficiency transport	-0,0342 (0,037)	0,3463*** (0,129)
Efficiency Buildings	0,0759 (0,084)	---
Fyear	Yes	Yes
Obs	1151	142
Wald Test (X2) **(Sig.)**	129,58 (0,000)	28,98 (0,088)

(***) Significant at 1% level (**) significant at 5% level and (*) significant at 10% level.

5. Conclusions

- Market for environmental technology transfer in Spain is still small.
- Most of technologies that have experienced changes in ownership, have been through relationships between companies in the same group (37% of changes) →Administrative transactions.
- The patent sale or transfer by merger or acquisition is much smaller, representing only 27% of registered changes → Commercial transactions.
- Technologies related to energy generation with renewable energy and non-fossil fuels → most patented in Spain.
- Although, in absolute terms, the patents in wind energy have been the largest in number of registered changes, technologies for the improvement of internal combustion engines are the most dynamic in relative terms.
- Although innovation is highly fragmented in terms of the types of applicants, in Spain the private company profile dominates, being Gamesa Business Group who shows the higher percentage of total environmental patent applications (8.94%).
- Finally, from an econometric preliminary analysis the, likelihood of reallocation or trade may be influenced by the quality of green patents.

Thank you very much

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CSIC
Consejo Superior de Investigaciones Científicas

European Studies and Policies for Research and Innovation

The Grand Challenges: a potential boost for Responsible Research and Innovation

Giovanni Colombo

Istituto Superiore Mario Boella

Helsinki, June 2015

Basic aims of a Responsible Research and Innovation

To avoid negative implications of R&I on environment, human health and social wellbeing by:

- driving R&I through social and ethical arguments (*engagement, ethics, governance*)
- creating collective values (*principles*, *rules*, *virtue* of agents) and substantiate innovation (*scrutiny* of expected consequences and *risk assessment*)

The dilemma of evaluating the consequences

The limits of a *governance* based on a risk assessment approach:

- delay between R&I action and consequences
- the *unpredictability* of the innovation mechanisms
- the low *accuracy* of models

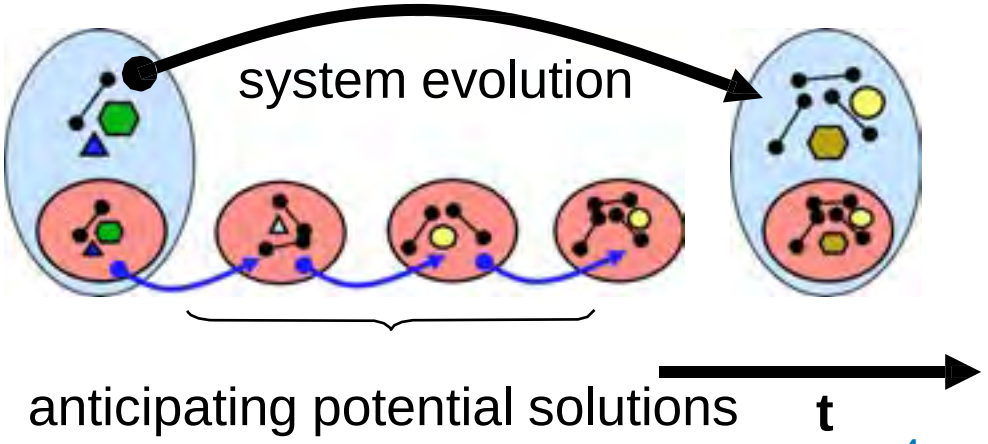
A *future oriented (anticipatory) approach based on moral accountability* and *evidence*?

The *future oriented* approach
(Stilgoe, Owen, Macnaghten)

From *governance of risks* to *governance of innovation* through:

- collective responsibility of all the actors
- unpredictability of R&I linked to its *collective* character
- *anticipatory approach* – guided by *social expectation* (*Why*), knowledge of *What* to do and *How* to proceed (*model*)

capability to adopt *responsible* choices in future and new circumstances



Grand Challenges

a unique chance for Responsible Research and Innovation

Sustainable energy

Low carbon goods production systems

Health paradigms for healthy living and active ageing

Food chain, Water cycle

New mobility and transport paradigms

Radical transformations of existing processes to be conducted by adopting *Smartness*, *Inclusiveness* and *Sustainability* criteria (H2020)

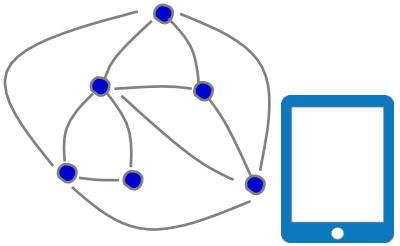
A unique opportunity to experiment and consolidate a *future oriented* (*anticipatory*) R&I approach to *responsibility*.

Grand Challenges and RRI
the enforcing factors

The R&I actions tied to Grand Challenges can rely on three *responsibility enforcing factors*:

- the social involvement

- the education boost
- the anticipatory role of the ICT



It is essential to recognise *Why* these factors have the potential to affect the *future oriented* approach to responsibility and *How* this enforcement can take place

Social involvement in Grand Challenges

Why has it the potential to affect RRI ?

- the expected transformations *cannot happen* without a new level of society's involvement (*engagement, responsiveness*) and the consciousness of a common aim (*the perspective*)
- this *pragmatic* circumstance is requiring:
  - social intentionality, agents' identification in shared aims
  - active role of people (*behavioural change*)
- the social involvement is really *participatory* in comparison with the *non-participatory* cases like e.g. GMOs and Geo engineering.

Social involvement in Grand Challenges

How can it enforce the RRI ?

- the beneficiaries of the innovation action, social bodies and social disciplines should be embedded in the innovation process *from the beginning* of the action
- they should play an *active role* in defining *what* needs to be done rather than just register *a posteriori* the effects of the action

Education boost in Grand Challenges

Why has it the potential to affect RRI ?

The transformations driven by Grand Challenges present a number of unexplored and inspiring issues:

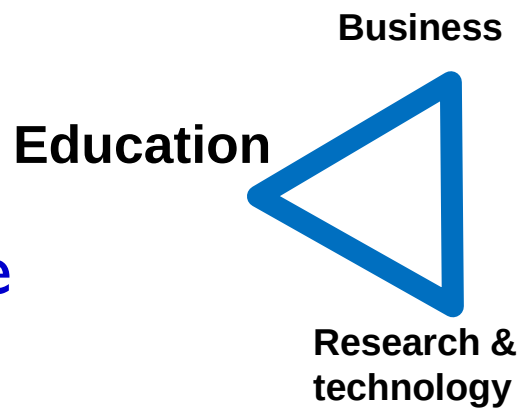
- (higher) education curricula need to be renewed accordingly
- the relevant R&I Projects adopting *responsibility* principles *contaminate* the education models and the incidence of *responsibility* principles accelerates along the circle: *knowledge creation–innovation–production process*

Education boost in Grand Challenges

How can it enforce the RRI ?

Education streams should be associated R&I Projects on Grand Challenges (EIT approach) and breed the ability:

- to act under uncertainty and complexity
- to challenge on the final scope of R&I
- to cultivate curiosity, scepticism and inclusive view of different disciplines
- to use abstraction techniques to bridle the dynamics of innovation and to anticipate the potential consequences

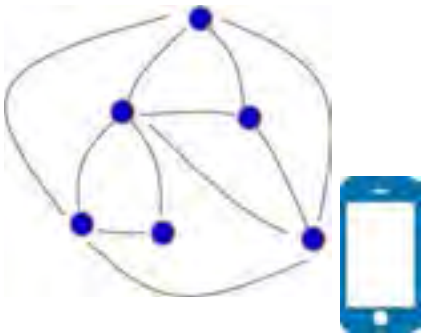


Anticipatory role of ICT in the Grand Challenges
Why has it the potential to affect RRI ?

Grand Challenges require radical transformations (disruptive discontinuities) mostly based on the *constitutive* character of ICT

grounded on its basic enabling functions:

- Processing (*intelligence*)
- Connection (*space independence*)
- Interaction (*creation of sense, correlation*)
- Information storage (*time flexibility*)



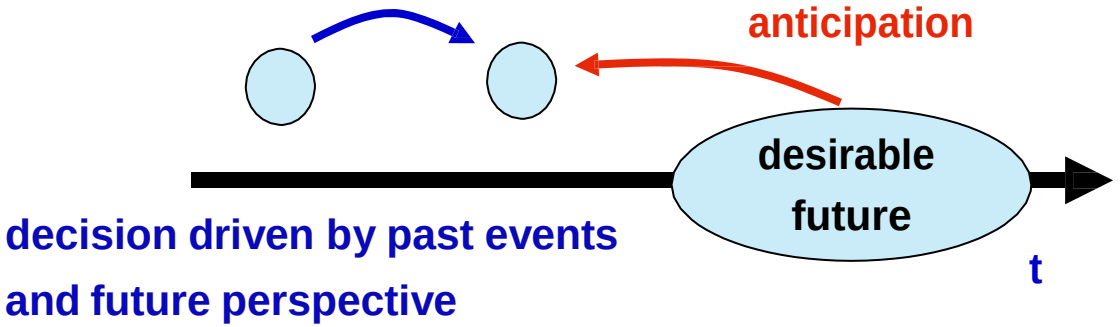
Anticipatory role of ICT in the Grand Challenges
How can it enforce the RRI ?

By adopting the *constitutive* spirit in using the ICT *enabling* functions for transformations, namely the ICT ability to:

- Extend the communication space
- Enable new value chains to take place in the overlay dimension
- Embed essential features in the process innovation
- Educate through new knowledge-creation models

Anticipatory role of ICT in the Grand Challenges
How can it enforce the RRI ?

- by relying on the ability of the ICT to *represent* (to *model*) the same *technical* solutions it enables
- this is the ability to *Envisage* potential solution for *anticipatory* development steps
- social forces are then supported to challenge the various alternatives and to decide the innovation steps to be run

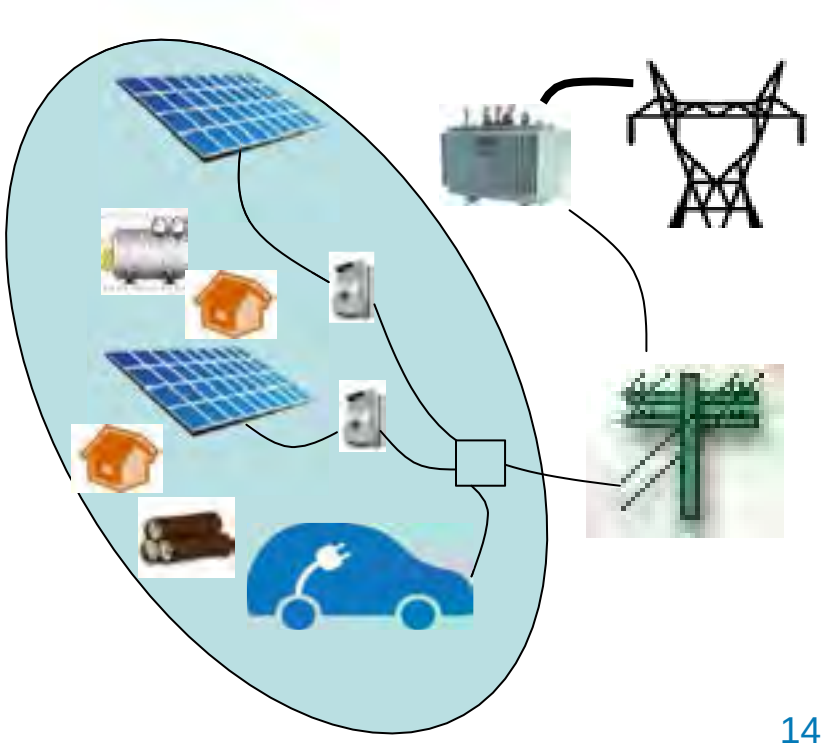


Energy Community
a fundamental step towards the zero carbon society

Energy Community: a set of energy users/producers performing common choices in energy use and generation to maximise environmental and economic benefits

Social involvement: EC is inevitably a new form of sociality (*inclusion*)

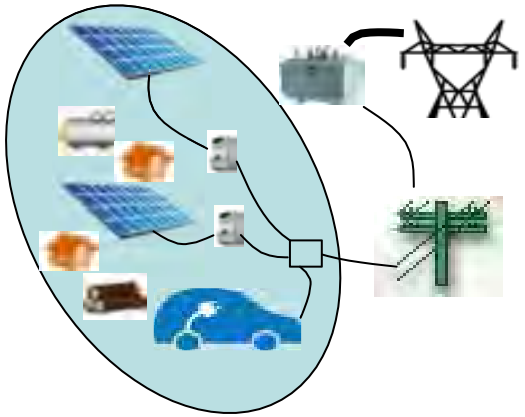
- local character
- sharing of energy resources
- environmental aims



Energy Community
a fundamental step towards the zero carbon society

Education boost: new skills are necessary to avoid pure voluntary approaches

- design and management of the EC (*engineering*)
- roles and business model (*economy*)
- community dynamics and synergy (*social science*)



Anticipatory ICT

- EC enabling functions and EC control
- EC model and evaluation of the evolutionary options (*anticipation*)

Healthy living and active ageing

responsible innovation of de-hospitalised care processes

Polarisation of health systems and processes towards:
prevention, prediction, rehabilitation, decentralised care of chronic diseases, assistance

Social involvement: necessary to create a new culture and new behavioural attitudes

- personal literacy
- self-management capability
- life style

Healthy living and active ageing
responsible innovation of de-hospitalised care processes

Education boost: new skills are essential

- new role for the third sector (*social science*)
- frail people acceptance of technical care solutions (*social science, engineering*)
- economic sustainability of new processes (*economy, social science*)

Anticipatory ICT

- health processes enabling functions and control
- health processes model and evaluation of evolutionary options (*anticipation*)

Concluding remarks

The Grand Challenges are inevitably increasing the weight of the *local dimension* and the *responsibility degree* of the agents

Social involvement, Education, Anticipatory ICT are at the same time:

- *necessary* to realise the aims tied to Grand Challenges and
- *key* components of a Responsible R&I

…. and should be intentionally pursued in public R&I measures

Within a given technological framework,
Responsibility in R&I *is* the way to resolve Grand Challenges issues

ADDRESSING ORIENTATION FAILURE: DIRECTIONALITY AND THE SYSTEMS OF INNOVATION HEURISTIC

Ralf Lindner and Stephanie Daimer*

Conference of the EU-SPRI Forum, 11 June 2015, Helsinki

*Co-Authors: Bernd Beckert, Nils Heyen, Jonathan Koehler, Philine Warnke, Sven Wydra and Benjamin Teufel

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The point of departure

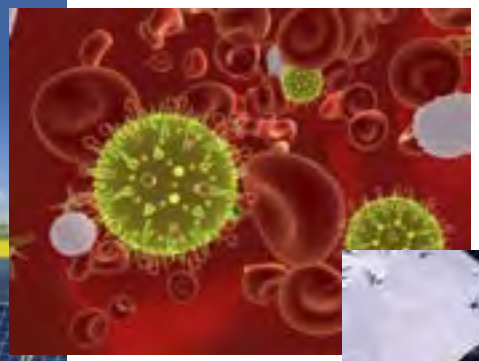
We observe a „normative turn“ in innovation policy: policy objectives beyond ímmediate economic growth and competitiveness become relevant.

