EuSPRI Early Career Conference

Vienna/Austria November 22nd & 23rd 2016

Presentations in alphabetical order:

- Svetlana **Burinskaja** (University of Warsaw): Entrepreneurial discovery process within smart specialisation strategy: towards a differentiated approach from the change management perspective
- Julien **Chicot** (Université Grenoble Alpes/AMBS Manchester): The role of public procurement of innovation in the formation of markets: knowledge coordination problems and instruments
- Veronica **Chiodo** (Politecnico di Milano): Financing social innovation: an analysis of two policy approaches
- Béatrice **Cointe** (LAMES, Aix-Marseille Université): Science technology and innovation policy and expectations in practice: insights from the sociological study of an interdisciplinary project on microbial bioenergy
- Michele **Coletti** (Politecnico di Milano): Collaborations for innovation: a comparative analysis of policy issues
- Elizabeth **Koier** (Rathenau Institute): Spinning plates: The effects of national prioritizing policies on university internal decisions
- Soo Jeung **Lee** (Alexander von Humboldt Foundation): Academic Entrepreneurship: Exploring the effects of academic patenting activity on publication and collaboration among heterogeneous researchers in South Korea
- Lauma **Muizniece** (Tallinn University of Technology): Disregarding history and context: Innovation policy in Latvia post 1990
- Cian **O'Donovan** (SPRU University of Sussex): Democratic engagement with and within emerging regulator spaces
- Alex **Rushforth** (Leiden University): Investigating the growth and distribution of a priority research area: A bibliometric study of rare disease research
- Edgar **Salas Gironés** (Eindhoven University of Technology): Societal goals, STI policies and socio-technical transitions: The case of the Dutch smart mobility policy
- Najmoddin **Yazdi** (Sharif University of Technology): Rationales for Comparing Science, Technology and Innovation (STI) Indicator Frameworks

EU-SPRI ECC
November 22-23 2016, Vienna

Entrepreneurial discovery process within smart specialisation strategy: towards a differentiated approach from the change management perspective

Svetlana Burinskaja, University of Warsaw

Agenda

1. Introduction
2. Theoretical background
3. Method
4. Developing the framework
5. Cocluding remarks

Aim and Research Questions

To provide a conceptual tool to better understand dynamics of entrepreneurial discovery process in different regional innovation systems, based on the different approaches to change process proposed by Van de Ven and Poole (1995).

RQ1: How EDP was approached in different regions of Europe?

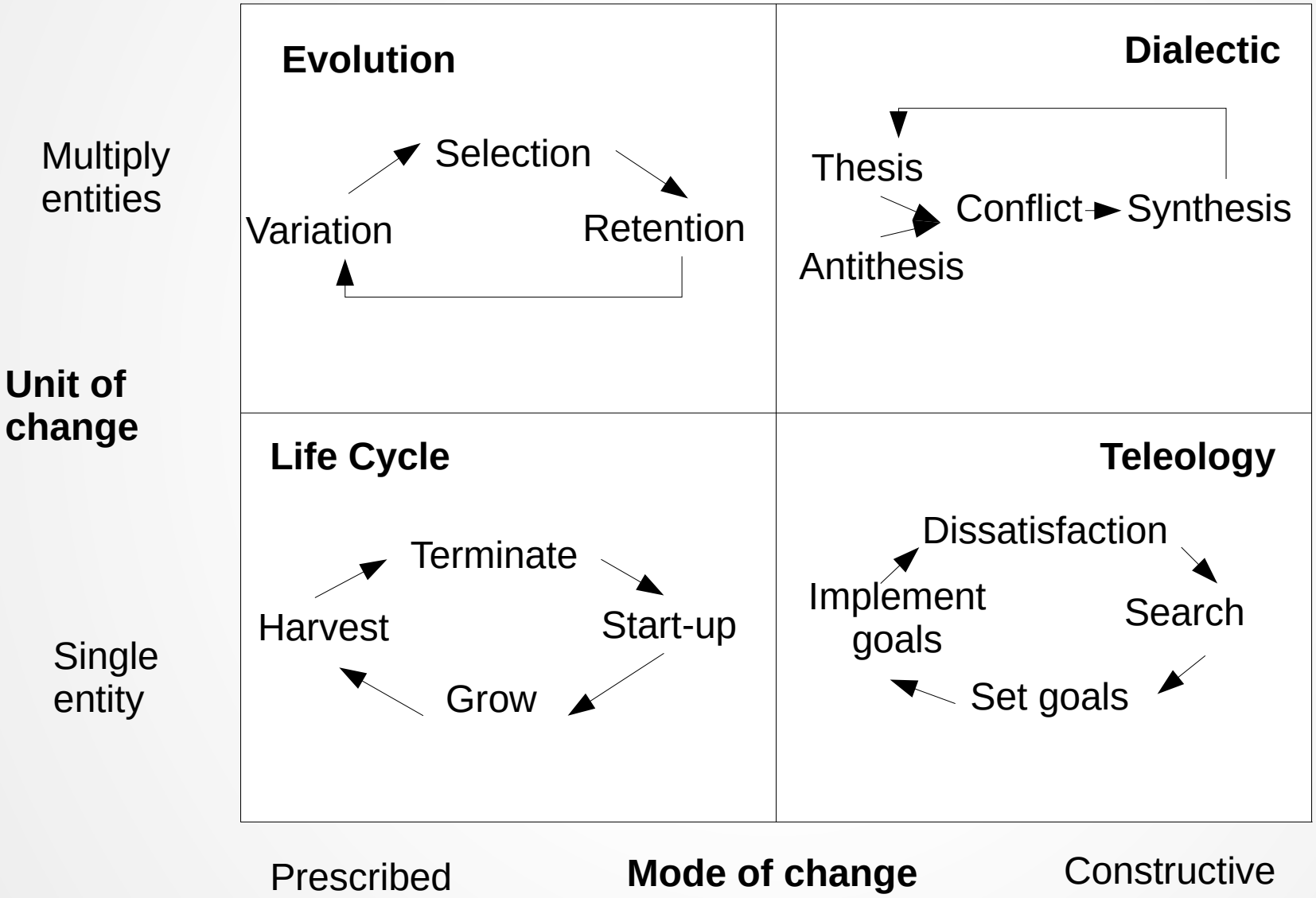
RQ2: Were there any differences and similarities between regions, and if yes, under what aspects have those emerged?

RQ3: What factors are crucial to implementation of EDP?

Theoretical Background

1. Research on Regional Innovation Systems
2. Bottom-up approach to innovation policy: entrepreneurial discovery process and smart specialisation
3. Approaches and perspectives of change management

Process theories of change (Van de Ven & Poole, 1995)



Source: Van de Ven & Poole, 1995, p. 520.

Method

Systematic literature review:

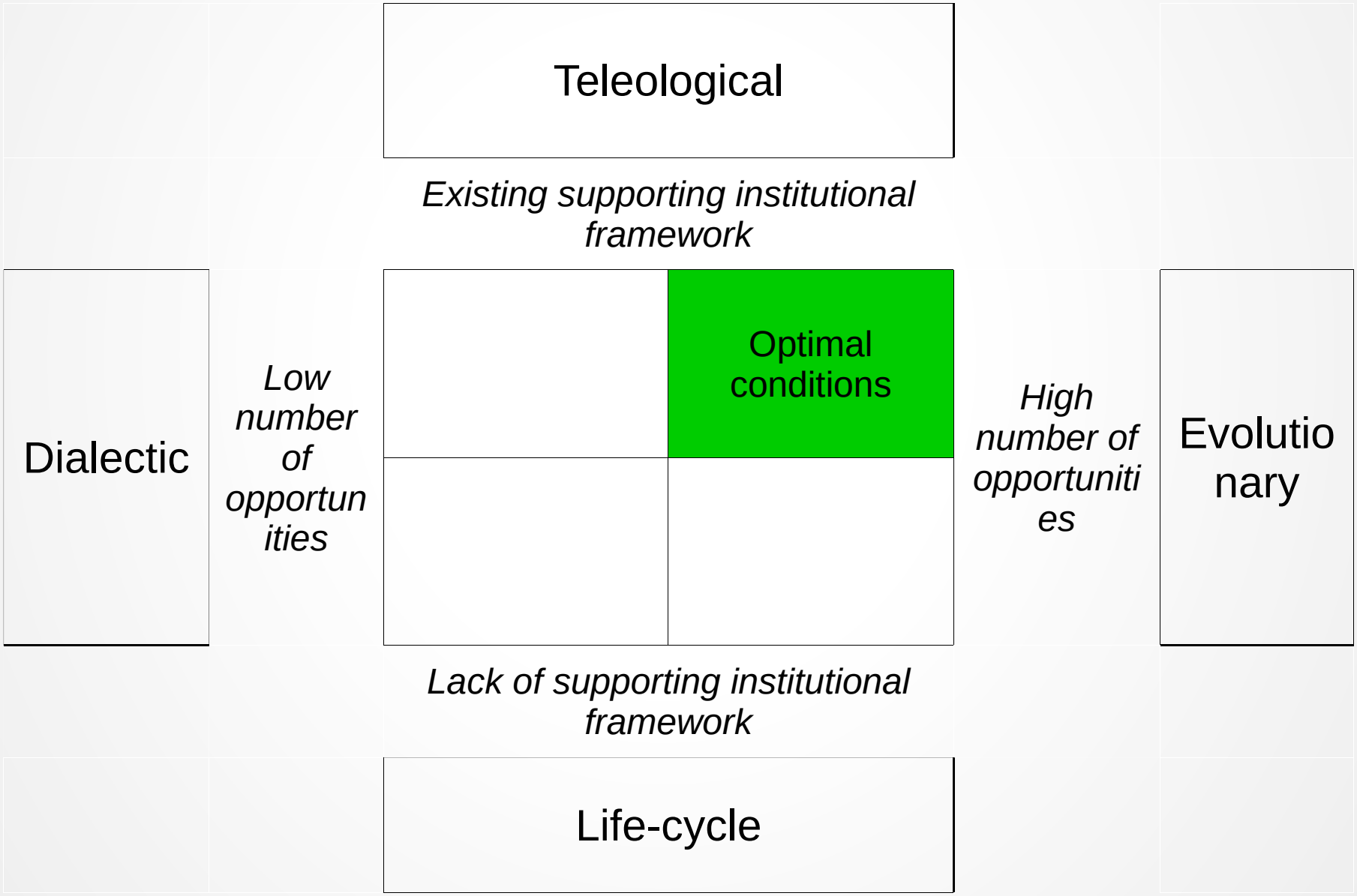
- Scopus and Web of Science

- keywords “smart speciali*ation”

Scopus: search in *title, abstract* or *keywords.* Web of Science: search in *topic.*

- 99 results after removing duplicates, 20 works selected for analysis, based on defined criteria.

Introducing the framework



Source: own elaboration

Concluding remarks

- two aggregated dimensions: institutional framework and number of opportunities;

- patterns are indicative, regions may move into different pattern e.g. while learning;

- in every pattern all of the approaches to change may be applicable, yet some may be generally more suitable under particular conditions.

Discussion and Questions

Thank you for your attention!