This poses significant challenges for the substance, procedural design and coordination of STI policies.

Only „undirected“ innovations?

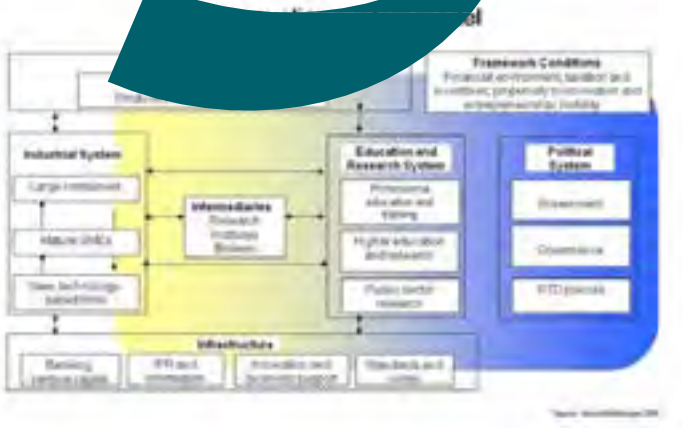
The innovation system heuristic is increasingly being criticised for its inability to address directions other than innovative capacity as a source of economic success.

Grand Challenges



Societal Needs

Responsible Research and Innovation



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Can systems of innovations concepts help us to identify the challenges linked to the need for directionality in innovation policy?
What kind of refinements are needed for IS concepts?

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Why the Systems of Innovation heuristic is a model worthwile to consider in our context

- Directionality is not (only) a challenge for innovation policy, hence for governments, but for ***all actors involved in or affected by*** knowledge creation and valorisation

  → the IS model is a good starting point to capture the relevant actors (… though an opening up towards new actors is needed).

- A transformation towards directed innovation activities requires ***reflexivity***

  → the IS model assumes ***exchange and feedback loops*** (non-linear processes)

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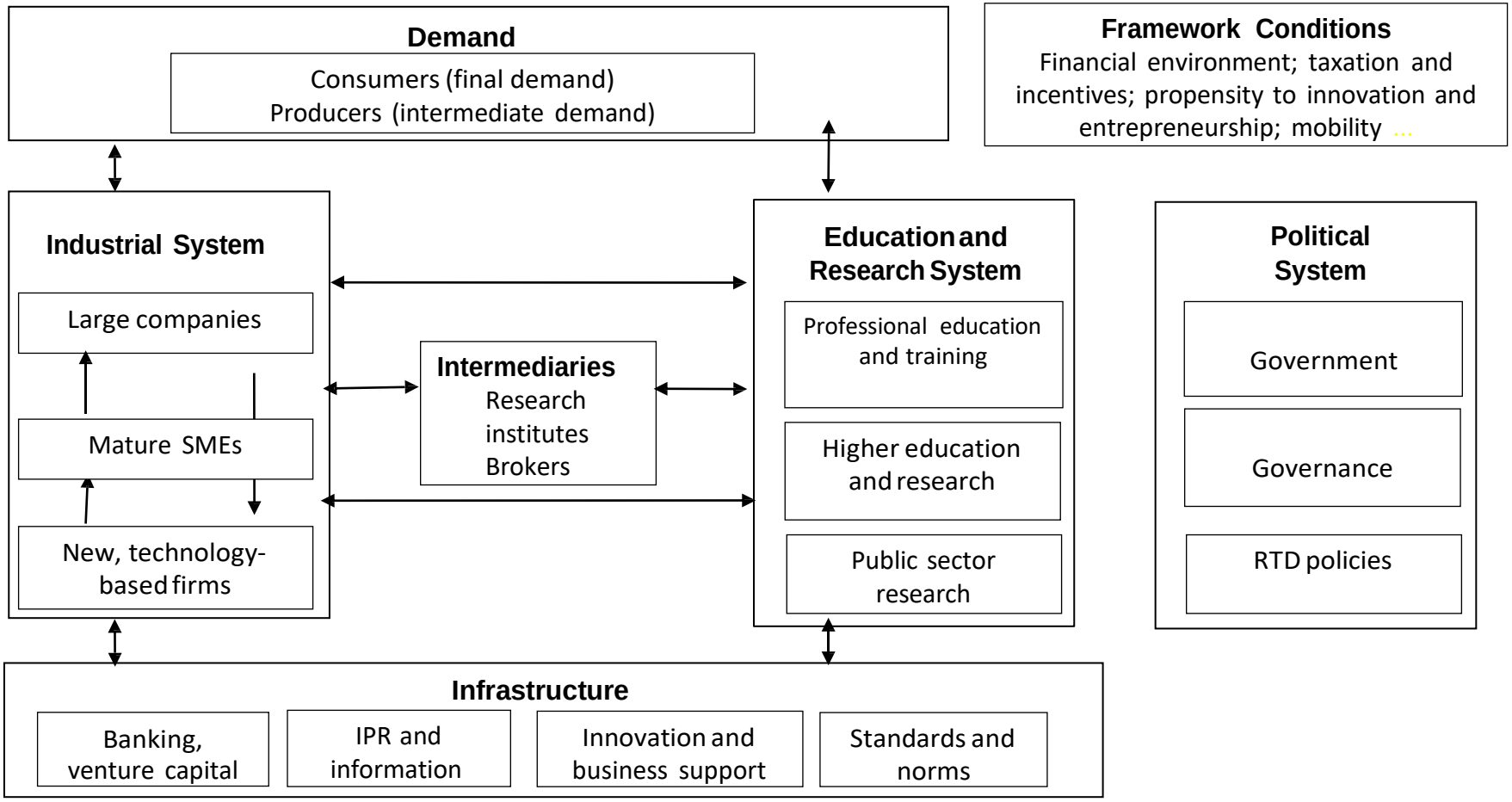
… but the classical IS model will need refinements



Source: Arnold/Kuhlmann 2001

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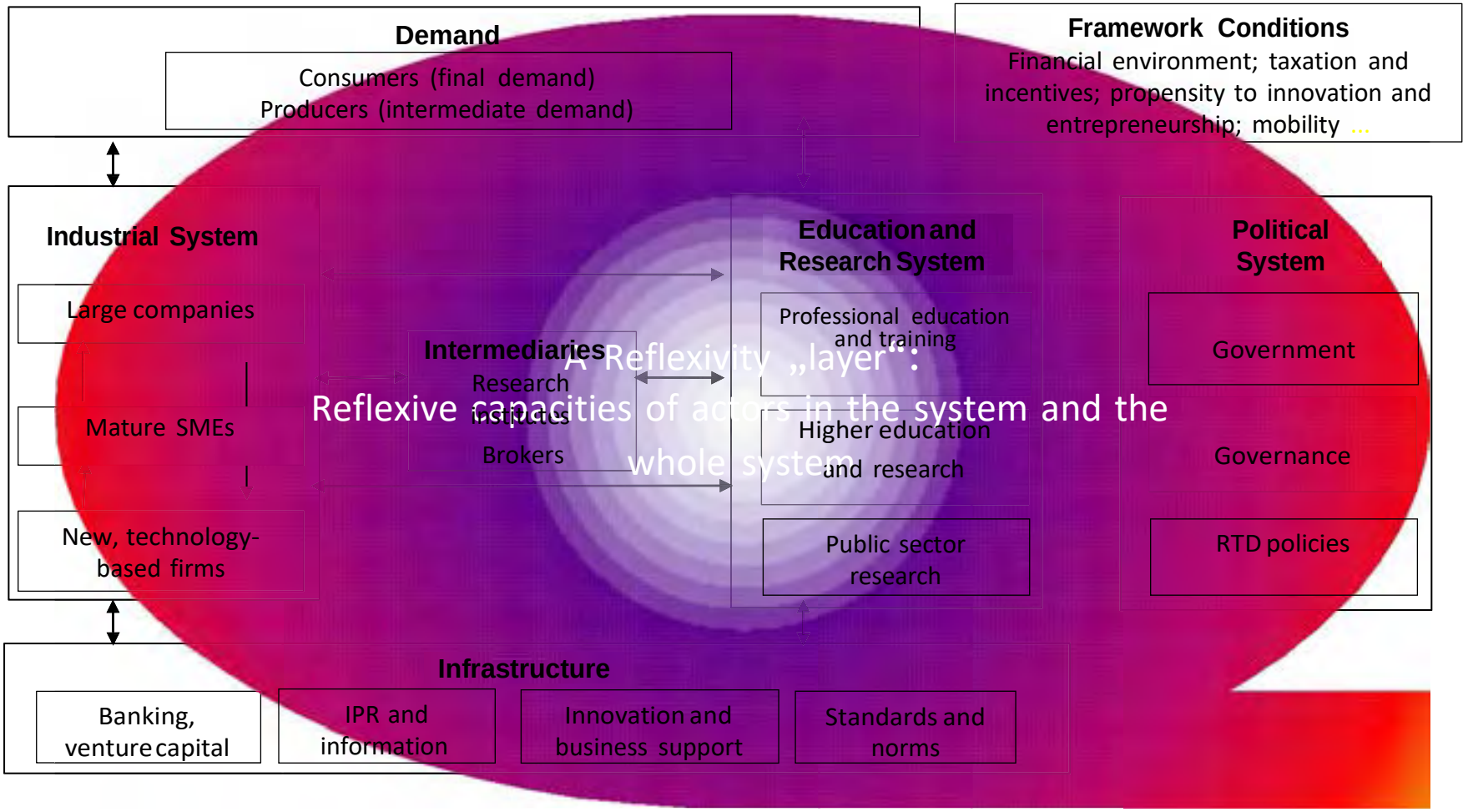
… but the classical IS model will need refinements