Svetlana Burinskaja

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Public procurement and market formation: A dynamic approach of the transformative role of public procurement

Julien Chicot

Univ. Grenoble Alpes, UMR GAEL, Grenoble, France

Mercedes Bleda

Alliance Manchester Business School, University of Manchester, Manchester, United Kingdom

Public procurement (PP) as a driver for innovation

- **Primary objective** of PP: Support the delivery of public services by public administrations

- **Public procurement of innovation** (PPI): Purchase or order
  - by public administrations,
  - of products, services or systems that do not exist yet, or that are novel to buying organisations,
  - in order to solve identified needs

PPI and market creation

- Importance of the **market-creating role** of the public sector:
  - To contribute to 'grand societal challenges' (Edquist & Zabala-Iturriagagoitia, 2012; Mazzucato, 2016)
  - To stimulate innovation via PP (Edler & Georghiou, 2007; Edquist, 2011; Rothwell, 1984)

Research objective

To investigate the role of PP in **addressing problems related to the creation and formation of markets** in technological innovation systems

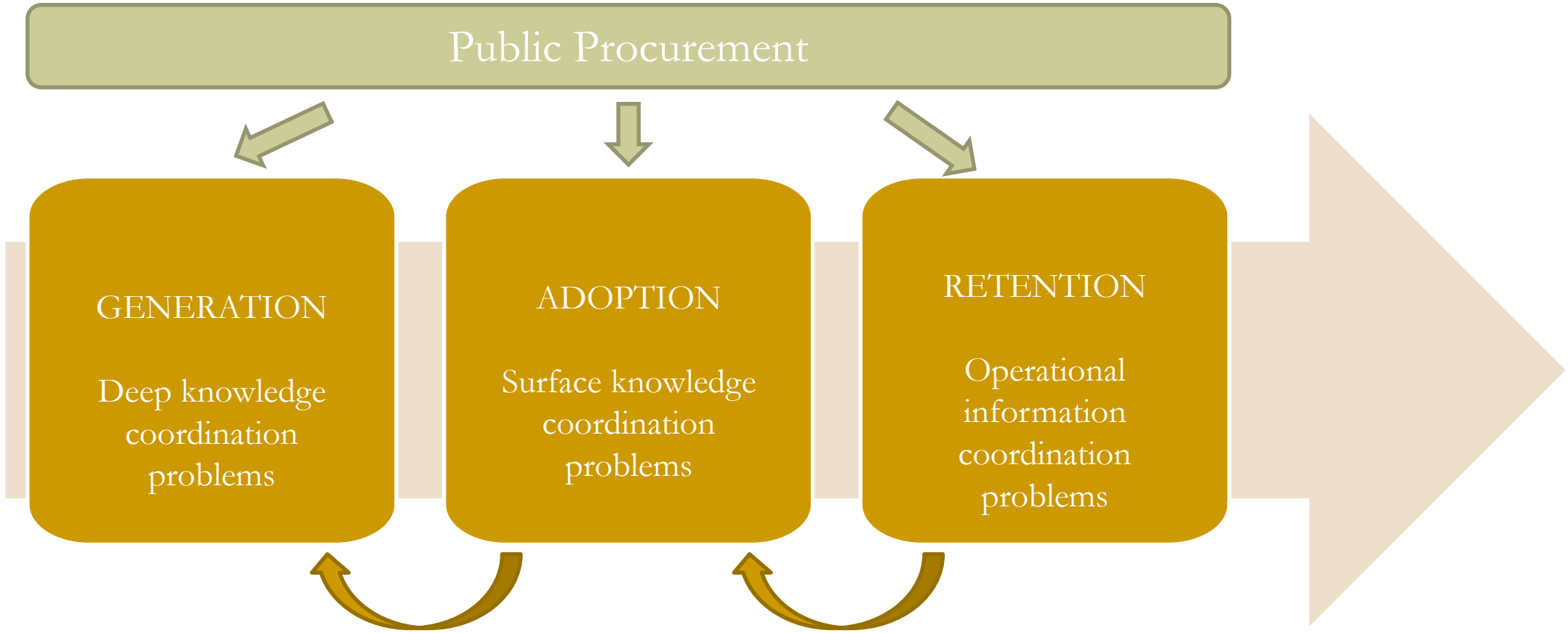
How public procurement and market formation processes interlink?

Evolutionary approach to market formation

- Market are systems for the **creation and coordination of knowledge** (Dopfer & Potts, 2008; Metcalfe, 2002; Potts, 2001)

- **Market malfunctions** are knowledge-related problems occurring at three different stages of market formation (Bleda & del Río, 2013)

Three stages in the formation of market



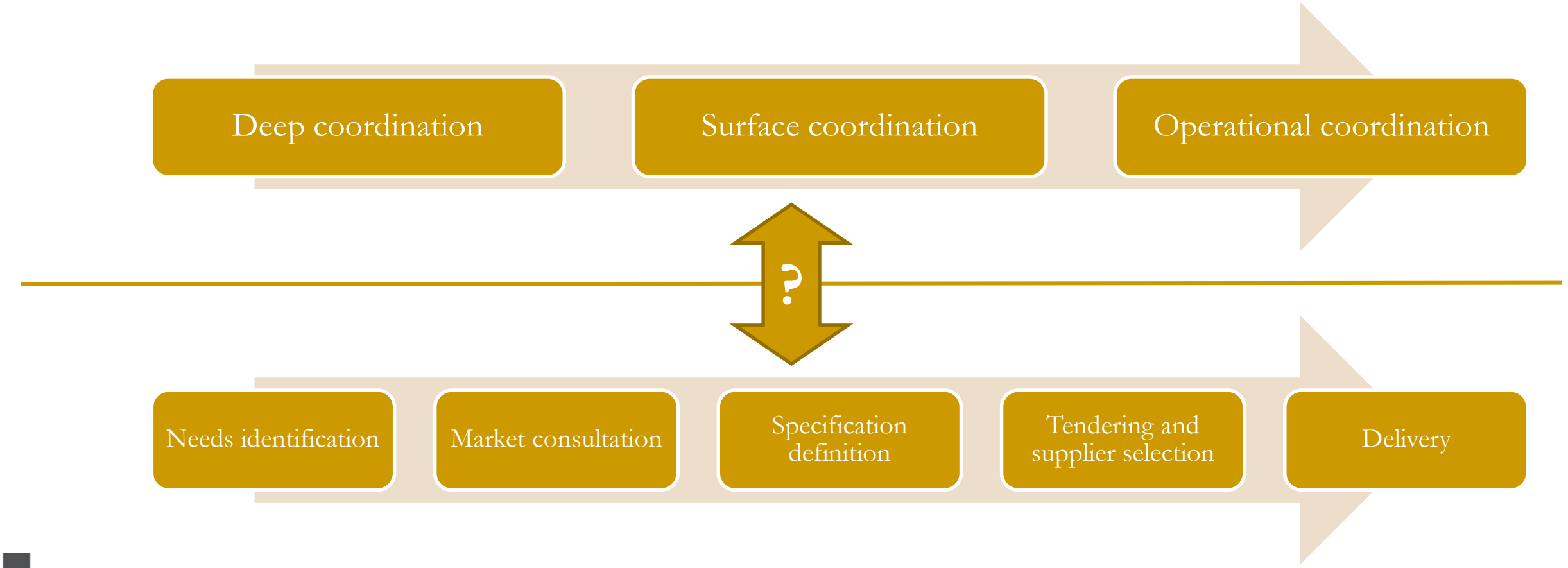
Methodology: Multiple case study

- Collection of evidence through **secondary case studies**

- Selection criteria:
  - **Provision of evidence on the influence of PP on market dynamics**
  - **Deliberative objective to spur innovation**
  - **Sufficient information on implemented PP instruments**

- **Data analysis**:
  1. Identification of instruments and their respective timing in the PP cycle
  2. Definition of categories of instruments depending on their purpose
  3. Associate these categories with market coordination problems

Abductive approach: how these two processes interlink?



PPI and deep coordination

PPI roles	Instruments/Actions	Procurement cycle stage
Facilitating the expression of a new demand	Pre-commercial procurement and the like Functional specification in calls for tenders	Definition of specifications
Reducing of uncertainties relative to demand	Commitment of purchase	Definition of specifications
Improving the innovation environment	Change in norms and rules Contribution of social acceptance	Definition of specifications Market exploration

PPI and surface coordination

PPI roles	Instruments/Actions	Procurement cycle stage
Encouraging complementary between users and suppliers' knowledge sets	Involvement of end-users in: • Identifying, integrating and aligning needs • Market consultation and exploration Outsourcing the public procurement process to a central organisation	Identification of needs Market exploration Identification of needs & Market exploration
Facilitating suppliers and users co-adaptation and interactive learning	Experimentation and testing Providing end-users with relevant knowledge	Tendering and supplier selection Delivery

PPI and operational coordination

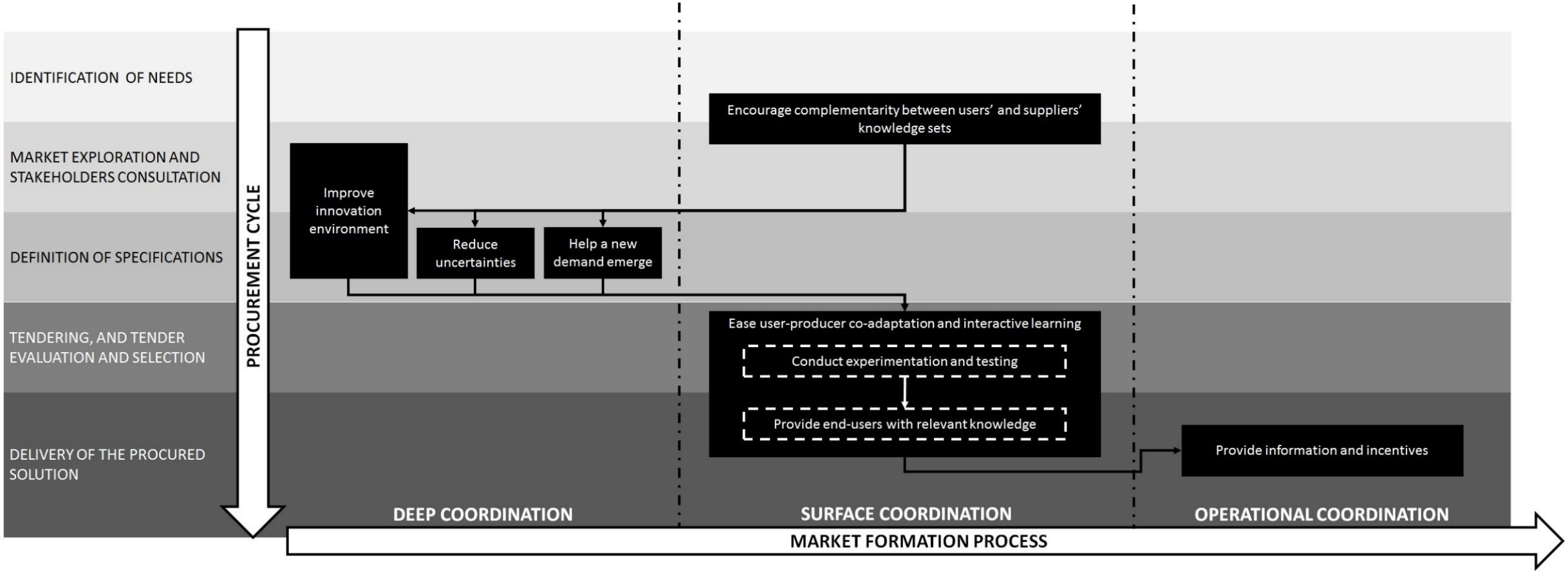
PPI roles	Instruments/Actions	Procurement cycle stage
Provision of information and incentives	Financial support Non-financial support Information sharing and communication tools	Delivery

Conclusion

- Public procurement can support market formation at all the stages of the **whole cycle of public procurement** by actively contributing to the provision of knowledge components and their articulation and coordination, as well as to information sharing

- Our research highlights the complexity of market formation via public procurement and the challenges that public procurers may face

Market formation via public procurement



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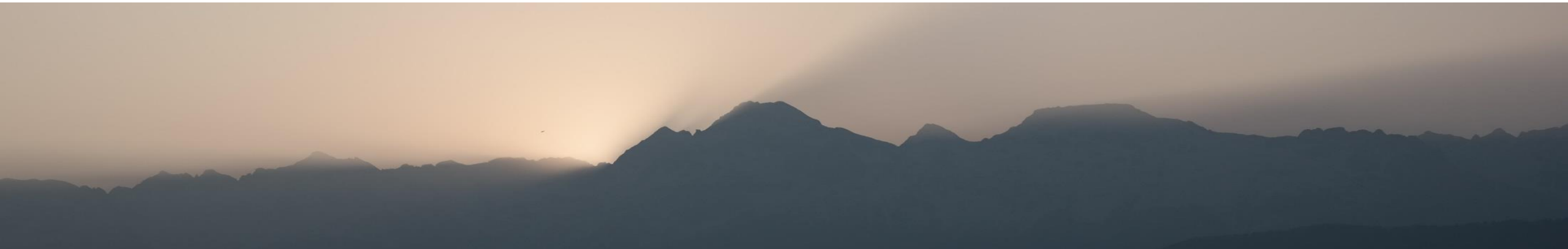
This research project was financially supported by Rhône-Alpes region (CMIRA grant)

THANK YOU FOR YOUR ATTENTION



Financing Social Innovation: an analysis of two policy approaches

Veronica Chiodo & Fania Valeria Michelucci

EU SPRI ECC

School of Management - Politecnico di Milano

Background 1/3

- Governments should deal with increasing societal challenges;
- They have demanding constraints over the budget designated to welfare expenses;
- Social Innovations are new solutions that meets a social need more effectively than existing solutions (European Union, 2012).
- They commonly reengineers how public services are provided.