Source: Arnold/Kuhlmann 2001

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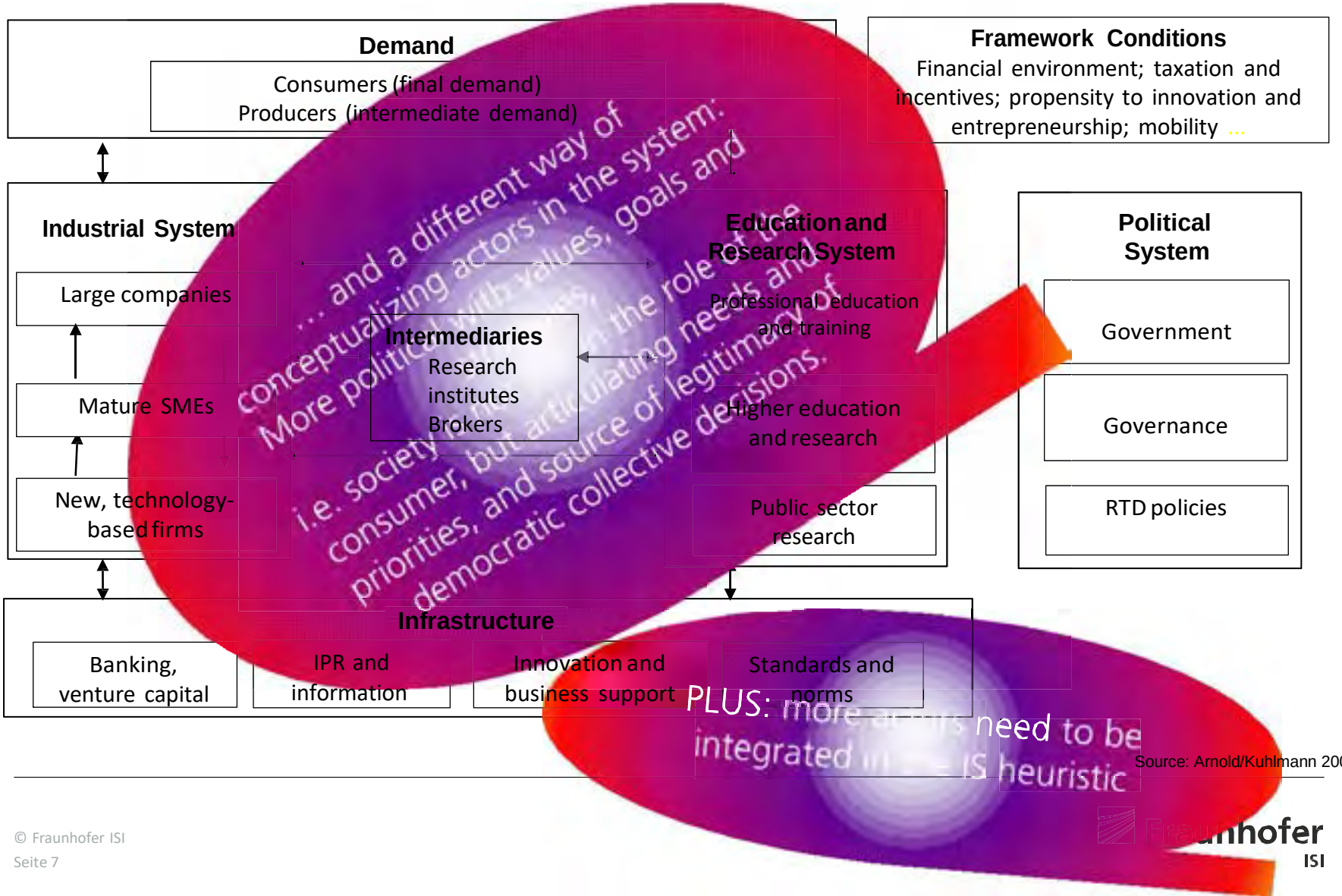
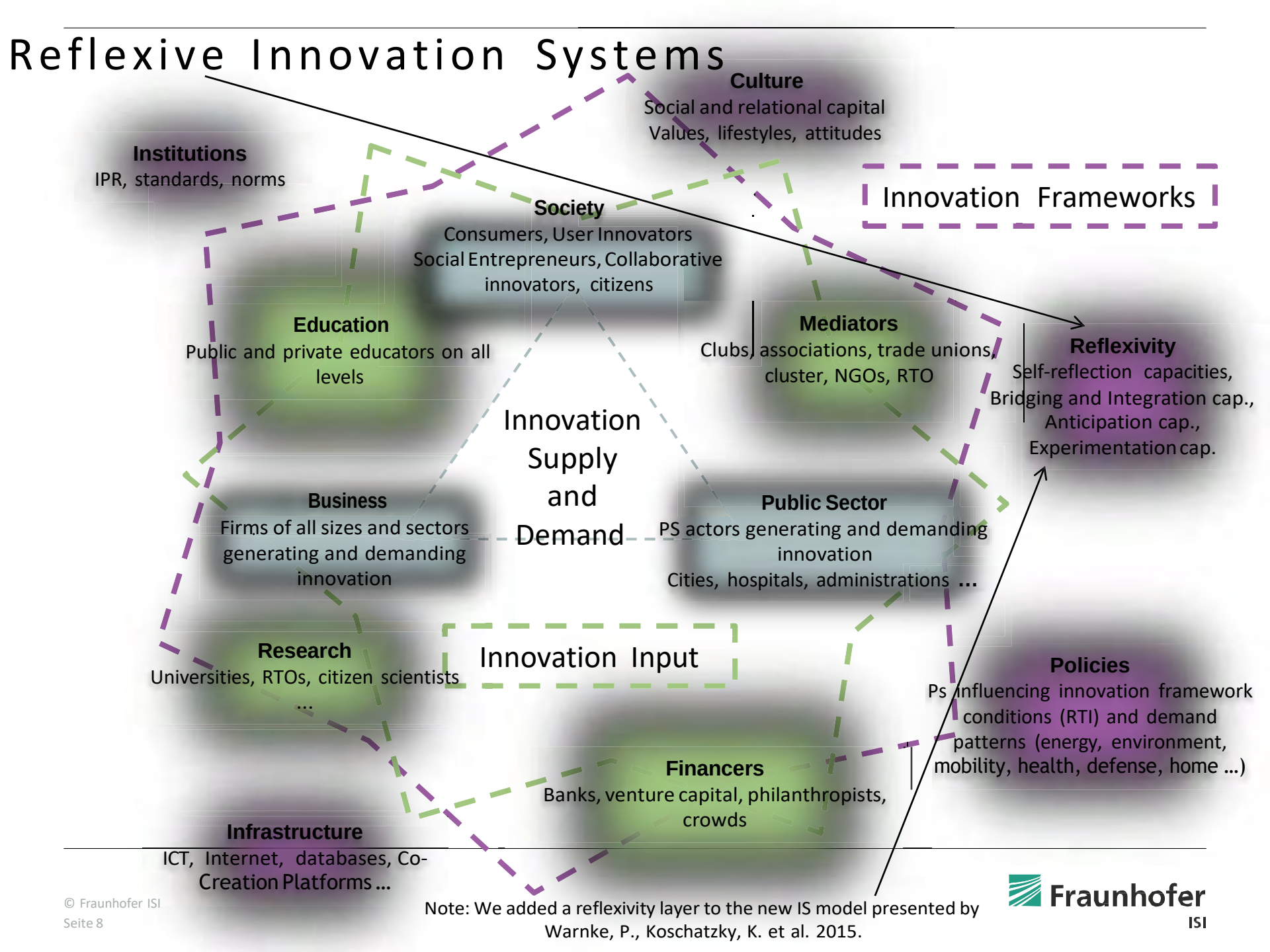
… but the classical IS model will need refinements



Source: Arnold/Kuhlmann 2001

Reflexive Innovation Systems



Note: We added a reflexivity layer to the new IS model presented by Warnke, P., Koschatzky, K. et al. 2015.

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Reflexive Innovation Systems

- Reflexivity in Innovation Systems means a set of system qualities and processes underpinning the ability to address directionalitiy of innovation.
- Reflexivity stretches onto three procedural steps (Voß et al. 2006) ….
  - Situation analysis
  - Goal formulation
  - Strategy development and implementation
- …. And comprises four types of capacities
  - Self-reflection capacities
  - Bridging and integration capacities
  - Anticipation capacities
  - Experimentation capacities

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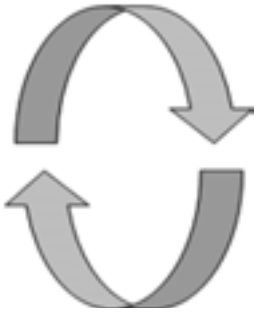
	Self-reflection capacities	Bridging and integration capacities	Anticipation capacities	Experimentation capacities
Situation analysis	Critical reflection about values and orientation (1) Indicators: position papers	Transdisciplinarity, collective intelligence, new actors (2) Indicators: which knowledge sources are being used, more arguing than bargaining; diversity of stakeholders	Futures awareness, recognition of uncertainties (3) Indicators: reflected in communications and publications; processes dealing with uncertainty (scenarios, radars, foresight)	Learning through failure on all levels and in different contexts Allowing for parallel approaches (4) Indicators: Policy-experiments 
Goal formu-lation	Articulation, adaptation (5) Indicators: Are goals formulated at all? On both levels - individual and systems level;	Participatory goal formulation, conflict recognition and moderation (6) Indicators: Existence of participatory agenda-setting; critical reflection on power imbalances, degree of inclusiveness	Openness towards goals for alternative futures (7) Indicators: Existence of processes to break organizational lock-in or to open mindsets beyond daily operational work	
Strategy development and imple-mentation	Articulation, adaptation, learning (8) Indicators: Is a strategy explicitly developed? Are the goals reflected/ applied in the strategy?	Interactivity, coordination (9) Indicators: Heterogeneity of actors involved, Coordination across silos, bottom-up and top-down elements for strategy development	Awareness of Uncertainties, assessment of (non-intended) side-effects, environmental scanning (360˚) (10) Indicators: Existence of systematic scanning and assessments, foresight cultures.	

Source: Own compilation, integrating insights from Voß et al. 2006, Weber/ Rohracher 2012, Daimer et al. 2012 and Kuhlmann/ Rip 2014.

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Conclusions - Why and what next?

- **A Model for Analysis**: The addition of a „reflexivity layer“ to IS shall help to adapt the IS model to the requirement of addressing directionality of innovation.
- **A „Checklist“ for Empirical Application**: The next step will be to check the presented set of quality criteria and indicators for its empirical usefulness – in national, sectoral or regional innovation systems.
- **A tool for Identification of failures**: An analysis of IS as regards their reflexive capacities might prove to be a tool helpful in identifying sources of „directionality / orientation failures“.

→ Tailored policy interventions, reflexive („tentative“ (Kuhlmann/Rip 2014)) governance, enabling self-organised and informed/ conscious action at all ends of the system?

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HIGHLY SKILLED MIGRATION AND KNOWLEDGE DIFFUSION: A GRAVITY MODEL APPROACH

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Presented at the EU-SPRI Conference, Helsinki 10.-12.06.2015

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GREThA

The context

- Highly skilled - *hs* - migrants: important knowledge asset for host countries
  - empirical findings on their positive impact on knowledge production and productivity
  - immigration policies *e.g.* the U.S. Green card program and the EU Blue card .

- In the contrary, *hs* migration has been depicted as a lost for sending economies —> with the so-called brain drain to sending economies —> low income ones in particular.

- Reported medical brain drain from these low income economies (Connell et al., 2007; Chojnicki and Oden-Defoort, 2011) —> with some economic costs.

The context

- Existing case studies on the beneficial impact of Chinese and Indian immigrants to the U.S. on their sending countries linked to:
  - the size of returnees after some experience abroad and;
  - the ties with their respective home countries.
- And it is these ties that interest us here as they are the ones conveying knowledge diffusion back home.

OUTLINE

- Motivation
- Research question
- Some background literature
- Model
- Main contribution and findings
- Data description
- Results and implications
- Extension

- Apart of India and China, little is known on the brain gain effect of *hs* migrants on other sending economies;
- Much less known on the mechanisms underpinning brain gain as a knowledge contribution of *hs* migrants to their home economies;
- So we dig into the role *hs* migrants as a channel of knowledge diffusion to sending economies.

- Is sending their *hs* abroad technologically beneficial to the home countries as it is to the host countries?
  - Impact of *hs* migration on the level of knowledge flow;

- Hypothesis on the positive relationship between these two variables —> two formulations:
  - Knowledge diffuses through ethnic ties from *hs* migrants to the source country;
  - The size of *hs* migrants affects the magnitude of knowledge flow from the sending to the receiving country;

- On using patent citations as a measure of knowledge spillovers (Caballero and Jaffe, 1993)
- On the determinants of knowledge spillovers: Foreign Direct Investment (FDI), geographical, technological and cultural proximity (MacGarvie, 2005; Keller, 2001), R&D (Coe and Helpman, 1995; Keller, 997)
- On linking migration to knowledge spillovers through migrants networks and ethnic communities (Kerr, 2008)
- On associating migrant networks or ethnic ties to FDI (Kugler and Rapoport. 2007; Javorcik. Özden et al. 2011), R&D off shoring (Miguelez. 2014) and international trade (Gould. 1994)

Gravity model:

$$KF_{ijt} = e^{\beta_0} . mig_{ijt}^{\beta_1} . Z_{ijt}^{\gamma_n} . e^{\tau_i} . e^{\tau_j} . e^{\delta_t} . \varepsilon_{ijt} \quad (1)$$

Where :

- KF_{ijt} is the flow of knowledge between country i and country j in the year t,
- mig_{ijt} is the total inventors of country i living in country j in year t,
- Z_{ijt} is the set of dyadic and country specific control variables in year t,
- τi, τj and δt are country i, country j and time FE respectively. εijt stands as the error term.

$$E(KF_{ijt} \mid X_{ijt}) = \exp[\beta_0 + \beta_1 \ln(mig_{ijt} + 1)\gamma_n + \ln(Z_{ijt} + 1) + \tau_i + \tau_j + \delta_t + \varepsilon_{ijt}] \quad (2)$$

Poisson pseudo-maximum likelihood (PPML) regression —> due to the presence of many zeros in variables (Santos-Silva and Tenreyro, 2006)

Findings

- Positive and statistically significant impact of migration on knowledge diffusion.
  - Baseline specification: a 10 % increase in the number of inventors from country *i* residing in country *j* ==> a one percentage point increase in the knowledge diffusion from country *j* to the sending country *i*.
  - Stronger coefficients for the pairs made of low income economies as sending/citing countries and high income economies as receiving/cited countries.
- Other control variables: in line with results found in the literature on the determinants of knowledge spillovers.

Data origin

Period 1990-2010

- Patent citations: the OECD Citations database derived from the EPO's Patstat database, Spring 2014 respectively. These are patents filed at the EPO but that went through the PCT procedure.
- Inventor migrants: Patent Cooperation Treaty (PCT), the patent database from the World International Patent Office (WIPO) from October 2013
- Almost all of the dyadic control variables come from the *Centre d'Etudes Prospectives et d'Informations Internationales'* (CEPII). (For reference see Mayer and Zignago 2011).

Main variables definition

- The migration flow variable: directly from the PCT data measures the number of immigrant inventors from one specific origin country at a given destination country.

- The knowledge flow: computed from the citation tables from the OECD Citations database. It is the fractional count of citations from one country to another per year, weighted by the number of inventors per patent.