Background 2/3

- Social Innovations cannot be implemented due to :
  - lack of public funding;
  - high risk adversity;
  - mainstream financial capital does not fit the characteristics of SI.

- They envisage also new financial instruments that goes under the label of **Social Impact Investments**: investments that **aim to solve social and environmental challenges while generating financial returns**.

Background 3/3

- Scholars and practitioners (Dowling, 2016; Moore, Westley and Nicholls, 2012; Nicholls and Paroah, 2008; Wells, 2012; Wilson, 2014) have identified several challenges in the SII market:
  - transactional costs due the lack of products and specialized intermediaries;
  - information asymmetries between investors and investee due to the lack of globally shared measurement systems to account for social risk and return;
  - market is fragmented and still disorganized since regulations are lagging behind;
  - there are no incentives for investors to engage in these sectors.

Objective

- Even though SII instruments are conceived to solve a failure in the provision of finance to support social service, they still show many inefficiencies that need to be addressed to make the market flourish. **In this respect, the public sector might intervene and could act as regulator, facilitator and investor.**

- So, the objective of this paper is to **investigate the policy approaches used to finance social innovation (SI).**

- This research empirically analyses two cases to theorize the policy approaches to finance SI.

Literature Gap

- Academic research on SII is very scant and dominated by practitioners (Daggers & Nicholls, 2016).

- Specific gaps can be pinpointed concerning the role of the public sector in SII:
  - the role of the public sector is theoretically hypothesized but not tested in practice;
  - the focus of research is usually on the UK policies;
  - UK policy model has been recently criticized.

Theoretical framework

- **Stage Heuristic (SH) Framework** (Gultekin, 2014; Howlett et al., 2013):
  - Agenda setting;
  - Strategic planning;
  - Implementation;
  - Scaling and ex-post evaluation.

- Academicians intend policy-making as a process of evolution, adaptation and adjustment (Weible et al., 2011).

- For our analysis, we assume the SI policies are developed through the aforementioned process.

Method 1/2: multiple case design

- Multi-case design allows us to strengthen the results by exploring two different settings and comparing recurring patterns (Yin, 1994; Creswell, 1997).

- Looking for alternatives to the UK paradigm in Europe, the authors purposefully chose the **Italian and Portuguese cases** on the basis of an **intensity case sampling strategy**:
  - dynamic and promising SII sector, still emerging and not institutionalized (as in the UK model);
  - no contributions about these two countries have been identified in the previous literature.

Method 1/2: documents

- 30 open-ended semi-structured interviews:
  - 13 with informants about the Italian case;
  - 17 for the Portuguese case.

- Unit of analysis is the national SII policy environment in each case.

- The informants are public officers, belonging to both national and local authorities, their advisors and representatives of other partners involved in projects implemented by the public sector.

- The interviews were complemented by the analysis of public releases, institutional websites, official documents describing policy initiatives and the reports produced by the National Advisory Board of the G8 Taskfroce on SII.

Results: Portugal

- **Agenda setting & strategic planning:**
  - need analysis aimed to identify the most urgent social problems of the country both at national and local level (Lisbon and Cascais);
  - They identify a gap in the financing of social economy organizations;
  - These efforts informed the creation of the **national strategy "Portugal Inovação Social"**.

- **Implementation:** creation of a **wholesaler** capitalized with European structural funds committed to provide both equity and debt and invests in highly impactful initiatives.

Results: Italy

- **Agenda setting:** needs analysis before setting their agenda both at national and local level (Turin and Milan);
- **Strategic planning:**
  - the lack of a national strategic plan left the initiative to the local authorities;
  - Turin and Milan approved a strategic plan in which they set the priorities and the actions to finance SI.
- **Implementation:** these local strategic plans were turned into local SII policies.
  - **Torino**: SII programme to finance SI and social enterprises;
  - **Milan**: first social incubator FabriQ, a platform of crowdfunding;
  - **Sardinia Region** launched the first Italian SII fund.
- No one of the initiatives currently ongoing in Italy are promoted by the central government.

Final remarks

- Two different approaches seem to emerge:
  - **Portugal**: priorities and strategies of SII policies are set nationally, but implemented locally such as the case of Social Impact Bond in Lisbon.
  - **Italy:** there is a lack of a national policy devoted to SII, while decisions are frequently demanded to local policy makers. The role played by the public is decentralised and varies according to the specific case.
- Both has not reached the scale and post-evaluation phase.
- Contributions:
  - **policy makers**: suggestions for the development of policies to finance SI from the empirical analysis of hands-on cases;
  - **social innovators**: funding opportunities and public programs to transform their ideas into practice.

Thank you for the attention

Q&A

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Method 1/2: documents

Data Type	Quantity
Interviews	28
Transcription of conference intervention	30
Report	10
Normative Document	1

The effect of national policies on research portfolio decisions within universities

A resource dependency perspective

Elizabeth Koier, Barend van der Meulen, Edwin Horlings en Rosalie Belder

Rathenau Instituut

Research question

- What effect do the recent Dutch priority setting policies have on the national research portfolio?
  - How do the financial incentives in the policies affect research portfolio decisions?
  - Who creates the national research portfolio? University boards, deans, individual researchers?
  - What effect do the policies have on choices of participants in the research system?

Policy context

- Dutch national government wants science to focus on economic priorities, grand challenges and national strengths. Two policies:
  1. Earmark half of national research council funding for nine '**top sectors**'
  2. Agreements between Minister and universities on developing distinctive university research portfolios: so-called **profiling**

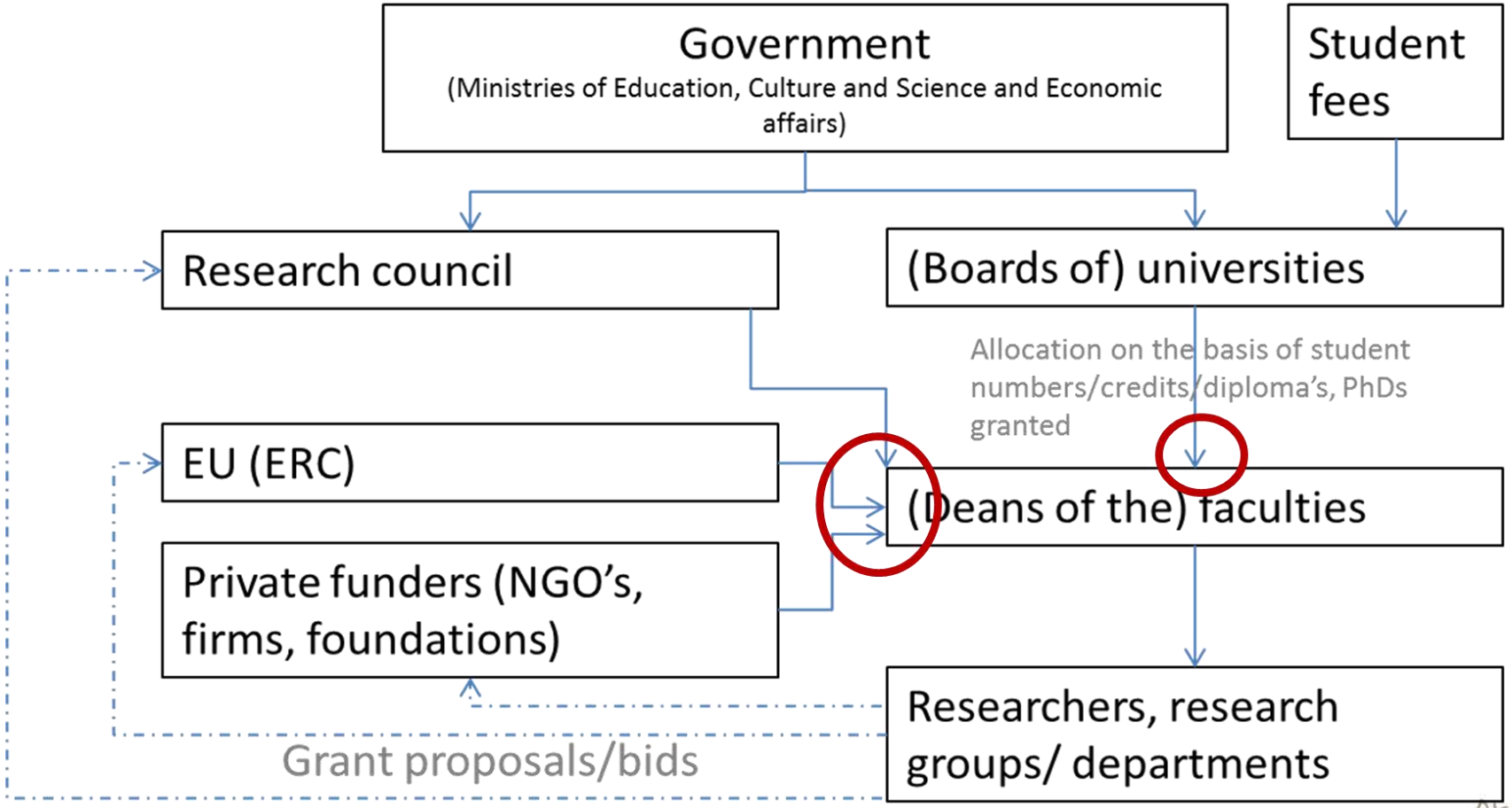
Sources

- Survey in person of all deans (response 74%)
- Survey of members of the Royal academy of Sciences and the Young academy of Sciences
- Laws, annual statements of all universities, policy documents
- Survey held by the Ministry of Finance on university governance and budget allocation
- Report of EY on matching

The university research portfolio: Who pulls the strings?