KF built

Share product = (1/Total citing inventors)*(1/Total cited inventors)

Citing appli. id	*Cited appli. id*	*Year*	*Citing inv. country*	*Cited inv. country*	*Total citing inv.*	*Total cited inv.*	*Share product*
6697	*16009750*	*2008*	*AT*	*DE*	*1*	*2*	*0.25*
6697	*17392033*	*2008*	*AT*	*IE*	*1*	*2*	*0.25*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*
6705	*16519023*	*2008*	*AT*	*CA*	*3*	*3*	*0.11*

Share product = (1/Total citing inventors)*(1/Total cited inventors)

Knowledge flow = ∑ share product by citing - cited pair for each year

Year	*Citing country*	*Cited country*	*Sum share product*
2006	*AT*	*DE*	*512.8451559*
2007	*AT*	*DE*	*406.8226368*
2008	*AT*	*DE*	*428.3662443*
2009	*AT*	*DE*	*382.15106*
2007	*AT*	*CA*	*28.89806689*
2008	*AT*	*CA*	*36.36805556*

back

Citing country	Cited country	# of citations	Citation share Cum. (%)
Germany	USA	31535,83	5,55
USA	Japan	30436,24	10,9
UK	USA	26071,23	15,49
USA	Germany	19469,17	18,91
France	USA	14961,82	21,54
Germany	Japan	14487,21	24,09
Japan	USA	13766,22	26,51
Netherlands	USA	12971,89	28,79
USA	UK	12328,78	30,96
Canada	USA	11642,68	33,01
Israel	USA	9,803,344	34,73
Sweden	USA	9,785,602	
Italy	USA	9,206,611	
Australia	USA	9,084,947	
Switzerland	USA	8,699,053	

Table 1. Citations corridors (Total flow of citations for the top country pairs for the period 2006-2010)

Database, October 2013

Origin country	Destination country	Total migration flow	Cum. Migration share (%)
China	USA	27696	13.48
India	USA	21712	24.04
Canada	USA	11364	29.58
UK	USA	8313	33.62
Germany	USA	5895	36.49
Germany	Switzerland	4952	38.9
Republic of Korea	USA	4877	41.27
France	USA	3898	43.17
Japan	USA	2844	44.55
Russian Federation	USA	2309	45.58
France	Switzerland	1880	46.59
Israel	USA	1878	47.51
Australia	USA	1783	48.37
Netherlands	USA	1670	49.19
France	Germany	1492	49.91

Table 2. Migration corridors (Total flow of inventor immigrants for the top 20 country pairs for the period 2006-2010)

Source: WIPO Statistics Database, October 2013

Other control variables

- Dyadic variables:
  - Cultural distance: a common language dummy;
  - Geographical distance: a contiguity dummy and a variable for the distance between the biggest cities in citing and cited countries;
  - Technological proximity;
  - A dummy variable for colonial ties;
- Country specific technological level: Total number of inventors per year.

Descriptive stat

Table 3: Baseline estimations for the period 1990 – 2010

	PPML (1)	PPML (2)	PPML (3)
Ln(migrant inventors + 1)	0.101*** (0.00999)	0.0994*** (0.00992)	0.107*** (0.0103)
Contiguity	0.0435* (0.0222)	0.0356 (0.0229)	0.0474** (0.0235)
Colony	0.0152 (0.0217)	0.0199 (0.0215)	0.0898* (0.0492)
Common official language	0.0817*** (0.0206)	0.0777*** (0.0210)	0.192*** (0.0363)
Ln(distance)	-0.0514*** (0.0122)	-0.272** (0.119)	-0.159 (0.120)
[Ln(distance)]2		0.0139* (0.00728)	0.00700 (0.00738)
Colony*ln(migrant + 1)			-0.0140 (0.0107)
Common language * ln(migrant + 1)			-0.0236*** (0.00820)
Technological similarity	1.451*** (0.0739)	1.452*** (0.0739)	1.460*** (0.0740)
Ln(# of inventors in country i + 1)	0.516*** (0.0308)	0.517*** (0.0308)	0.515*** (0.0309)
Ln(# of inventors in country j + 1)	0.350*** (0.0325)	0.351*** (0.0325)	0.349*** (0.0326)
Constant	-8.659*** (0.535)	-7.820*** (0.709)	- 8.365*** (0.715)
N	382,304	382,304	382,304
Pseudo R2	0.970	0.970	0.970
Country i & Country jFE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Link

*** p<0.01,
** p<0.05,
* p<0.1

Table 4: Estimations without some of the biggest players for the period 1990 – 2010

	PPML(1)	PPML(2)	PPML(3)
Ln(migrant inventors + 1)	0.0705*** (0.00983)	0.108*** (0.00998)	0.104*** (0.0101)
Contiguity	0.0446* (0.0243)	0.0185 (0.0228)	0.0319 (0.0229)
Colony	0.0465* (0.0255)	0.00890 (0.0218)	0.0193 (0.0217)
Com. official language	0.0712*** (0.0223)	0.0936*** (0.0209)	0.0739*** (0.0210)
Ln(distance + 1)	-0.344*** (0.131)	-0.359*** (0.119)	-0.276** (0.119)
[Ln(distance + 1)]2	0.0174** (0.00813)	0.0196*** (0.00729)	0.0142* (0.00731)
Technological Similarity	1.699*** (0.0735)	1.396*** (0.0748)	1.467*** (0.0750)
Ln(# of inv. in country *i* + 1)	0.507*** (0.0300)	0.488*** (0.0313)	0.485*** (0.0342)
Ln(# of inv. in country *j* + 1)	0.541*** (0.0327)	0.344*** (0.0327)	0.347*** (0.0329)
Constant	-8.194*** (0.711)	-7.537*** (0.709)	-7.795*** (0.711)
N	376,682	379,451	379,451
Pseudo R2	0.973	0.970	0.970
Countries *i j* , year FE	Yes	Yes	Yes
Without U.S. as cited/receiving Country	Yes	No	No
No India as citing/sending country	No	Yes	No
No China as citing /sending country	No	No	Yes

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Estimations for –low income-high income and –Africa-high income pairs for the period 1990 - 2010

	PPML(1)	PPML(2)	PPML(3)
Ln(migrant inventors + 1)	0.602*** (0.211)	0.101*** (0.0105)	0.075** (0.0349)
Contiguity	-0.827 (3.076)	0.0219 (0.0229)	2.533* (1.351)
Colony	-0.888* (0.529)	0.0115 (0.0215)	0.203 (0.248)
Common official language	0.835 (0.540)	0.0870*** (0.0211)	0.0208 (0.188)
Ln(distance + 1)	-0.732 (7.583)	-0.371*** (0.121)	6.662** (2.860)
[Ln(distance + 1)]2	-0.0199 (0.452)	0.0203*** (0.00746)	-0.407** (0.174)
Technological similarity	-3.169** (1.527)	1.459*** (0.0776)	-0.549 (0.442)
Ln(# of inventors in country i + 1)	1.135*** (0.271)	0.514*** (0.0307)	0.269** (0.116)
Ln(# of inventors in country j + 1)	0.584 (0.607)	0.298*** (0.0372)	0.271*** (0.0955)
Constant	-0.946 (33.94)	-1.902** (0.801)	-30.05*** (11.62)
N	9,616	123,534	21,979
Pseudo R2	0.256	0.970	0.983
Countries i j, year FE	Yes	Yes	Yes
Low-High income	Yes	No	No
All-High income	No	Yes	No
African-High income	No	No	Yes

*** p<0.01,
** p<0.05,
* p<0.1

- Signs of all explanatory variables —> in line with those found in the literature

- Results suggest immigrant inventors from one origin in a given country are a channel of knowledge diffusion from that country to the sending country. The migration variable remains significant even after dropping the biggest players from the regression.

- Brain gain for low income economies? two pieces of evidence:
  - *hs* migrants' "knowledge feedback" to low income economies >> much higher;
  - evidence holds for technology in which low income economies are not specialised in.

- Policy implication for all countries:
  - instead of focusing the debate on brain drain, the attention of home and host economies policy makers should be more oriented towards finding strategies in order to establish and strengthen the connection between *hs* diaspora and those remaining home, through adequate knowledge networks.

- For low income sending economies:
  - where the coefficient for the number of inventors was higher than in all other model specifications, there should be an emphasis on policies leading to an increase of their *hs* size like more investment on education for instance.

- We added some more control variables: GDP, similarity in religious beliefs and linguistic similarity and found an even stronger coefficient of our explanatory variable.
- Additionally, we ran an IV strategy model using the below instrument :
  - An index of tightness in immigration laws computed by Ortega and Peri (2013) but only for 12 receiving OECD countries over the period 1980 - 2006.
- But, further robustness check needed: 2 to 5 years time windows regressions, time lag between dependant and independent variables.

Table 6: More control to the baseline model (1990-2006)

	PPML(1)
Ln(migrant inv. + 1)	0.209*** (0.0101)
Contiguity	0.0745* (0.0408)
Colony	-0.0393 (0.0349)
Common official language	0.522*** (0.0534)
Common ethno language	-0.170*** (0.0458)
Ln(distance + 1)	0.256*** (0.0105)
Religion similarity	-0.424*** (0.0722)
Linguistic similarity	-0.299*** (0.0536)
Technological similarity	1.572*** (0.100)
Ln(# of inv. in country i + 1)	0.618*** (0.0663)
Ln(# of inv. in country j + 1)	0.783*** (0.0105)
Ln(GDPi)	-0.514*** (0.191)
Ln(GDPj)	0.452*** (0.0286)
Constant	-10.32*** (1.576)
N	376,457
Pseudo R2	0.256
Countries i j, year FE	Yes

*** p<0.01, ** p<0.05, * p<0.1

Table 7: IV regressions for the baseline model (1990-2006)

	PPML	OLS	IVPOISSON
VARIABLES	*Knowledge flow*	*Migration flow*	*Knowledge flow*
Ln(migrant inv. + 1)	0.140***		0.0237
	(0.0106)		(0.0269)
Immigration law		-0.0586***	
		(0.00200)	
Contiguity	0.0569	1.037***	0.0428
	(0.0416)	(0.0560)	(0.0449)
colony	-0.164***	0.284***	-0.123***
	(0.0369)	(0.0236)	(0.0395)
Common official language	0.344***	0.268***	0.519***
	(0.0293)	(0.0138)	(0.0447)
Ln(distance)	0.248***	-0.0123	0.212***
	(0.0125)	(0.00833)	(0.0125)
Technological similarity	1.821***	0.352***	2.157***
	(0.183)	(0.0352)	(0.217)
Ln(# of inv. in country i + 1)	0.644***	0.0695***	0.943***
	(0.0449)	(0.00812)	(0.0510)
Ln(# of inv. in country j + 1)	0.857***	0.143***	0.945***
	(0.0138)	(0.00244)	(0.0220)
Constant	-13.60***	-0.879***	-14.25***
	(0.518)	(0.0775)	(0.558)
N	28, 560	33, 264	33, 264
R-squared	0.9010	0.5850	0.1239

*** p<0.01, ** p<0.05, * p<0.1

Table 8: IV regressions for OECD countries as citing/sending and cited/receiving countries (1990-2006)

	PPML	OLS	IVPOISSON
VARIABLES	***Knowledge flow***	***Migration flow***	***Knowledge flow***
Ln(migrant inv. + 1)	0.140***		0.0268
	(0.0110)		(0.0272)
Immigration law		-0.106***	
		(0.00522)	
Contiguity	0.0625	0.530***	0.0479
	(0.0421)	(0.0532)	(0.0455)
colony	-0.166***	0.504***	-0.121***
	(0.0376)	(0.0522)	(0.0404)
Common official language	0.330***	0.738***	0.502***
	(0.0305)	(0.0440)	(0.0448)
Ln(distance)	0.251***	-0.114***	0.213***
	(0.0127)	(0.0131)	(0.0128)
Technological similarity	1.946***	1.110***	2.279**
	(0.200)	(0.0915)	(0.232)
Ln(# of inv. in country i + 1)	0.673***	-0.267***	0.706***
	(0.0627)	(0.0304)	(0.0710)
Ln(# of inv. in country j + 1)	0.856***	0.331***	0.942***
	(0.0141)	(0.00691)	(0.0223)
Constant	-13.09***	-1.085***	-13.85***
	(0.836)	(0.164)	(0.950)
N	7, 056	7, 056	7, 056
R-squared	0.900	0.666	0.1178
OECD countries	Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

Table 9: IV regressions for non-OECD countries as citing/sending and OECD countries as cited/receiving countries (1990-2006)

	PPML	OLS	IVPOISSON
VARIABLES	***Knowledge flow***	***Migration flow***	***Knowledge flow***
Ln(migrant inv. + 1)	0.163***		0.128**
	(0.0185)		(0.0589)
Immigration law		-0.0457***	
		(0.00184)	
Contiguity	0.492	-0.813***	0.524
	(0.543)	(0.173)	(0.542)
colony	-0.0973	0.209***	-0.0940
	(0.0925)	(0.0213)	(0.0887)
Common official language	0.531***	0.177***	0.598***
	(0.0793)	(0.0114)	(0.128)
Ln(distance)	0.144***	0.0138	0.158***
	(0.0401)	(0.0086)	(0.0446)
Technological similarity	0.281	0.112***	0.404
	(0.220)	(0.0363)	(0.308)
Ln(# of inv. in country i + 1)	0.409***	0.0655***	0.414***
	(0.0474)	(0.00923)	(0.0484)
Ln(# of inv. in country j + 1)	0.837***	0.0925***	0.865***
	(0.0206)	(0.00222)	(0.0491)
Constant	-11.78***	0.382***	-12.24***
	(0.626)	(0.130)	(0.923)
N	21, 504	21, 504	26, 208
R-squared	0.8950	0.8940	0.1009
Non-OECD-OECD	Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

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THANK YOU FOR YOUR ATTENTION!

☺

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Towards new mission-oriented RTI policy and new rationales for programming and priority-setting

Insights from the case of security

K. Matthias Weber (AIT)
E. Anders Eriksson (FOI)

EU-SPRI Conference
Helsinki, 10-12 June 2015

Background

- Growing importance of „new“ mission-orientation, but RTI policy development and programming is still from the previous era
  - Novel approach to RTI policy and programming required
- Prevailing governance systems of RTI policy have grown over many years, geared towards competitiveness objectives, with stable rationales and practices
  - Hard to change
- Security as a particularly dauting case
  - Very diverse, limited incentives for innovation, etc.
- General insights applicable to other areas of mission-oriented RTI policy and programming

Structure of presentation

- The need for a new approach to R&I programming and priority- setting
- Four archetypes of security innovation
- From security needs to R&I priorities
- From priority-setting to the governance of challenge-oriented R&I programming
- Conclusions

The need for a new approach to R&I programming and priority-setting

… but incompatible with the new approach to security RTI policy and programming

‚Societal' Security
- Societal security needs
- Security investments
- Security R&I

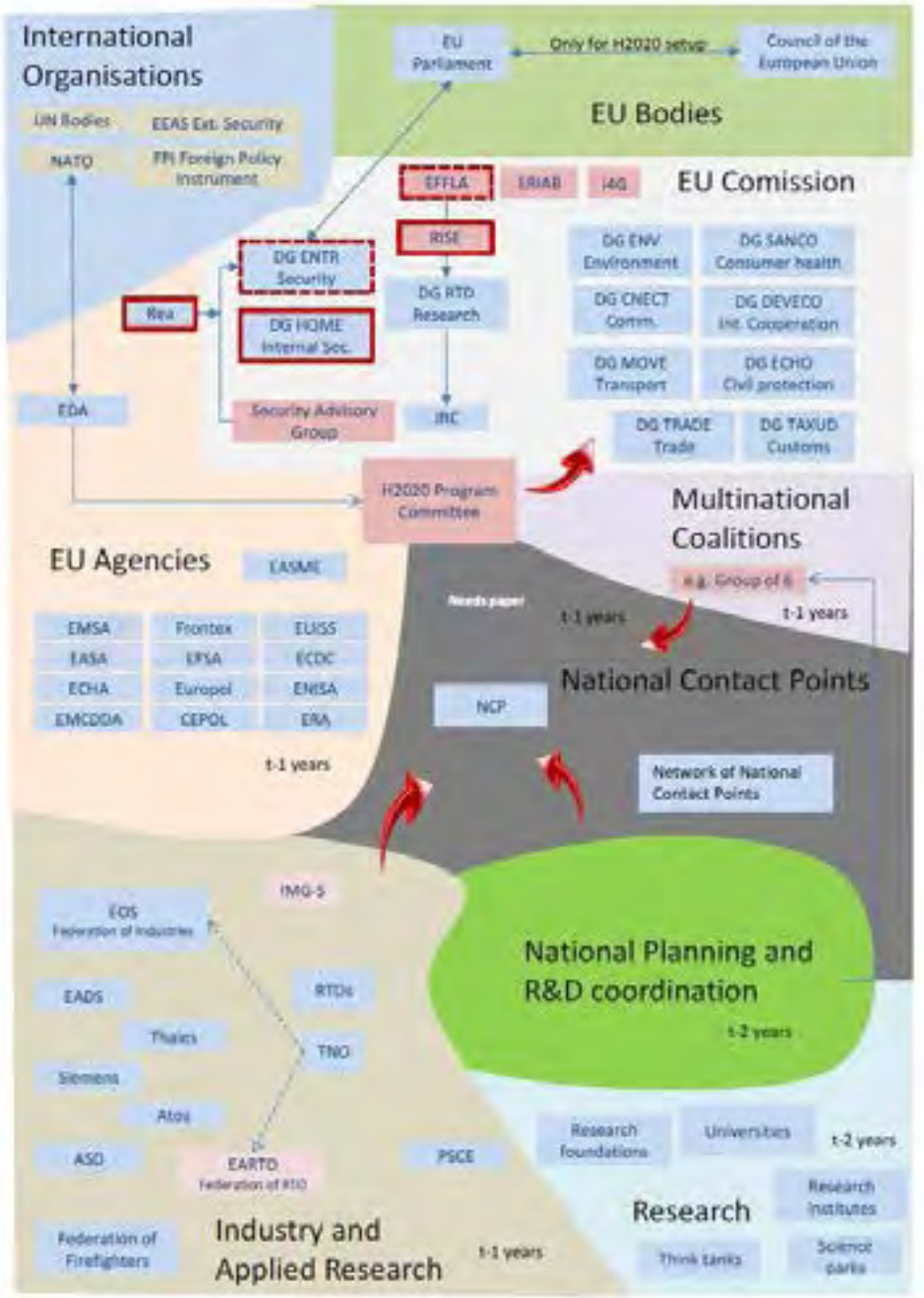
New Mission-Orient. R&I policy
- Tackling Societal Challenges
- Embedded in sectoral policy goals (e.g. societal security ?)

New requirements for R&I policy

???

Current Approach
- Technologically oriented
- Embedded in industrial policy
- Inspired by an ‚industrial innovation

Current practice of prioritisation in RTI policy



Three novel elements needed

- A broader and more differentiated approach to R&I: four archetypes of security R&I
  - The debate about social innovation
- Moving from societal security needs to R&I priorities
  - Need for a more comprehensive set of technical and social rationales underpinning prioritisation
- From priority-setting to the governance of challenge-oriented R&I programming
  - Governance setting in which priority-setting takes place, the programme environnment

Four archetypes of security R&I

The specifities of security R&I in a mission-oriented frame

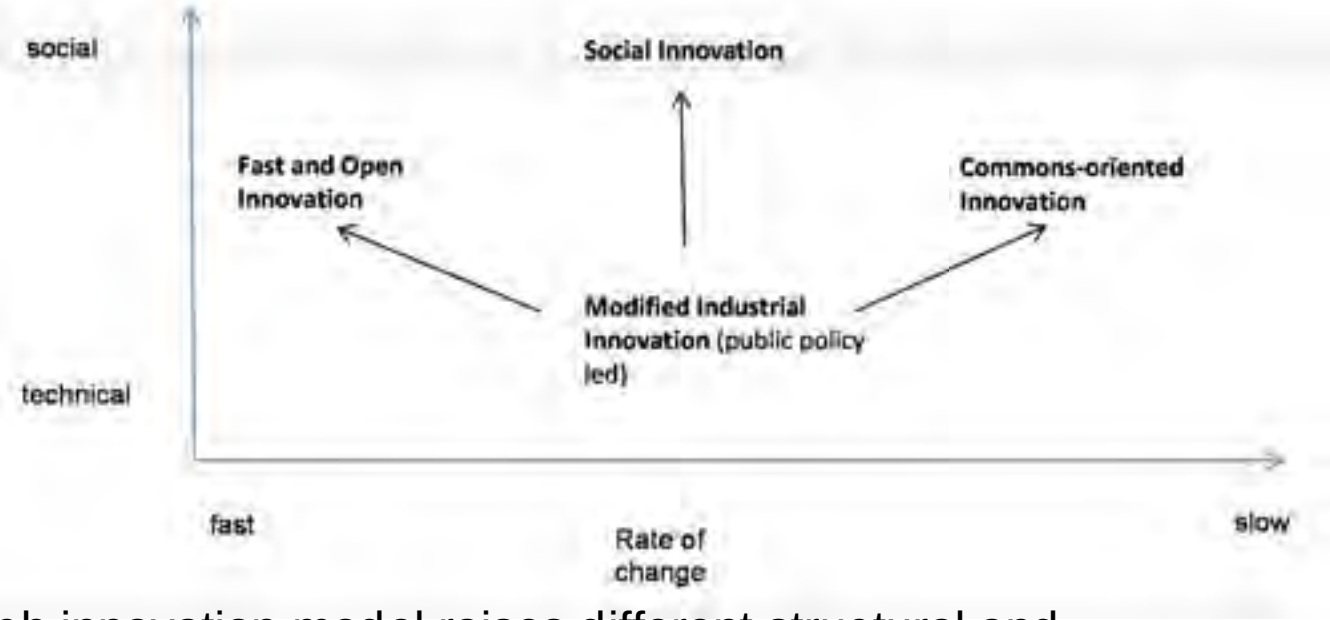
- Inherently limited incentives for innovation due to
  - Broad range of low-probability events
  - Public good character of security
  - High diversity, short as well as long time horizons

- New inroads for addressing security issues by way of R&I
  - Societal security implies moving beyond threat-response model
  - More comprehensive set of targets of innovation: threats as well as sources of security in the focus
  - Broader range of innovations to be considered: technological, social, organisational, etc.

➡ A more differentiated approach to innovation (and R&I policy!) is needed!

Four archetypes of security innovation

- Broadening of the range of innovation areas to be considered
- Two key dimensions
  - Rate of change – fast/slow
  - Balance between social and technological aspects

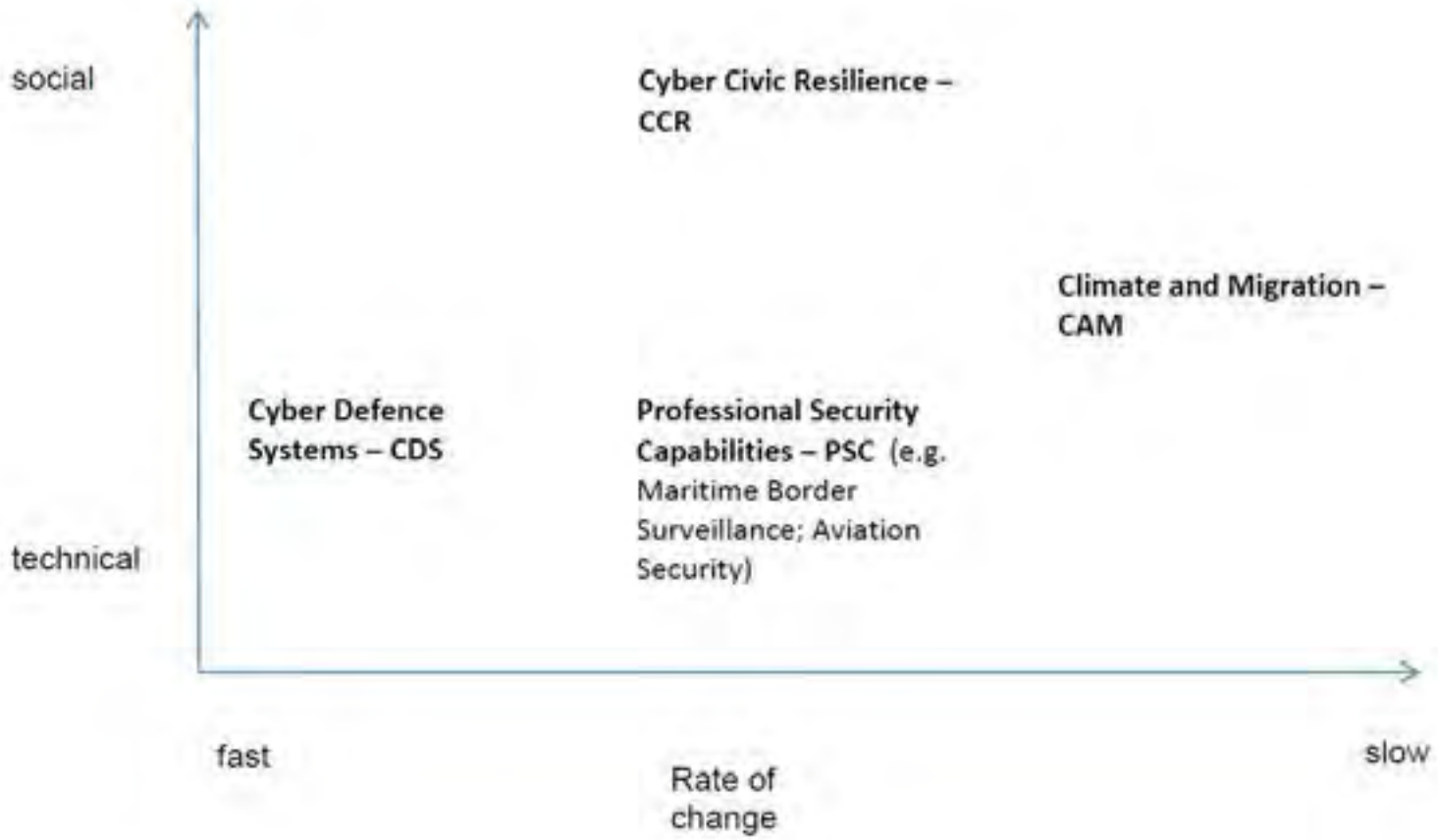


➡ Each innovation model raises different structural and institutional requirements, and thus also for R&I policy and programming

Cases and archetypes

- Professional Security Capabilities – mainstream ‘modified industrial innovation model‘
  - Supply chain security and customs risk-based approaches
  - Geo-engineering (linking to commons-oriented innovation)
- Cyber Defence Systems – ‘fast and open innovation model‘
- Cyber Civic Resilience – strong ‘social innovation‘ elements
- Climate and Migration – ‘commons-oriented innovation model‘

Positioning the cases



From security needs to R&I priorities

Key issues in priority-setting

- The purpose of R&I in the field
  - *Generic R&I policy rationales*: Mission-oriented or not?
- The mission to which R&I is supposed to contribute
  - The overarching mission is defined by domain policy: societal security
  - Identification of future security challenges using foresight methods (e.g. cybersecurity, terrorism, enhancing societal resilience)
  - *Security policy rationales* to determine priority areas of security (thematic priorities)
- The kinds of R&I systems needed to tackle selected missions
  - *Security R&I policy rationales* for the four archetypes of security R&I (structural priorities)
  - Use of different methods of assessment and prioritisation
- The role of government, and of the EU in particular
  - Legitimacy of government intervention in R&I

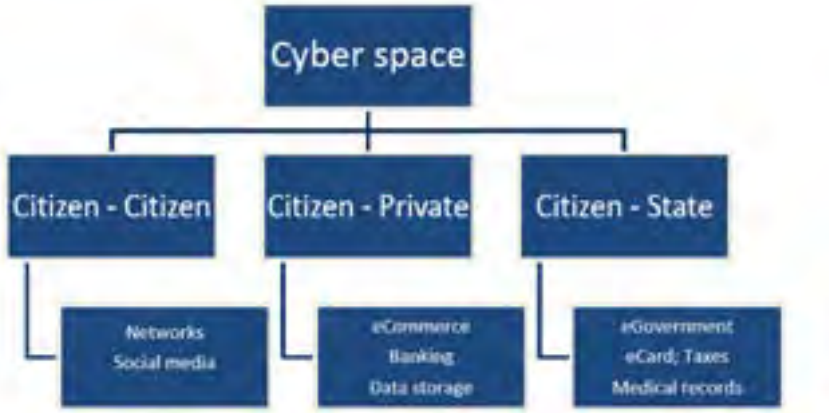
➡ Consideration of both technical and social rationality: beyond a technocratic approach

Methodological framework

- Differentiated assessment methodology depending on innovation archetypes
  - Quantitative portfolio analysis vs. qualitative assessment
- Underlying rationales for collective priority-setting
  - Considering both technical AND social rationales/stakeholder perspectives
  - Considering security policy AND RTI policy rationales AND security R&I policy
- Considering the need for government intervention
  - R&I policies to help build systems that deliver the innovations for enhancing societal security
  - Considering both thematic AND structural priorities