- Deans decide on:
  - the job description of new positions and advise on the appointment of full professors
  - the submission of large grant proposals
  - start and closure of departments
- Deans are responsible for budget considerations
- Deans are relatively autonomous in their allocation of basic funding to research groups and institutes and change their allocation model on average at least every six years
- Deans are responsible for the fulfilment of all university tasks (education, research, knowledge dissemination)
- The faculty level is the only level in the university at which external and internal funding come together

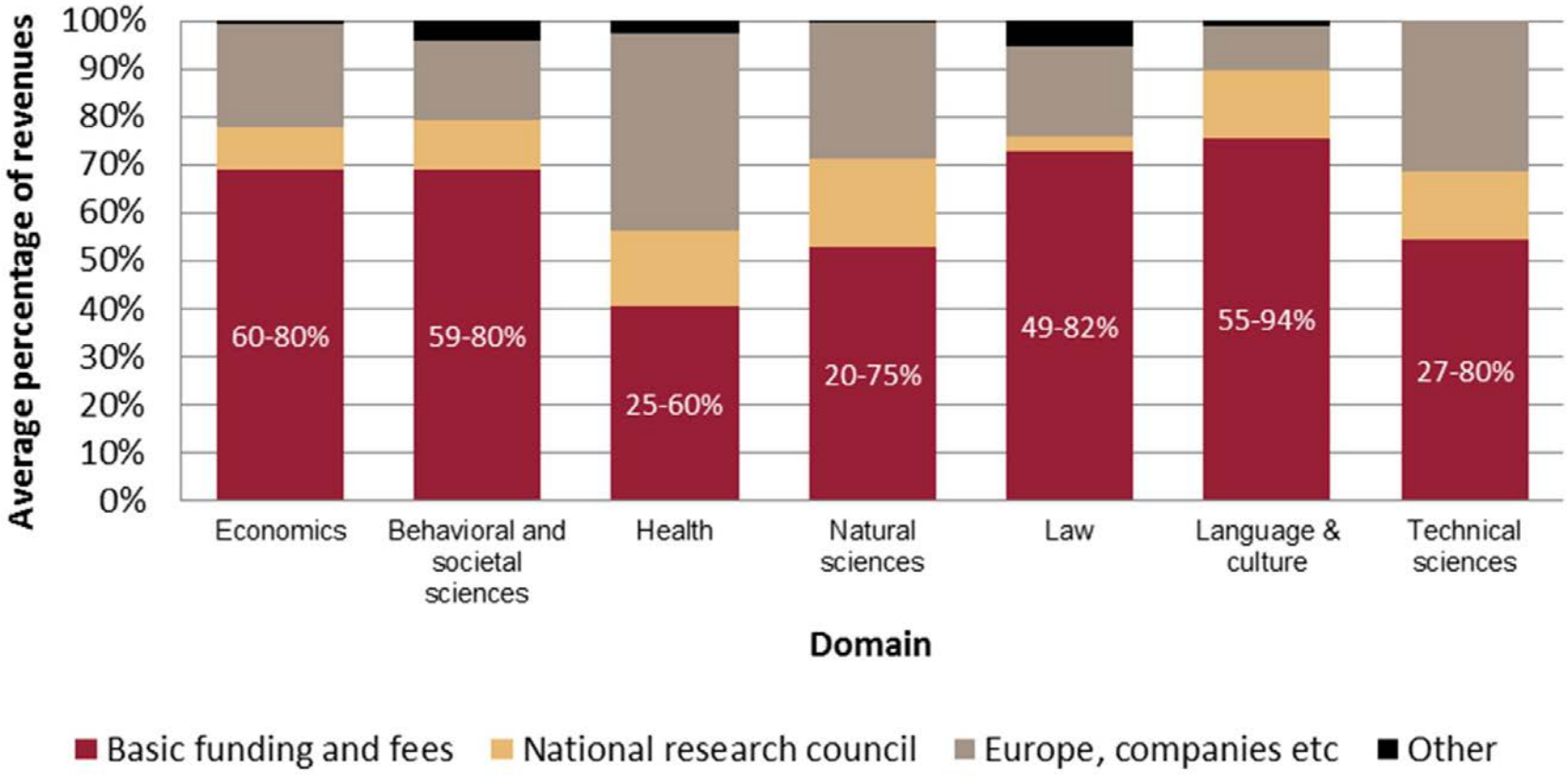
Financial flows to and in Dutch universities



Variation in funding dependencies

- There is a large variation in the dependency on types of funding between faculties, even between faculties in the same domain
- Basic funding is allocated differently at all Dutch universities, but the number of students and PhDs is an important factor for all allocation models
- Faculties differ with respect to their internal allocation models, both within the same university and within the same domain across universities
- Due to matching requirements (almost 2/3rds of the externally acquired funding) policies on external funding have effects on the use of basic funding

Sources of revenue of university faculties in the Netherlands by domain

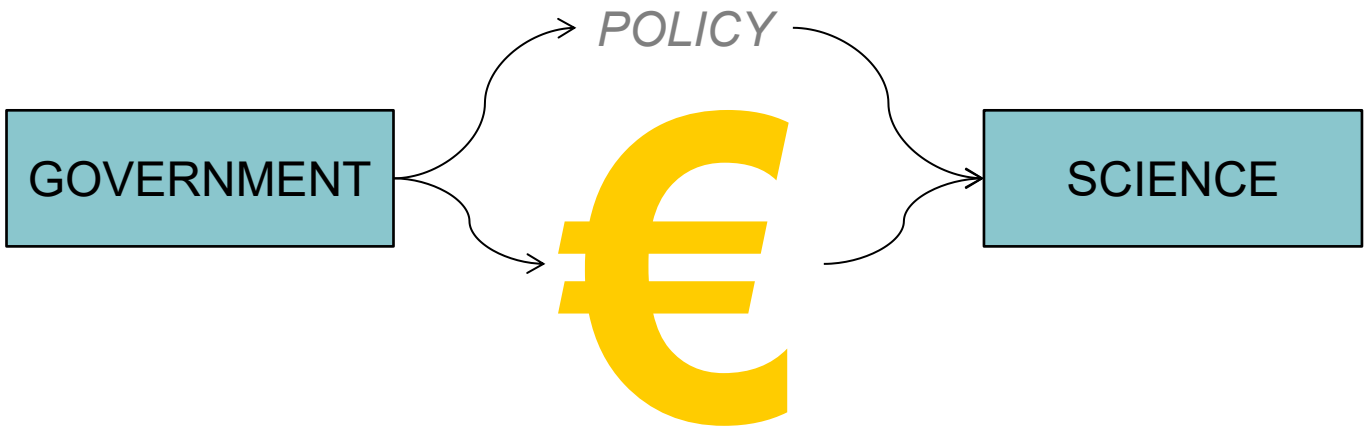


The effects of changes in funding sources of faculties

- Deans expect to be able to adjust to changes in their funding sources in such a way that the negative effects of some policy measures will be compensated by success in other funding sources.
- The recently instituted national policies influence deans' decisions, but to a large majority of deans they are less important than Horizon2020 and internal considerations.
- The negative consequences of some new policies result in more influence for other funding sources because deans expect adaptation to other funding sources to be more fruitful than adaptation to the new policies.

Conclusions: Why policy goals and policy effects do not match

- Implicitly many policy documents assume that policies translate directly into effects on researchers.
- However, the faculty, university and – in the end – national research portfolio is only partially determined by choices of individual researchers. University internal policies determine which departments continue and which researchers are appointed.
- The dependency on funding sources varies between faculties, even within the same domain. This implies that the response to policy incentives varies as well.
- In order to keep a faculty in the black various external influences need to be aligned (student choices, research capacity, teaching capacity, external funding and matching). This makes a dean's options to change the faculty's research profile limited.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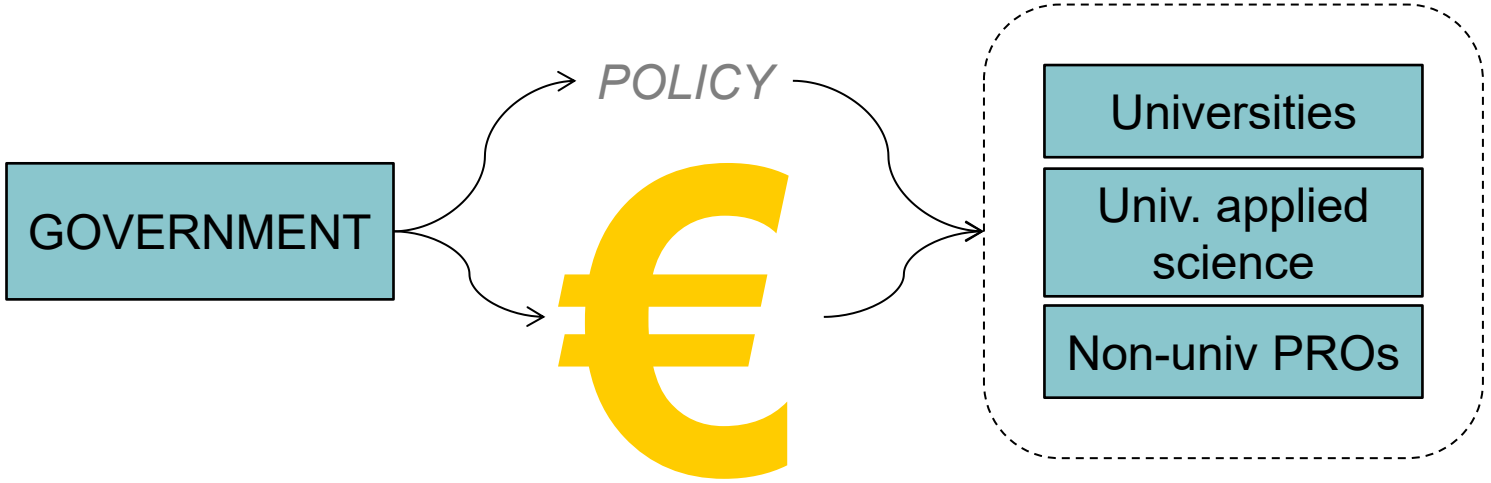
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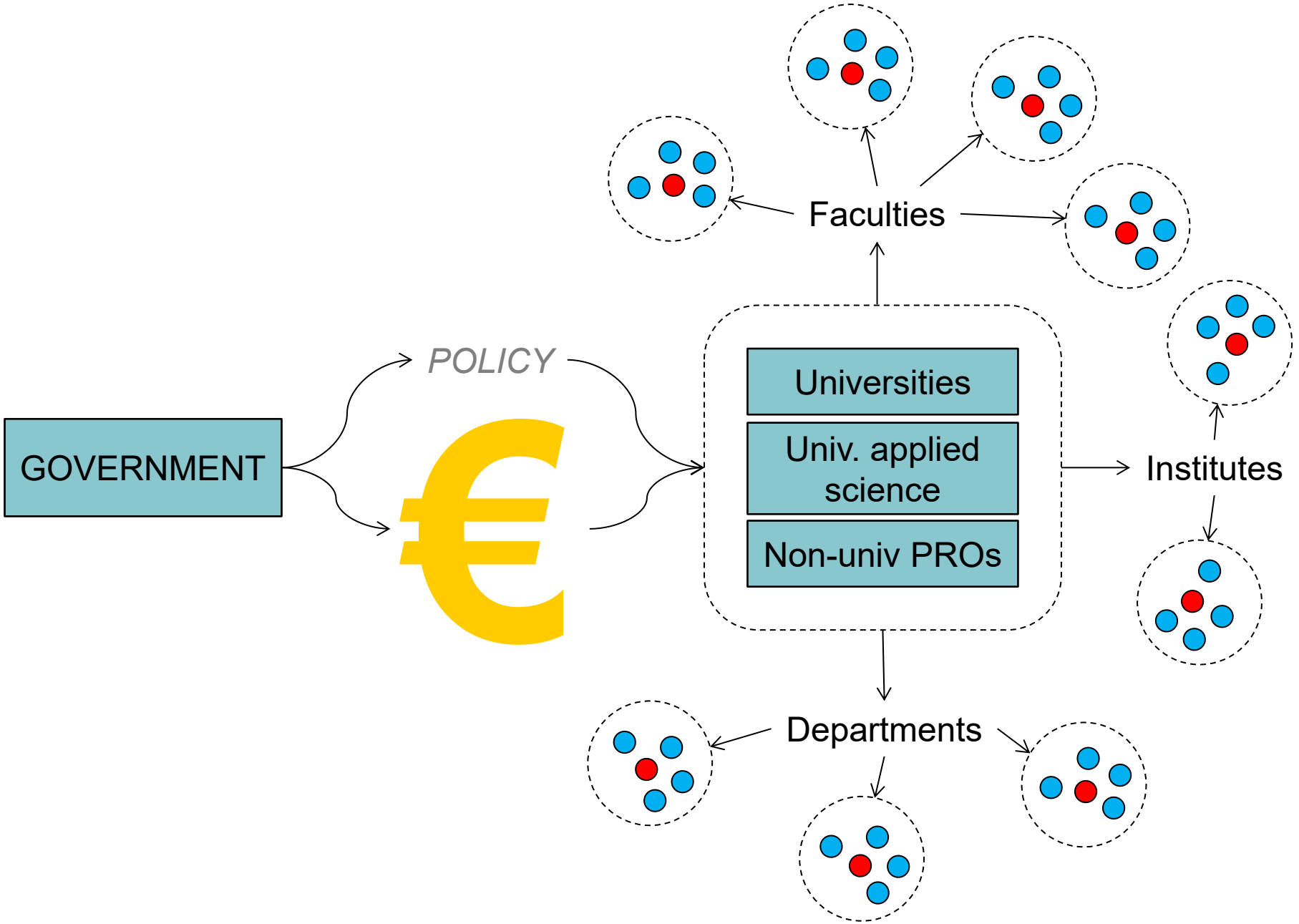
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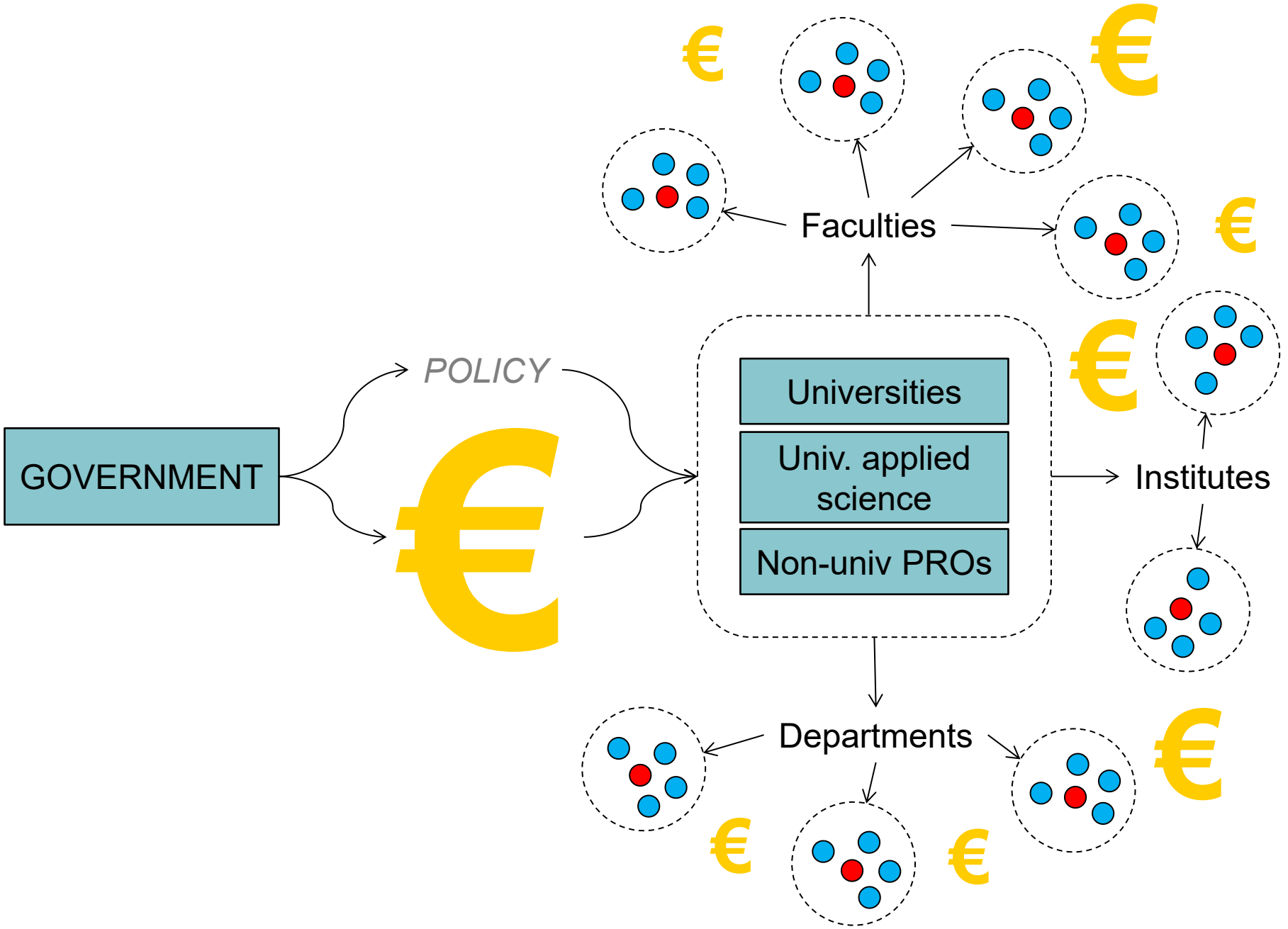
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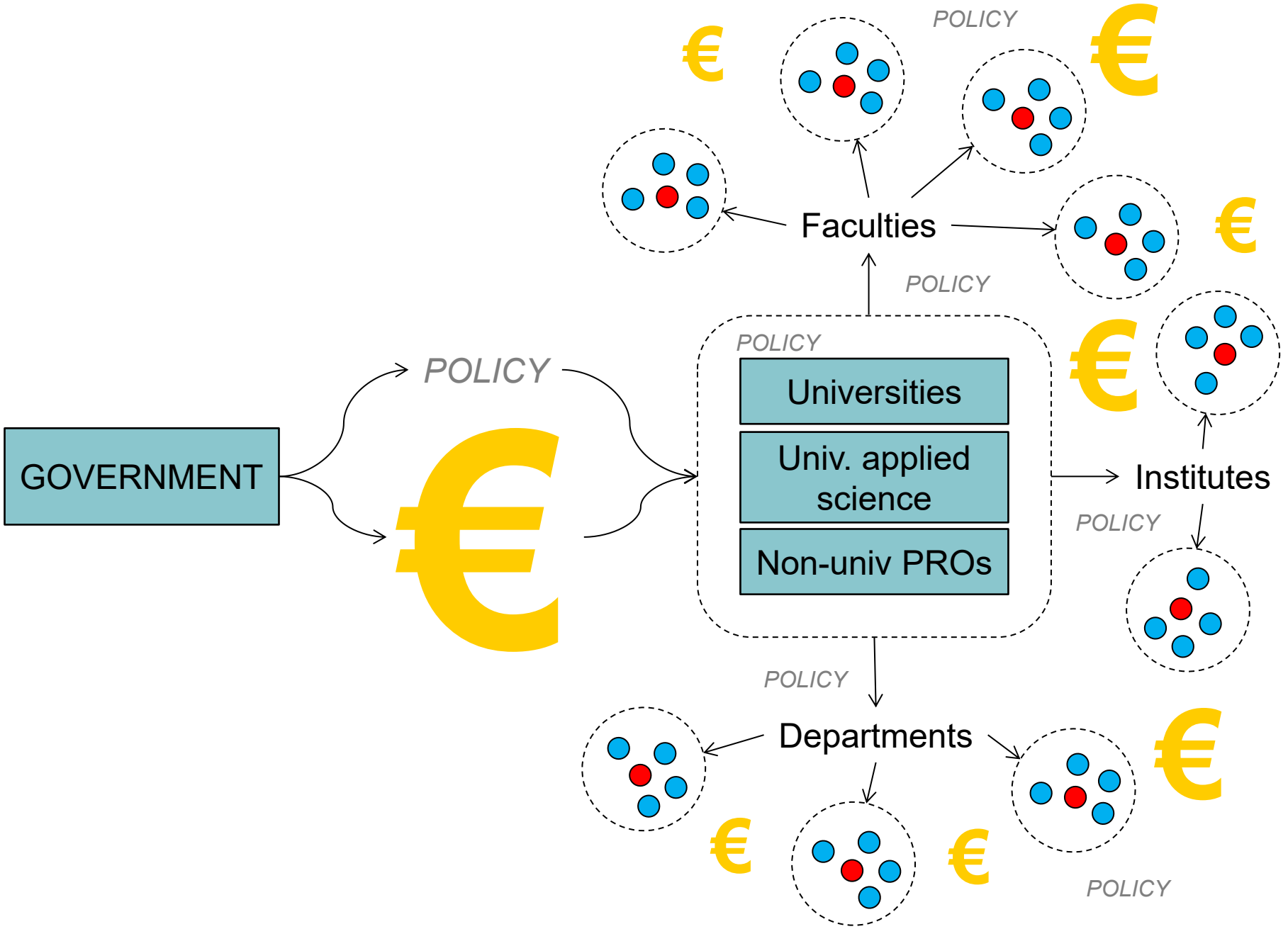
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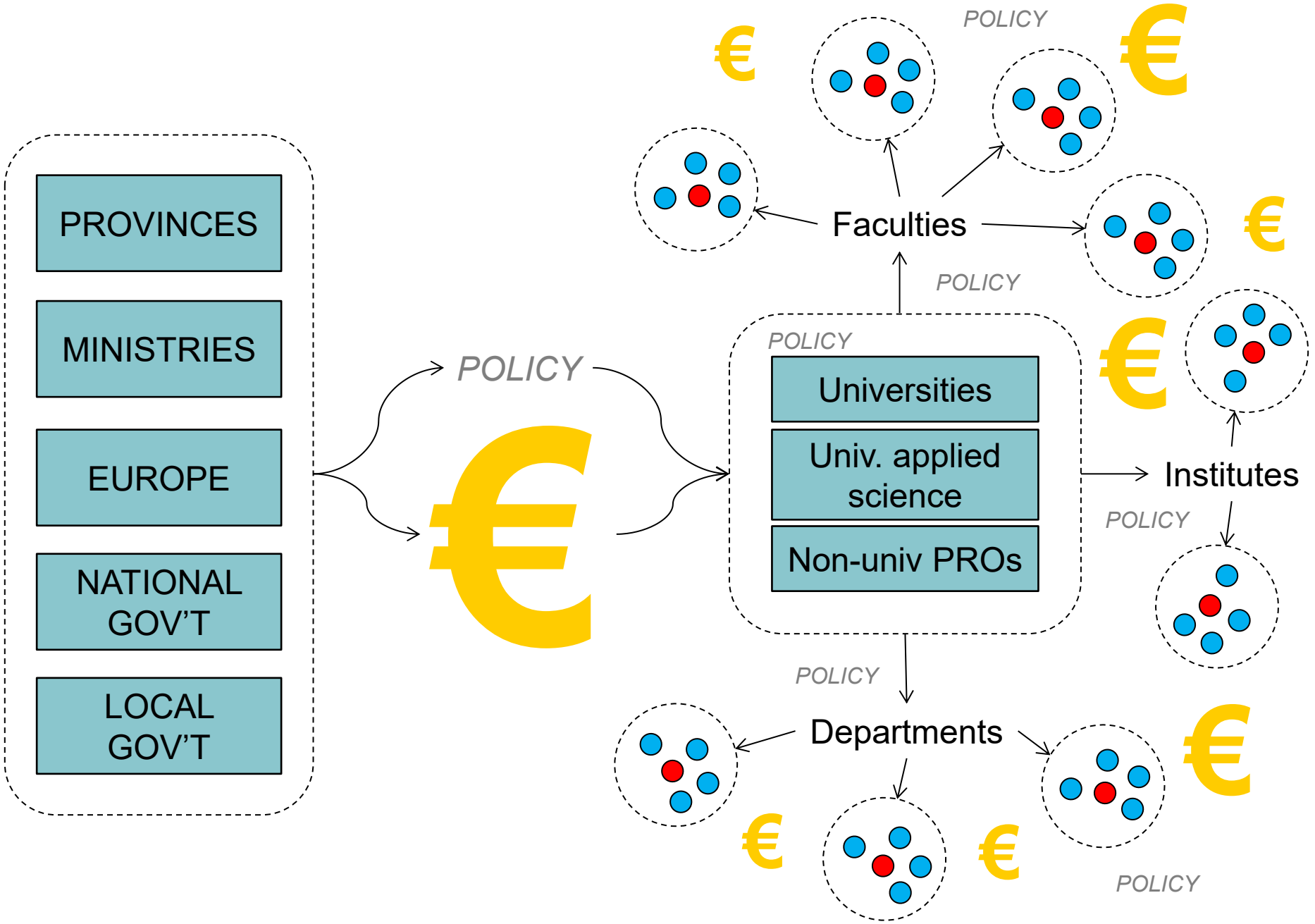
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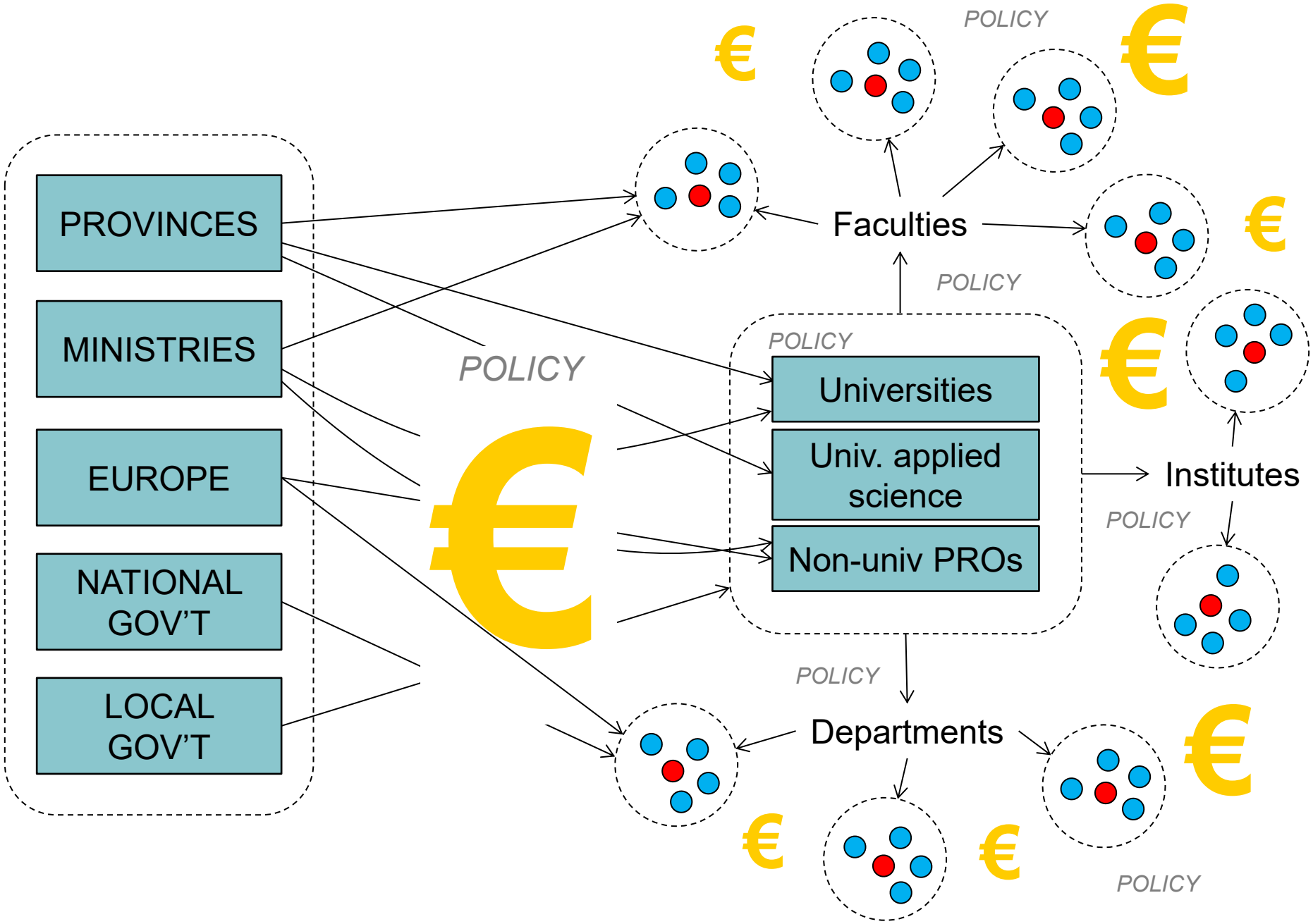
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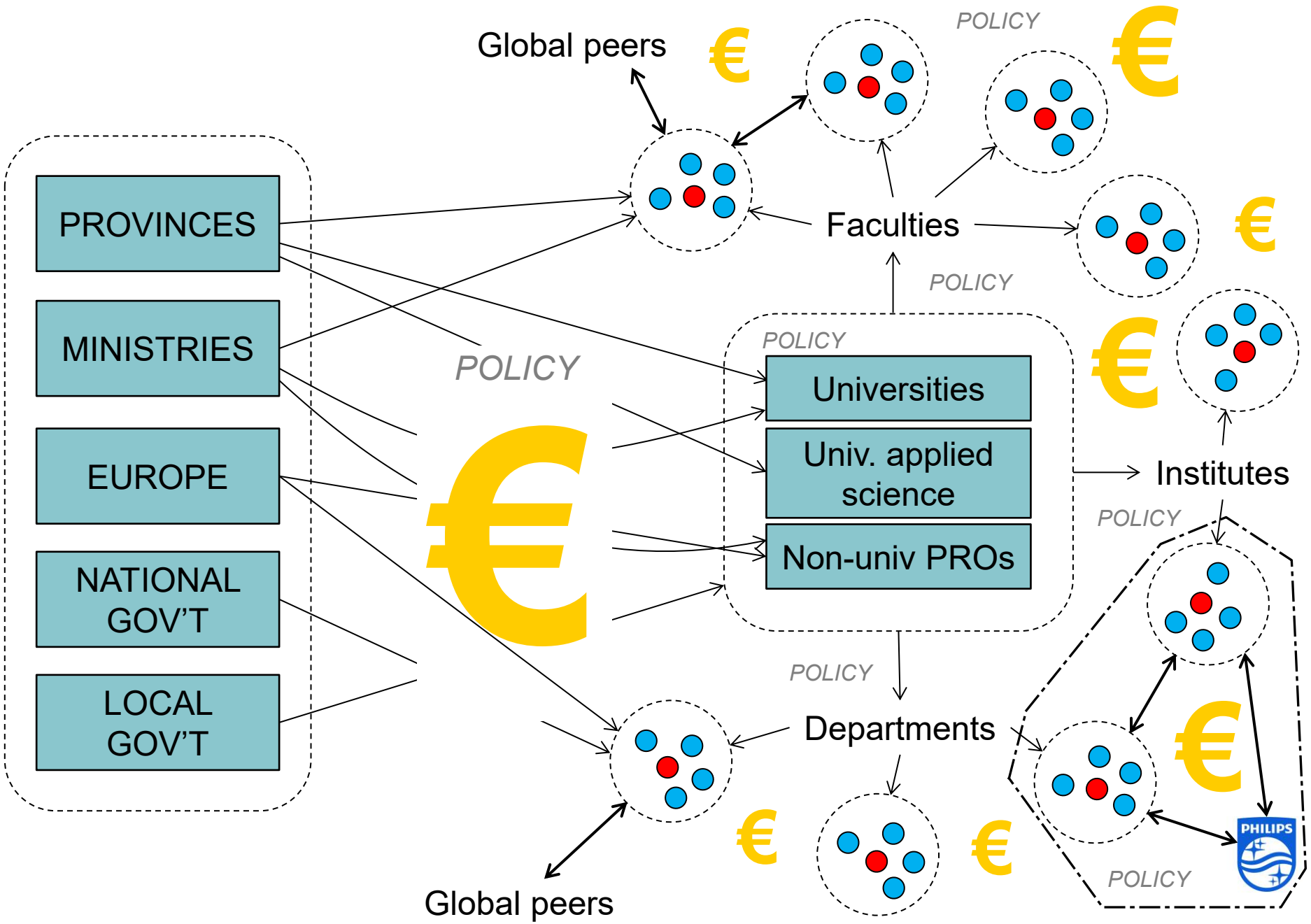
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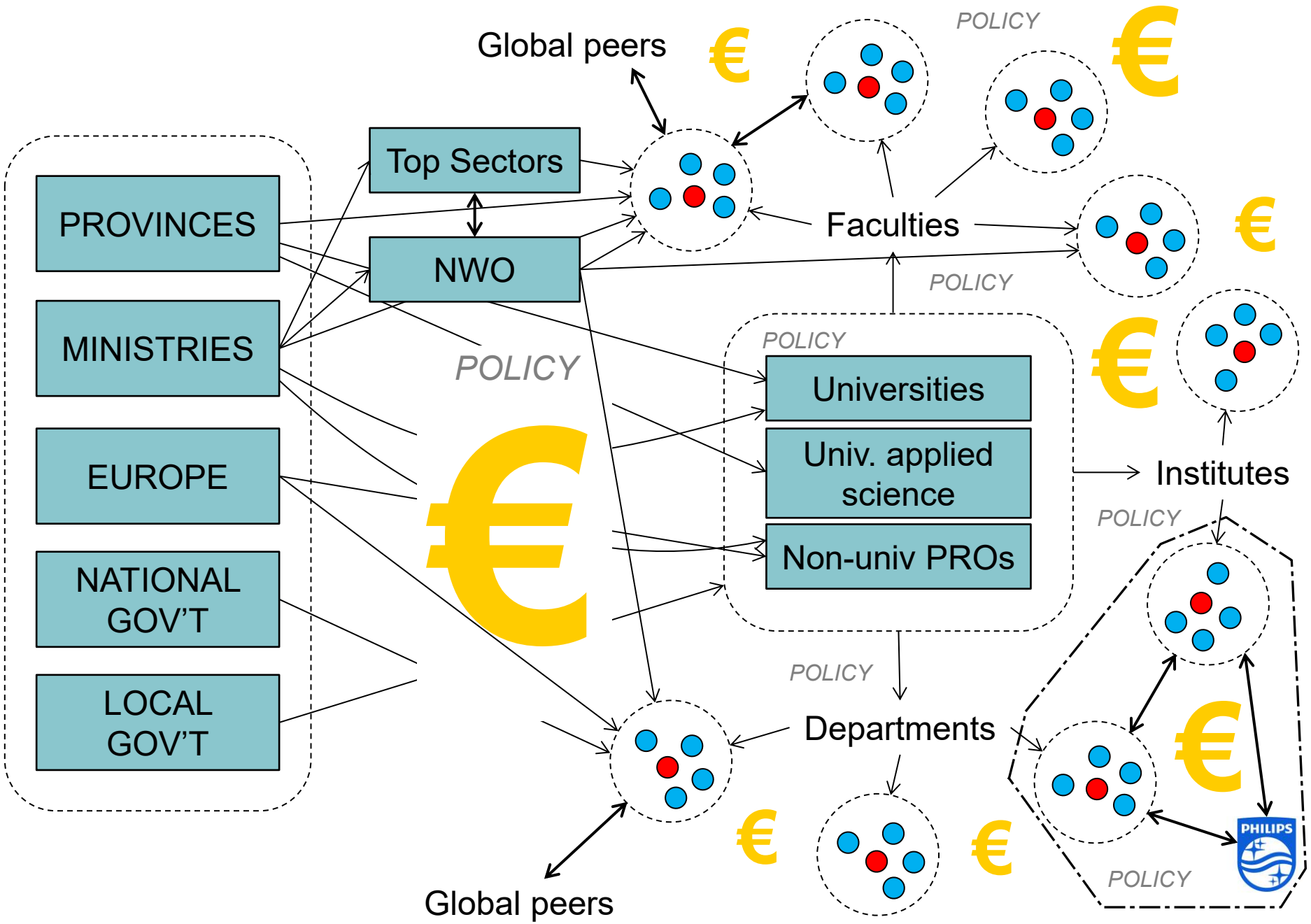
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Questions, comments, suggestions?