Example: the case of Cyber Civic Resilience CCR

- „Cyber“
  - Computers, computer networks and services
- „Civic“
  - Citizens perspective
- „Resilience“
  - Strength/ability of something to return to its original or better state after a disruption



➡ The identification of ‚Cyber Civic Resilience‘ is an example of a novel kind of R&I areas of different ‚shape and content‘

Structural and thematic R&I agendas in CCR

Structural

- Comprehensive approach due to complexity – developers / adopters / users / citizens
- Short-term responses / long-term resilience building
- Integrating adaptivity in the R&I landscape
- Integration of ethical issues in R&I (privacy, …)
- Inter- and transdisciplineary: ICT, sociology, ethics, governance

Technological

- Big data and cloud computing
- Cyber services and civic resilience

Social

- Trust and trusted groups
- Awareness of possible attacks
- Citizens' self-organisation
- Cyberbullying
- Privately owned networks/platforms

Economic

- Resilience of e- commerce
- Hidden costs of cyber services
- Transparency of data use

Political / Legal

- Increaing awareness of citizens
- New forms of cyber policy
- Militarisation of cyber space
- Cyber rights/cyber citizenships
- International regula-tions/standards

Education

- Digital literacy
- Societal backlash

From priority-setting to the governance of challenge-oriented R&I programming

The prevailing model of governing R&I programmes

- Centred on industrial innovation
- Oriented towards a single and stable vision
- Linear process of deducing priorities from a single vision
  – Strategic Research Agenda
- Limited user and stakeholder involvement (i.e. mainly industrial)
- Limited scope for learning and

➡ flexibility Works at best for parts of

security R&I

A standard four-phase model of R&I programming

Adaptive four-phase model of programming for challenge-oriented R&I

Towards an adaptive programming cycle model

- From a linear to an interactive and adpative programing cycle
- Deductive approach (vision– implementation) inappropriat
- Continuous adjustment of wr constitutes the challenges a
- Need for continuous „resear understanding“, underpinnin
- Flexibility in implementation: vs. decentralised
- More actors and stakeholder participatory approach, and i

- Embedding in security policy coordination

Ten operational requirements for challenge-oriented security R&I programming

- Give guidance and orientation.
- Include the needs of those affected.
- Consider both social and technological innovation.
- Ensure flexibility and adaptivity
- Ensure embedding of R&I in the context of use
- Policy coordination with domain policy
- Inter- and trans-disciplinarity
- Ensure specificity of local solutions
- Address a global geographic area of concern
- Consider ethical implications and dilemmas

➡ Apply by and large to security as well to other challenges

The role of foresight in the adaptive programming cycle

- ETTIS foresight building blocks to underpin the programming cyc
  - Guiding security
  - Anticipating secu using scenarios
  - Exploring and as
  - Using foresight t implementation
  - Supporting the g programming cyc

Conclusions

- ‚Comprehensive societal security' as guiding normative concept for challenge-oriented security R&I policy
  - Need for a security R&I strategy that provides normative guidance
- More differentiated approach to innovation (models) to underpin R&I policy
  - Complement the prevailing „industrially inspired" model
  - Take specific features of security seriously: ‚societal' nature of security, diversity, time/pace of change, adaptivity…
- Priority-setting in the context of challenge-oriented R&I policy
  - Differentiated approach, depending on innovation archetypes
  - Drawing on security as well as RTI policy rationales
  - From a technocratic to a socially embedded process model
- Explore new approaches to programming
  - Adaptive and iterative approach
  - Decentralised vs. centralised elements
  - Integration of foresight and research to understand security challenges/solutions

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A system dynamic and multi-criteria perspectives in the evaluation of innovations

EU-SPRI conference, 10. - 12.6.2015, Helsinki

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Hyytinen, K., Ruutu, S., Nieminen, M., Gallouj, F. & Toivonen M.(Forthcoming): A system dynamic and multi criteria evaluation of innovation in environmental services. *Economic and Policy of Energy and the Environment (EPEE).*

Outline

- Background and motivation
- Aim of the study & research questions
- Sketching the new framework for evaluation
  - Multi-criteria perspective
  - System dynamic modelling
- Case context
- Research results
- Concluding remarks

Background & motivation

- Current societal problems (e.g. environmental sustainability) are complex and systemic in nature: too big to be solved via individual product or service innovations. Conversely, large scale changes combining various innovations with the social support and engagement aiming at system level solutions are required
  - Innovations needed in this context are multiple and complex in nature: technological, non-technological and service-based novelties are interlinked with broad social and systemic changes (e.g. Toivonen 2014; Rubalcaba et al. 2011; Djellal & Gallouj 2010; Gadrey 2010).
  - Collaboration between multiple actors representing different sectors of society is needed; particularly the complementarities and synergies between public and private and third sector organizations are essential (e.g. Lévesque 2013; Gallouj et al. 2013).
  - Furthermore, developing innovations and disseminating them at the systemic level requires understanding about the whole socio-technical system, including the dynamics and interplay between parts of the system (Geels 2002, 2004.)

Background & motivation

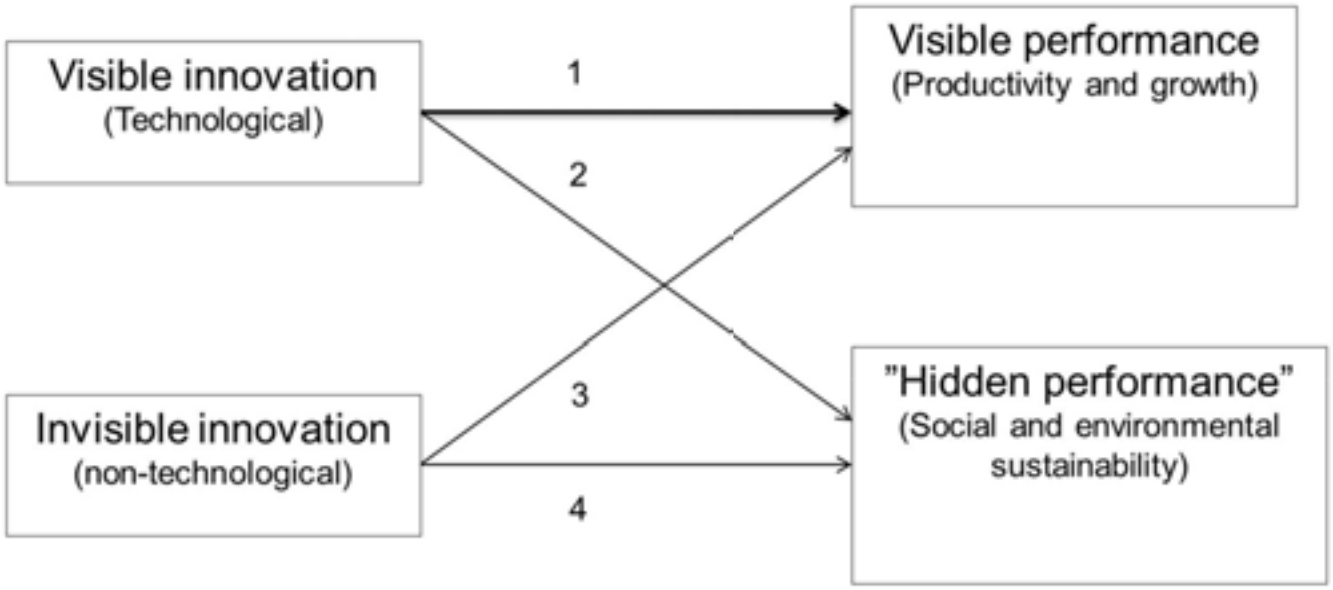
- Consequently, new approaches and mechanisms to support the innovation development, strategic planning and governance have become necessary (e.g. Borras & Edler 2014, Lévesque 2013, Hartley 2005, Smits & Kuhlmann 2004).

- Systematic evaluation has been an essential part of strategic thinking for decades. However, the primary focus in the evaluation of innovation has been on traditional S-T –indicators highly oriented towards technological and financial aspects of innovations; furthermore linear input-output-outcome thinking included in the traditional evaluation does not correspond to the complex development processes and multiple relationships

- In practice, "plurality of methods" to develop traditional evaluation approaches and governance are suggested as an answer (e.g. Lévesque 2013, Rotmans & Loorbach 2009, Hartley 2005, Smits & Kuhlmann 2004); there is still a need take into account the increasing complexity and adaptiveness in rapidly changing situations in order to guarantee robust information for decision-making

Background & motivation

- Arguments have been rationalised and crystallised by the idea of *innovation and performance gap* (Djellal & Gallouj 2010; 2013)



- Innovation gap refers to the fact that traditional (economic) innovation measures basing on industrialist and technologist definitions are not able to capture the reality and multifaceted nature of innovations produced (e.g. social innovations, innovations in services)
- Traditional definition of performance is unable to recognize the “hidden performance” concerning the social aspects of innovation (e.g. values like equality, ecological sustainability, societal well-being or trust)

Aim of the study and research questions

- Aim of the paper is to contribute to the above described challenges for a more diverse evaluation approach in the context of innovation

- Research questions to guide our work:
  - *How and by what means should the outcomes and impacts be evaluated in order to take into account the multifaceted and dynamic nature of innovation*
  - *What are the dynamic impacts of innovations in the sector of environment and energy?*

Concepts we apply 1/2

- We apply the **multi-criteria framework** (Djellal & Gallouj 2010, 2013) to describe the multi-faceted dimensions of innovation and the importance of quality and societal value. It analyses the benefit and outcomes of innovation by the perspective of different "worlds of services" aiming to give insight to the different justification criteria of different societal spheres by considering their different principles and values

	Industrial and technical world	**Market and financial world**	**Relational world**	**Responsibility world**	**Reputational world**
Output (direct, short term) *Performance related to output*	Volumes, flows and technical operations	Value and monetary and financial transactions	Interpersonal and organizational relations, trust, quality of relationships	Social and environmental sustainability, equal treatment, fairness and justice	Brand image
Outcome (indirect, long term) *Performance related to outcome*					

Concepts we apply 2/2

…However, analytical table remains static and does not increase understanding the their dynamic and complex nature. It does not show how the different impact criteria are mutually interlinked and may reinforce or contradict each other.

- For the reason we apply the **system dynamic perspective** (e.g. Sterman 2001) to understand the dynamic impacts of innovation.
  - System dynamic modelling pays attention to the interaction of various actors and their values in evaluation situation and provides information how the system structure creates complex dynamic behaviour over time.
  - It helps to explain the role of feedback loops between different actors and factors and promote or hinder the emergence of impacts.

Case-context and methodology

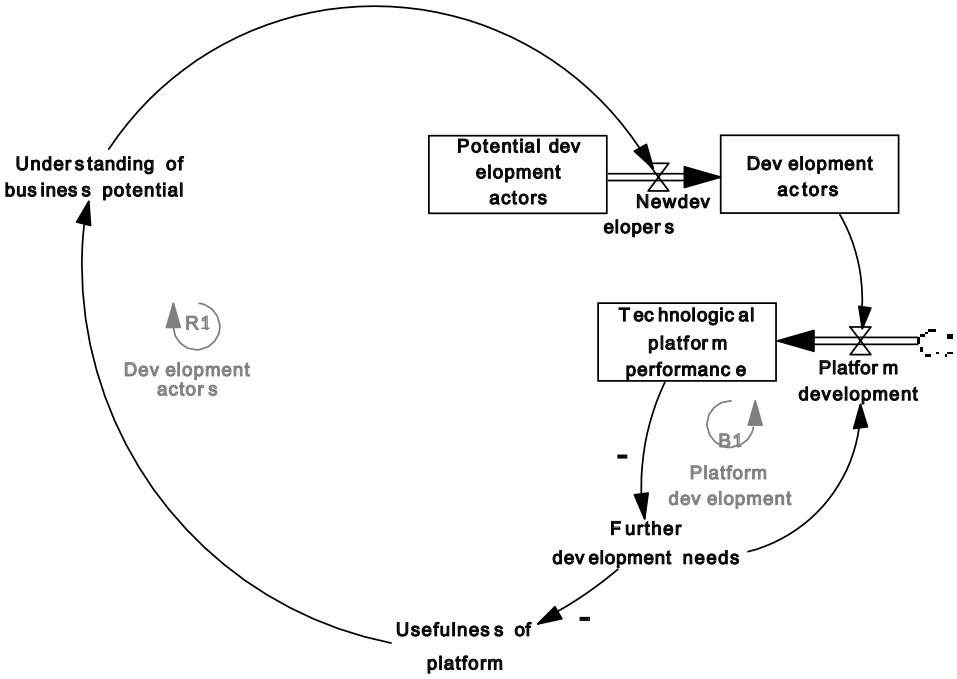
- Focus on new innovation policy instrument, SHOK – Strategic Centres for Science, Technology and Innovations; Cleen-SHOK and in the systemic innovations and industrial renewal generated in the area of environment and energy
  - *Environmental data platform: comprehensive platform to support continuous data gathering and real-time environmental monitoring, analysis and reporting*

- Case study approach; main method was face-to-face interviews based on a semi-structured method:
  - Altogether 30 interviews have been done between January and June 2013.
  - We applied snowball sampling to identify interviewees: the first were Managing Director of Cleen Ltd and three Programme Managers. Based on their suggestions other interviewees were selected among the members of the programme consortiums: company representatives, universities and public research organisations.