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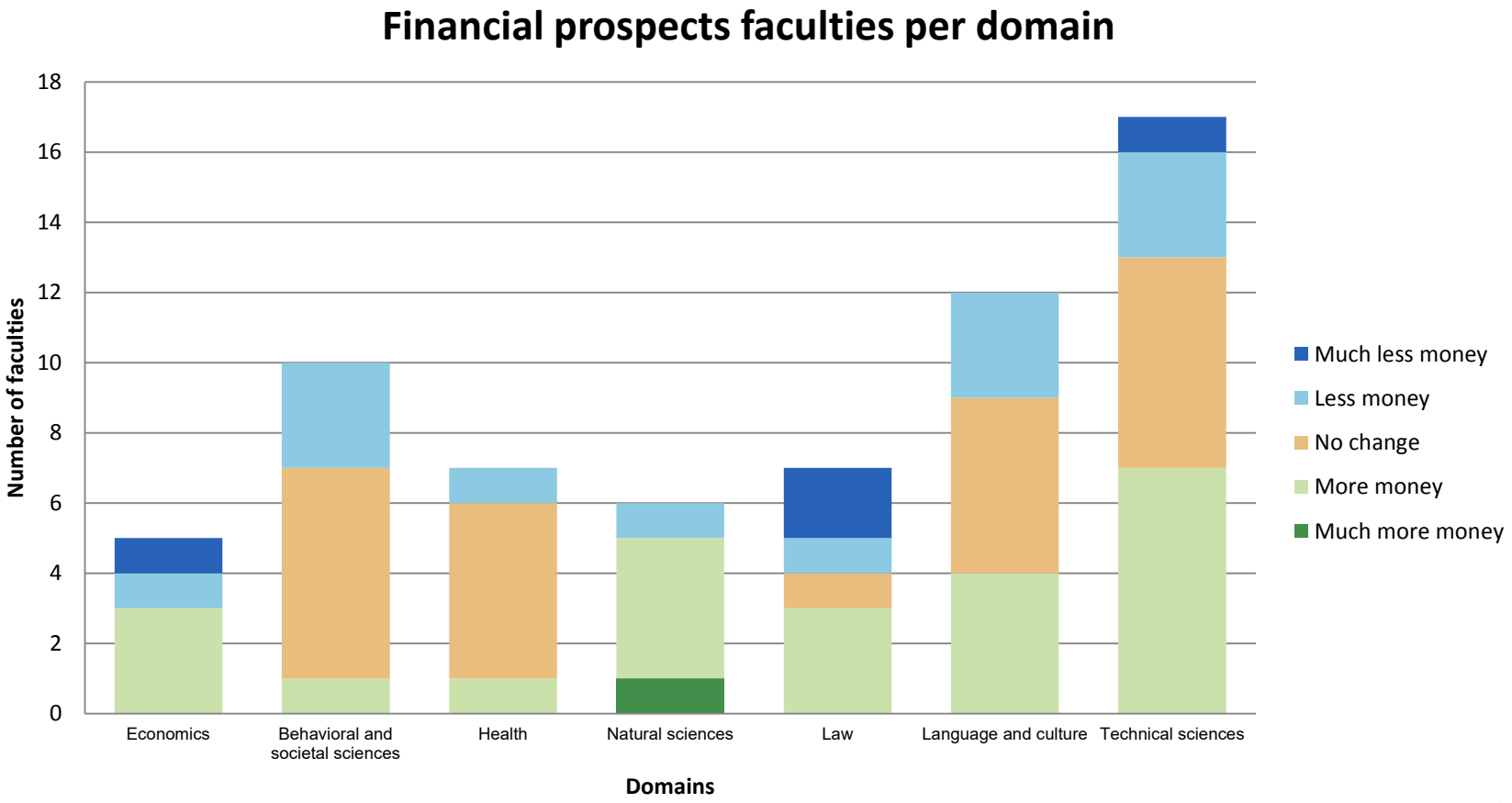
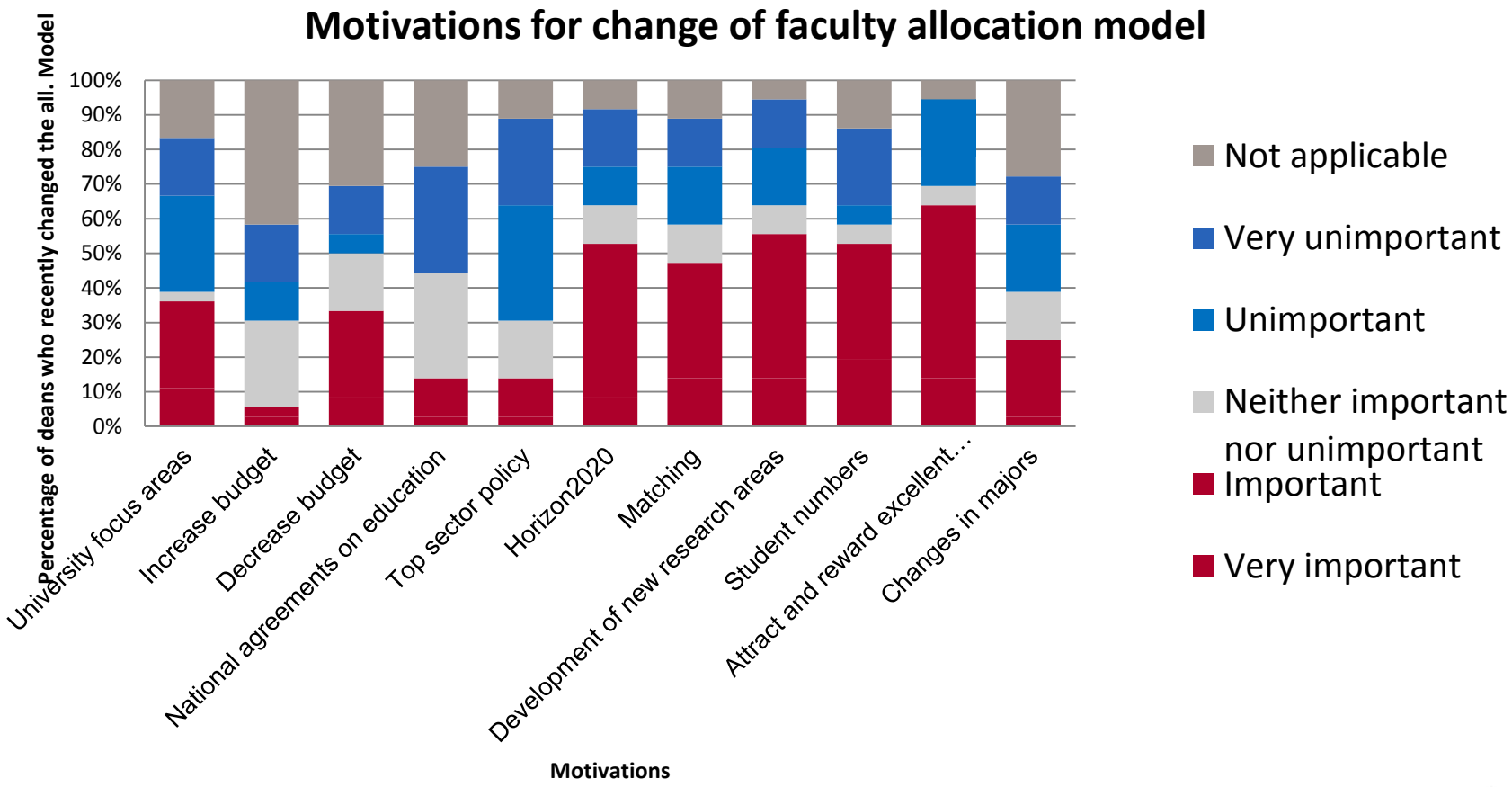
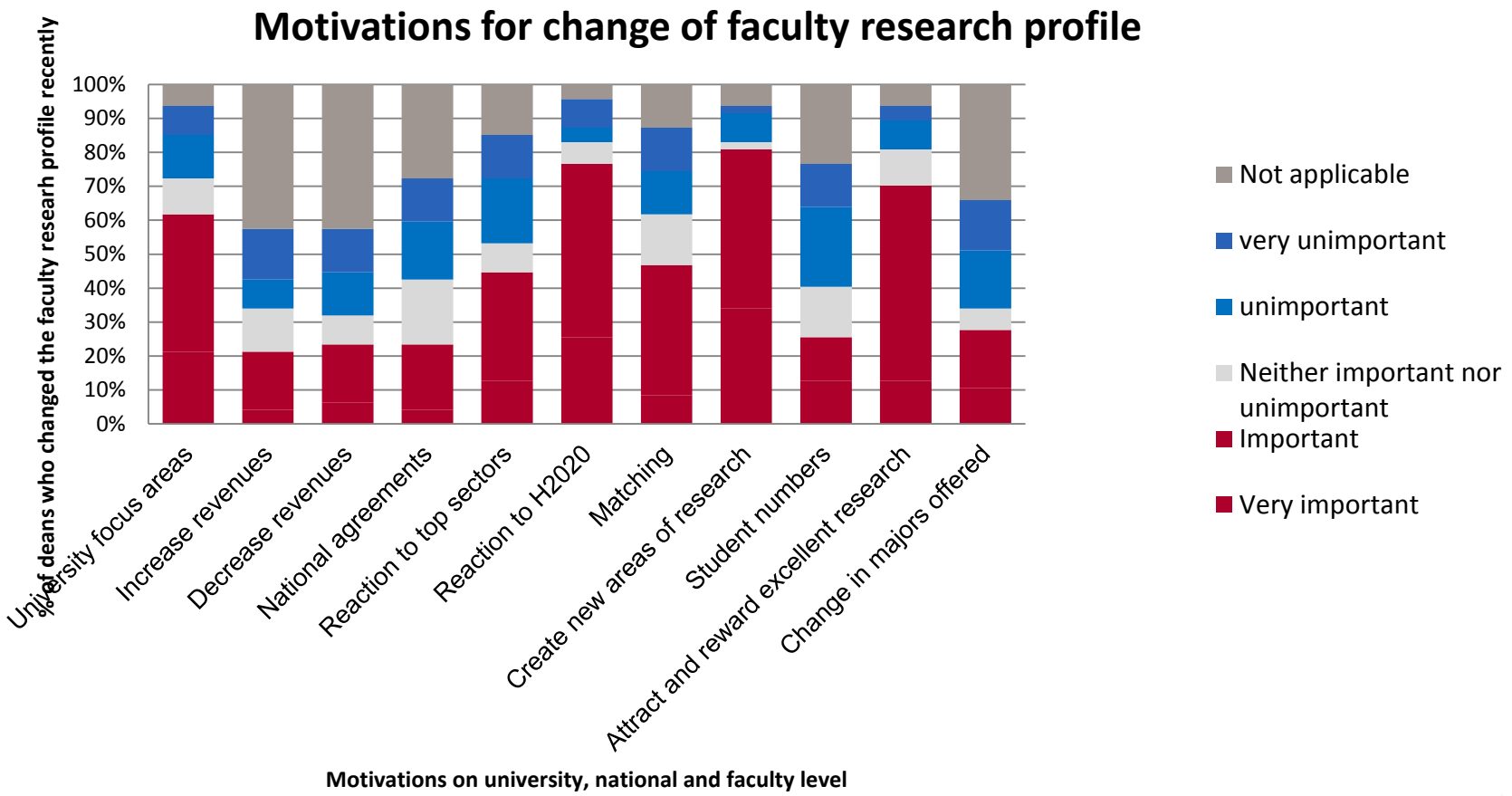
Financial prospects



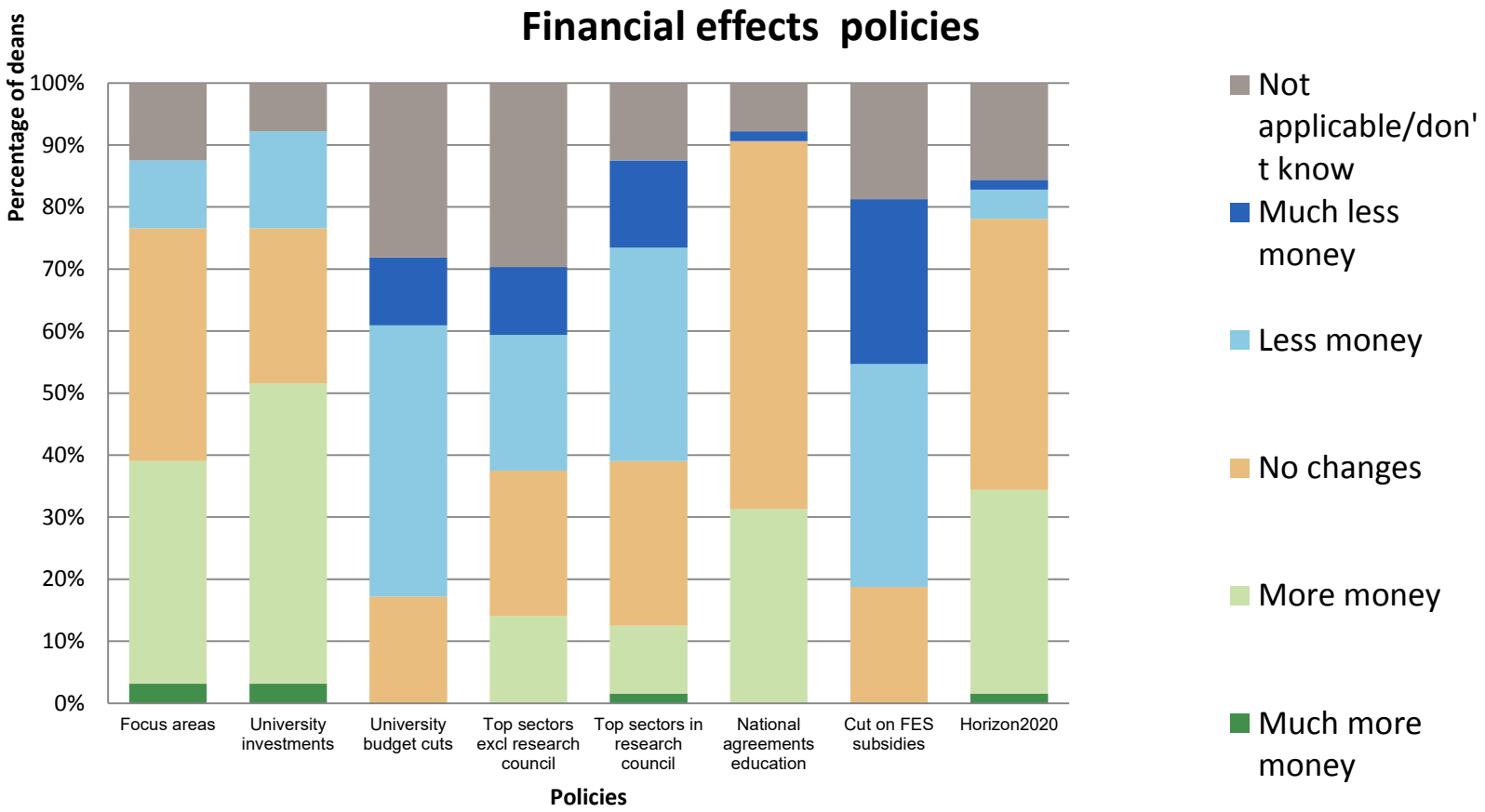
Influence of policy on changes in faculties 1