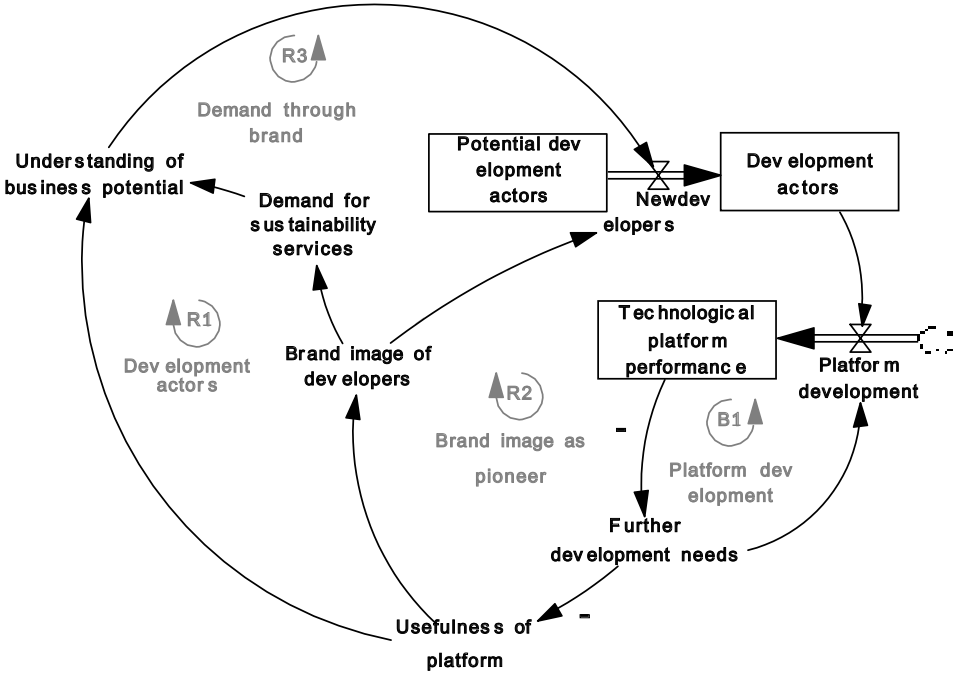
A multi-criteria framework applied for the evaluation of an environmental data platform

	Industrial and technological world	Market and financial world	Relational world	Responsibility world	Reputational world
Output (direct, short term)	• A technological solution for gathering data from various sources and sharing it • Processing mechanisms for the continuous upkeep of data • Tools to visualize data • Volume and variety of data	• Free access to data • Economic efficiency in the provision and sharing of environmental data • New cost-effective environmental services in public and private sectors	• New connection to data for professionals and partially to general public • New networks between public and private data providers • Increased connectivity between various data sources	• Awareness about the condition of environment and the consequences of pollution based on easily understandable and accessible data • Open and equal access to public data	• The developer gains reputation as a pioneer in the enhancement of sustainable development
Performance related to output	• Integration of dispersed environmental data • Efficient processing of data for various purposes • Increase of the volume and variety of data	• Increased understanding of the business potential of environmental data • Emergence of new market openings based on environmental monitoring	• Improved understanding of needs for environmental data • Increased knowledge and competence sharing in environmental issues • Increased trust in the reliability of data	• Increasing activity in environmental issues among citizens and policy makers • Increasing transparency and usability of public data	• Increased attractiveness of platform and it's developers
Outcome (indirect, long term)	• An advanced architecture based on the big data management open data policies • End-user applications • Quality control of the data	• Centralized market place for environmental monitoring, analyzing and reporting – additional monetary gains	• Free access to general public • End-users and commercial users as a data providers • Personalized environmental data	• Environmental data applied in educational services • Environmental data for entertainment - integrated into games, for instance	• Public bodies and private companies gain visibility for their sustainability efforts by participating in the application and further development of the platform
Performance related to outcome	• Versatile environmental information, resulting in improved warnings, for instance • Increased reliability of environmental data • Improved usability of data	• Opportunity for the development of a new competitive cluster: start-ups, value networks, new jobs etc. • New export possibilities with the related income flows	• Deepening collaboration and trust in actor networks fosters the opening of data reserves • The emergence of 'expert amateurs' (user communities) supports the acquisition of real time environmental data	• Better database for responsibility strategies in established and critical business sectors (e.g. energy companies)	• Environmental sustainability as primary societal value becomes more concrete

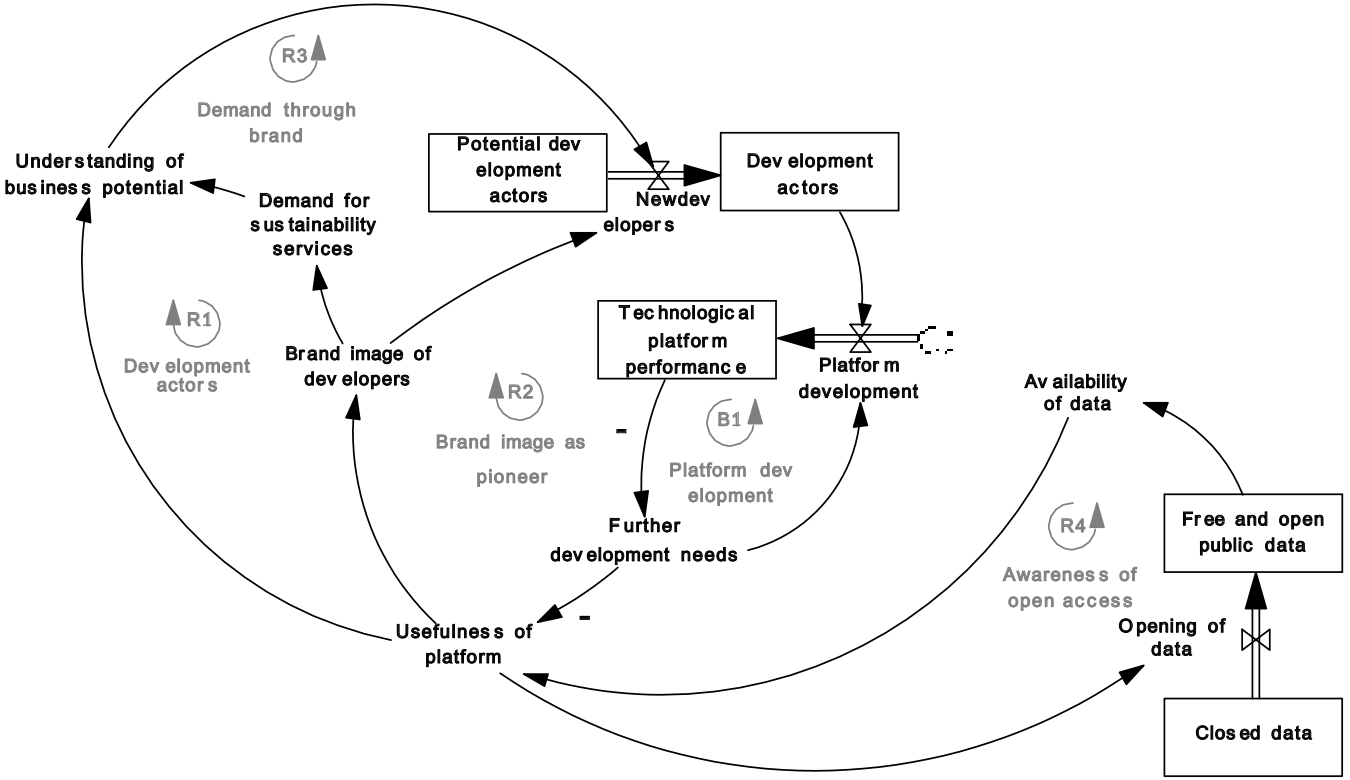
Actor networks and platform development



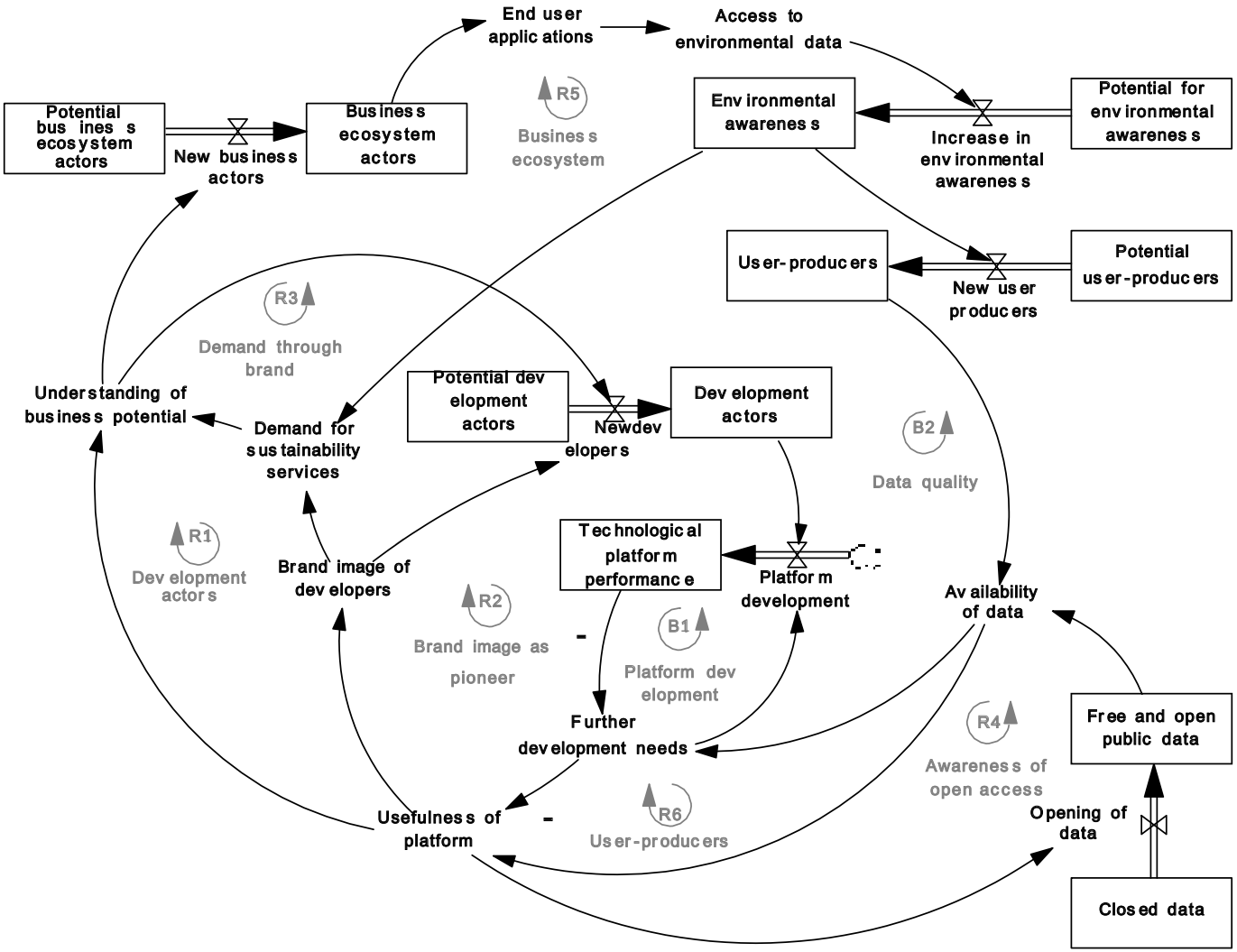
Effects of brand image



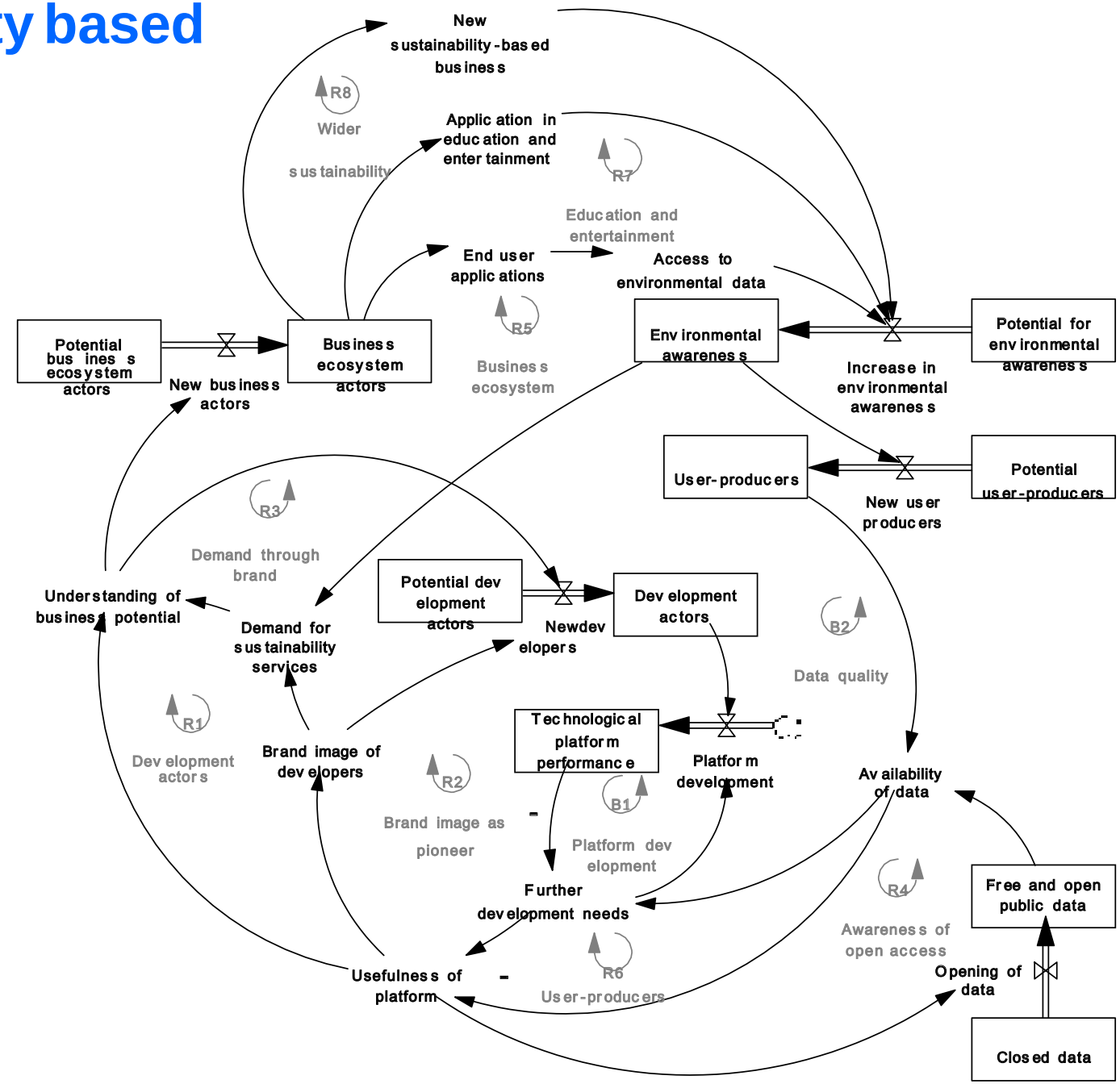
Awareness of open access



New business ecosystems



Wider applications and sustainability based business



Concluding remarks

- The emergence of comprehensive service solutions in renewing the environmental sector can be perceived *partially the by traditional measures*
  - however, the focus is in *technical, financial and measurable characteristics* of the concepts and solutions.
  - thus their *interactive nature and multifaceted performance* (including the systemic and social nature and value based aspects) *cannot be captured*.
- To perceive and make visible the societal goals of the innovations as well as their interactive nature relational and responsible worlds are particularly important.
- Impacts generated in the different worlds are often interdependent and complementary to each other. Some factors in relational and responsible worlds can be seen as a prerequisite to effects generated from the viewpoint of technical and financial worlds. In other words relational and responsible aspects are needed to generate long-term technological and economic impacts.
- The complex dynamics, interrelationships and multiple feedbacks between the different impact criteria remain invisible without systemic perspective. By integrating the multi-criteria and systems perspectives we aim to offer a dynamic alternative to create understanding of development and impacts of service solutions.

Prospects for future research

- Development of a simulation model based on qualitative SD model
  - Dynamic behaviour over time, possible tipping points
  - Changing strengths of feedback loops over time -7 role of the policy making at different points in time
- Comparison of identified system structure with TIS functions
  - Expanding TIS-framework to take into account service innovation

VTT
THANK YOU!

ENTREPRENEURIAL SCIENTISTS AND THE GOVERNANCE OF PUBLIC RESEARCH:

THE CASE OF Chinese Academy of Sciences

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The 2015 Annual Conference of the EU-SPRI Forum

Why talk about CAS on the EU-SPRI Forum?

- the highest academic institution in S&T and the comprehensive R&D center of natural science and new technology in China
- Historical, when was founded, its learning objects are French CNRS and former Soviet Union Academy of Sciences (PAH)
- Now, a mix of various public R&D organizations in Europe and America
- The organization change in the short time and long span
- “Good Student” of Europe and America, and could be considered as the good object of “ideal experiment”

CAS

Germany: **Max Planck Society**
The Helmholtz Association
Fraunhofer and Leibniz-Gemeinschaft

UK: **Royal Society**

US: **Federally Funded Research and Development Center, national laboratories and Public Universities (such as University of California)**

-104 research institutes
-5 universities & supporting organizations
-12 management organizations
-25 legal entities affiliated and 22 CAS invested hold
-More than 120000 people

What problems encountered in today's CAS?

- Scientists have no prior enthusiasm for advancing technology transfer after the national S&T investment has increased significantly
- Complaints from local governments
- Demand from the enterprise can not meet: Money can't buy good project from the Institute of CAS

R&D input and signed technological contracts since 2006

R&D input signed technological contracts

What factor reduces the enthusiasm of scientists?

- Have no value judgment: The weakening of entrepreneurship, there should be their reasons
- There are different types of scientists in public research
- First, a kind of "academic entrepreneurship" activity in public research institutions is defined (skip the literature review here)
- Then introduce the concept of "entrepreneurial scientist" (skip the literature review also)

Etzkowitz H. *Oliver A.* *Lam A* *Zucker L et al.*

- give "entrepreneurial scientist" an operation definition from 4 aspects

Research design: case study and object selection

- Issuing questionnaires is a suitable method. But, as the target population is mixed in the general population of scientists, we have no the database and it is difficult to deliver them
- So, we settled for the case study, selecting two of celebrity and with success experiences in transforming S&T achievements from the winners of the CAS's Beijing Branch Excellent Research and Technology Transfer Teams Selection.
- Important data about micro processes and infrastructures of academic entrepreneurship and relevant facilities and policy situations are gleaned from 13 interviewees in the case study.

Research design: Archives data from four resources

- CAS almanacs and annual reports of the 2000-2013 period
- Data from relevant news and media reports of the same period providing important supplementary information that help understanding almanac statistics in a more meaningful way.
- Annual working reports of the CAS Beijing Branch's TTO commercialization projects.
- The appraisement and application files of the Beijing Branch Excellent Research and Technology Transfer Teams Selection provide details of those entrepreneurial scientists' planning to commercialize their research knowledge

Research design: structural interview outline

- Entrepreneurship: industry identity motivation, Incentive motivation, opportunity recognition, risk attitude
- Entrepreneurial process: technical product, market grasp, venture capital, entrepreneurial learning
- Team organization： team composition, norms of team
- Entrepreneurial environment: organizational platform, relationship network, S&T Policy
- different emphases for the interviews between the members of academic entrepreneurial teams and TTO managers.

Findings and discussion:

- Entrepreneurial scientists indeed showed tendency of “stability”, think twice before the opportunities and conditions, in order to access to business income reliably.
- The entrepreneurial process is passive. "Technology" in the first place, then have the entrepreneurial impulse after obtaining capital attention.
- Sending the graduate students to relevant Start-up, and let own students become an important channel with VC in the entrepreneurial process

Findings and discussion:

- Some technical results transferred to company in the early stages, are By-product from other government research projects.
- The internal cooperation of entrepreneurial scientists team is stronger than that of PI, and has the center of agglomeration.
- The cultural conflicts of the PRIs has exceeded the external preferential policies, becoming the important factor to hinder the scientists to choose entrepreneur action.
- If we think deeply, these kind of culture conflict comes from governance and management contradiction of PRI.

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Qualitative analysis for action prioritization for the implementation of innovative technologies in the health sector

Jarmo Pääkkönen

12.6.2015 EU-SPRI, Helsinki

López A.MP., Hukelová H., López S., Acheson L., Andersson B., Gonzalez O.J., Malmqvist U., Martin G.M., Pääkkönen J., Sachinopoulou A., Suárez T., Tronde A., Väisänen M., Vialard L.

This project has received funding from the European Union's 7th Framework Programme for research, technological development and demonstration under grant agreement no 320021

CONTEXT

ICT is already playing an important role in healthcare and wellness. The healthcare systems can improve health outcomes and efficiency by using products and services developed by technology companies.

However, there are still gaps to overcome and significant barriers to successfully integrating ICT and creating real value adding health services (Li et al., 2013).

This project has received funding from the European Union's 7th Framework Programme for research, technological development and demonstration under grant agreement no 320021

PURPOSE OF THIS STUDY

Research has been performed

to identify the needs and expectations of stakeholders and users,

In order to:

- **Set priorities that will favour the successful implementation of ICT**
- **To guide** interventions and
- **To facilitate** innovation, business development and internationalization for ICT companies that focus their efforts on health sector innovations (Mahmud et al., 2013; Golan & Hansen 2012)

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OBJECTIVES

1) **Understand the opinions**, expectations and attitudes of leaders of four regional health systems regarding the implementation of ICT in patient care and well-being.

2) **Identify barriers and resistances** in the implementation of ICT.

3) **Conduct a prioritization exercise** to resolve needs with the participation of international experts.

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METHOD

- Qualitative study methodology used for:

  (Gill et al. 2008; Boyce, 2006; Tromp & Baltussen 2012)

  - **In-depth interviews** (professionals)
  - **Focus group** (patients and citizens)

- Data analyses process:

  (Li et al. 2013; O´Connor 2003)

  - Coding in **topics and categories**
  - **Conceptual framework of the identified needs**
  - Validation through a triangulation and saturation process

- Dual prioritization exercise of the identified needs:

  (Golan & Hansen 2012; Gibson et al. 2004; Tromp & Baltussen 2012)

  - **Quantitative** (criteria of **importance**)
  - **Qualitative** (criteria of **feasibility, acceptance and impact**)

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RESULTS – Final involvement

99 different types of stakeholders

From 4 eHealth ecosystems have been involved in the needs and gaps identification process:

81 in-depth interviews with

- 22 Decision makers
- 32 Health experts and influencers
- 8 Other experts
- 11 Healthcare professionals

3 groups with

- 18 Patients and citizens

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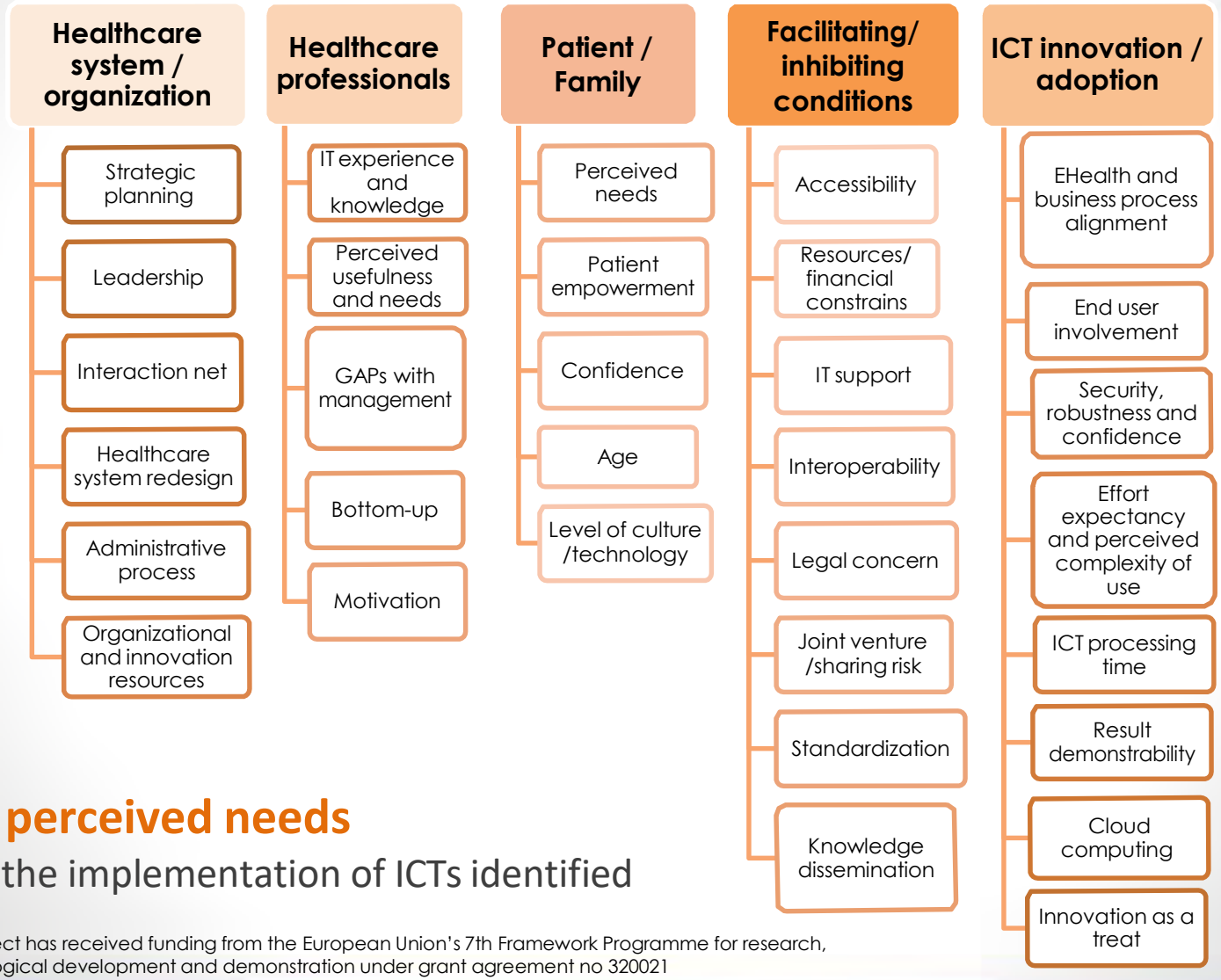
RESULTS – CONCEPT MAP of Identified Needs

5 Major Thematic Areas



32 perceived needs

for the implementation of ICTs identified

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RESULTS – Needs Prioritization

The first 10 needs to be solved

according to the method of prioritizing

	Quantitative prioritization		Qualitative prioritization
1	Leadership		End user involvement
2	Strategic planning		Strategic planning
3	Interoperability		Leadership
4	Patient empowerment		Interoperability
5	Perceived needs (patients)		Knowledge dissemination
6	Resources / financial constrains		Security, robustness, confidence
7	Healthcare system redesign		Result demonstrability
8	Security, robustness, confidence		Patient empowerment
9	Perceived usefulness and needs (professionals)		Perceived usefulness and needs (professionals)
10	Motivation		Perceived needs (patients)

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CONCLUSIONS

Aspects to facilitate the implementation of ICT in health and care have been identified and distinguished by the method of prioritization.

- Highlighting **the lack of leadership** involvement in eHealth, in the organizations, the need for **changes in patterns of care** for patients with chronic disease, and the involvement and **active participation of citizens / patients and professionals is essential.**
- The **need** has also been repeatedly expressed by health professionals, managers and policy makers in public health systems is to have **well evaluated and tested the results**, to ensure that the incorporation of information technologies provide better health outcomes with greater efficiency in health systems

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CLOSURE

- The outcome of this study has been taken into use in 4 different EU regions in READi for Health program
- It has acted as one of the enablers in eHealth agenda creation
- This qualitative method is encouraged to use in different projects to find out the healthcare ICT needs

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Thank you!

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/groups/READi-Health-Project-7443730

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