Influence of policy on changes in faculties 2



Financial effects of policies on faculties



Financiering van onderzoek

Totaal overzicht inkomsten universiteiten 2014

	totaal			onderzoek		
	totaal	universiteit	UMC	totaal	universiteit	UMC
Totaal (M€)	**8.405**	**5.822**	**2.584**	**4.906**	**3.666**	**1.240**
eerste geldstroom	**62%**	62%	60%	**56%**	60%	46%
tweede geldstroom	**6%**	7%	4%	**11%**	11%	9%
derde geldstroom	**21%**	21%	22%	**33%**	29%	45%
overige bedrijfs opbrengsten	**11%**	9%	14%	**0%**	0%	0%

Interne verdeling

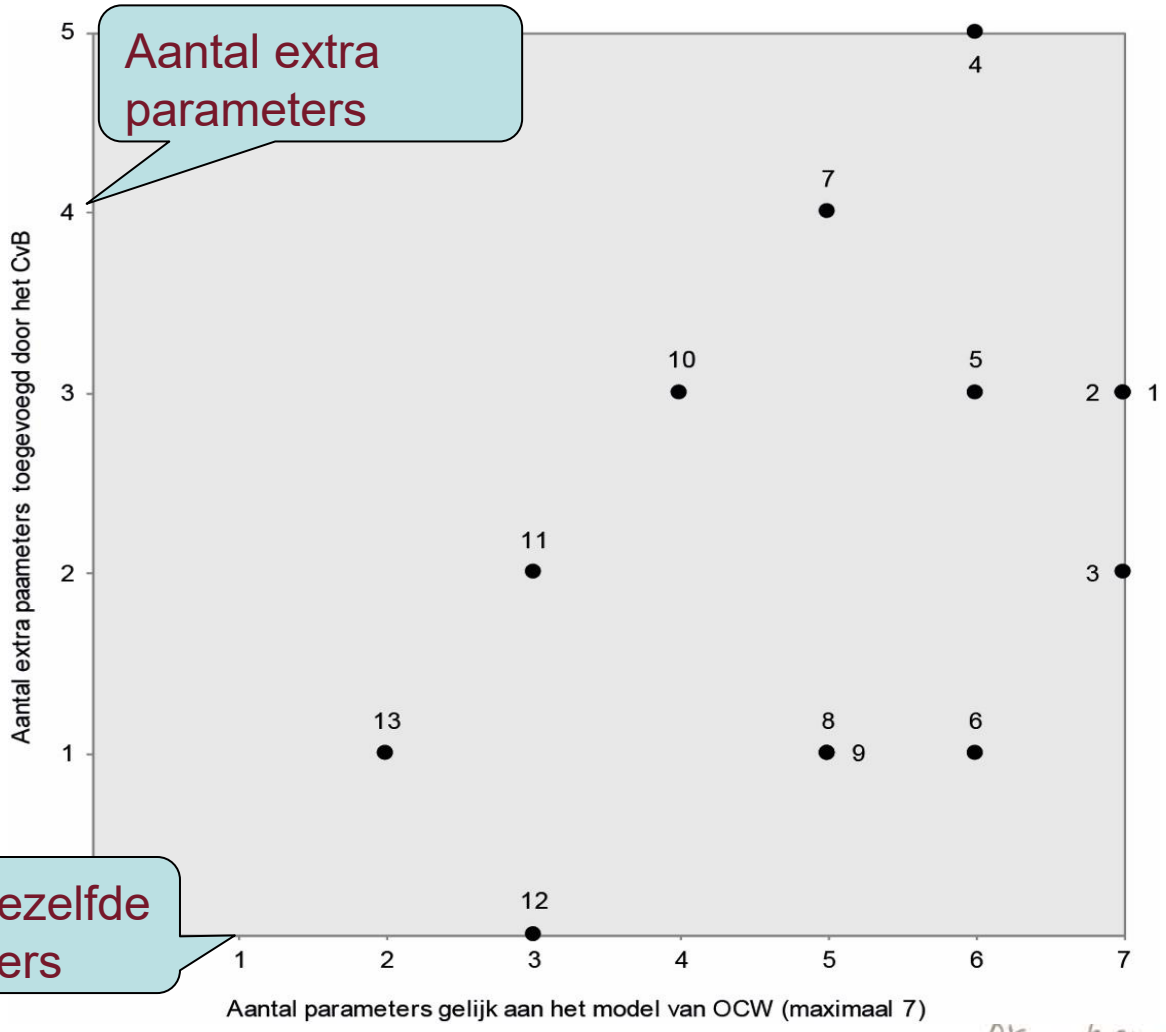
- Is intern model gelijk aan model van MinOCW?

Beeld is zeer verschillend:

Universiteit 4
Model met 11 parameters.
Veel diversiteit binnen universiteit,

Universiteit 6
Intern model is vrijwel gelijk aan extern model

Universiteit 13
Model met weinig onderwijs parameters.



Universitaire verdelingsmodellen I

Parameter	Aantal universiteiten (n=13)	Aantal faculteiten (n=66)
Aantal promoties	13	54
Aantal promovendi		6
Aantal publicaties		14
Binnengehaalde subsidies	6 a)	25
Citatiescores of journal rankings		13
Deelname aan zwaartepunten	8 b)	18
Grote faciliteiten (labs, apparatuur)		15
Aantal diploma's	10	26
Aantal studenten	9	27
Aantal studiepunten	7	27
Onderwijsuren		27
Studierendement		11
Vaste voet	13	31
Anders, namelijk:		20
Opslagfactor voor αβγ	6	
Aantal nominale studenten	5	
Eerstejaars	4	
Matching	2	
Onderzoeksvisitaties	1	

Funding dependencies faculties

	Types of funding						
	1e	2e	3e	other	total	Spread dependency basic funding	n
Economics	69	9	22	1	100	**60-80**	5
Behavioural sciences	69	11	16	4	100	**59-80**	10
Health	40	16	41	3	100	**25-60**	8
Physical sciences	53	18	28	0	100	**20-75**	7
Law	73	3	19	5	100	**49-85**	7
Language and culture	75	14	9	1	100	**55-94**	12
Engineering and agriculture	54	14	31	0	100	**27-80**	17

EU-SPRI ECC Science, Technology and Innovation Policy:
Rethinking rationales, concepts, applications and impacts
Vienna, 21 – 23 November 2016

Rationales for Comparing Science, Technology and Innovation (STI) Indicator Frameworks

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Story

- The team was working on designing a STI Indicator Framework (Model) for Iran, based on previous international and national frameworks developed, which led into six (now four) rationales for categorization and comparison of STI Indicator Frameworks.

- The authors thank the Research Institute for Science, Technology and Industry Policy (RISTIP) of Sharif University of Technology (Iran) for the research opportunity provided during the project of Iran's Yearbook of Science, Technology, and Innovation (2013-2014).

- This would help practitioners better leverage upon previous efforts, not starting from zero.

Outline

- Story
- Diversity of STI Indicator Frameworks
- Rationales for Categorization and Comparison of STI Indicator Frameworks
- CISC (Coverage, Implementation, Simplicity and Comparability) model comparing 22 STI frameworks
- Some Clarifications on CISC
- Concluding Remarks

Diversity of STI Indicator Frameworks

- **STI Indicator Framework or S&T Framework**: defined as incorporating some science, technology and/or innovation-related indicators for monitoring, mostly at a national level.
- Every S&T framework is based on an issue, question, policy or objective.
- Under different themes of economy, innovation, STI, S&T, human development, education, industry, etc.
- Under different names of model, framework, capacity index, capability index, manual, scoreboard, schematic overview, etc.
- Some framework examples:
  - Global Innovation Index (GII) (2016)
  - Knowledge Economy Framework (WorldBank, 2016)
  - South Korean STI Framework (In et al., 2014)
  - The US (Litan et al., 2014)
  - National Innovative Capacity (Furman et al., 2002)
  - EU Innovation Union Scoreboard (Ed-Sadki and Hollanders, 2014)
  - Dutch STI2 Framework (Hertog et al., 2012)
  - OECD Oslo Manual (OECD/ Eurostat, 2005)
  - ArCo Model of Technological Capability (Archibugi and Coco, 2004)
  - Links Between Technology and Human Development (UNDP, 2001)

Rationales for Categorization and Comparison of STI Indicator Frameworks (CISC Model)

- *Coverage (Comprehensiveness)*
- *Implementation*
- *Simplicity*
- *Comparability*

1. *Coverage (Comprehensiveness)*

- **Issue-driven** S&T frameworks aimed at solving a special problem and of niche coverage, such as Sampat (2011)in health area or ArCo model of Archibugi and Coco (2004),

Or

- Frameworks **of the widest scope** of STI covering all science, technology and innovation areas, such as the review model of Litan et al. (2014) for The US or Global Innovation Index (GII) (Dutta and Lanvin, 2013)
- A wide STI coverage would be **beneficial** to a country developing a general-purpose and reference STI framework rather than a problem-oriented or niche one.
- **Tradeoffs** between coverage, cost and accuracy (UNESCO Institute for Statistics, 2010).

2. *Implementation*

- **Assesses** development of indicators, data collection and periodical publication.
- **Not just** stands for all impracticalities, **but also** if data collection is possible but times-consuming, not economical, of low reliability and replicability, or volatile.
- **Whatever the goal and mission**, it seems that satisfaction of implementation rationale is always desired for a STI framework, unless the theory and rigor behind a framework be of such value which compensates for.
- **Theoretical frameworks** that have not developed indicators yet are examples of less desired frameworks regarding implementation rationale, such as Schematic Diagram of NSI (UNCTAD, 2011) and Schematic Overview of Innovation System (Jaffe, 2011)

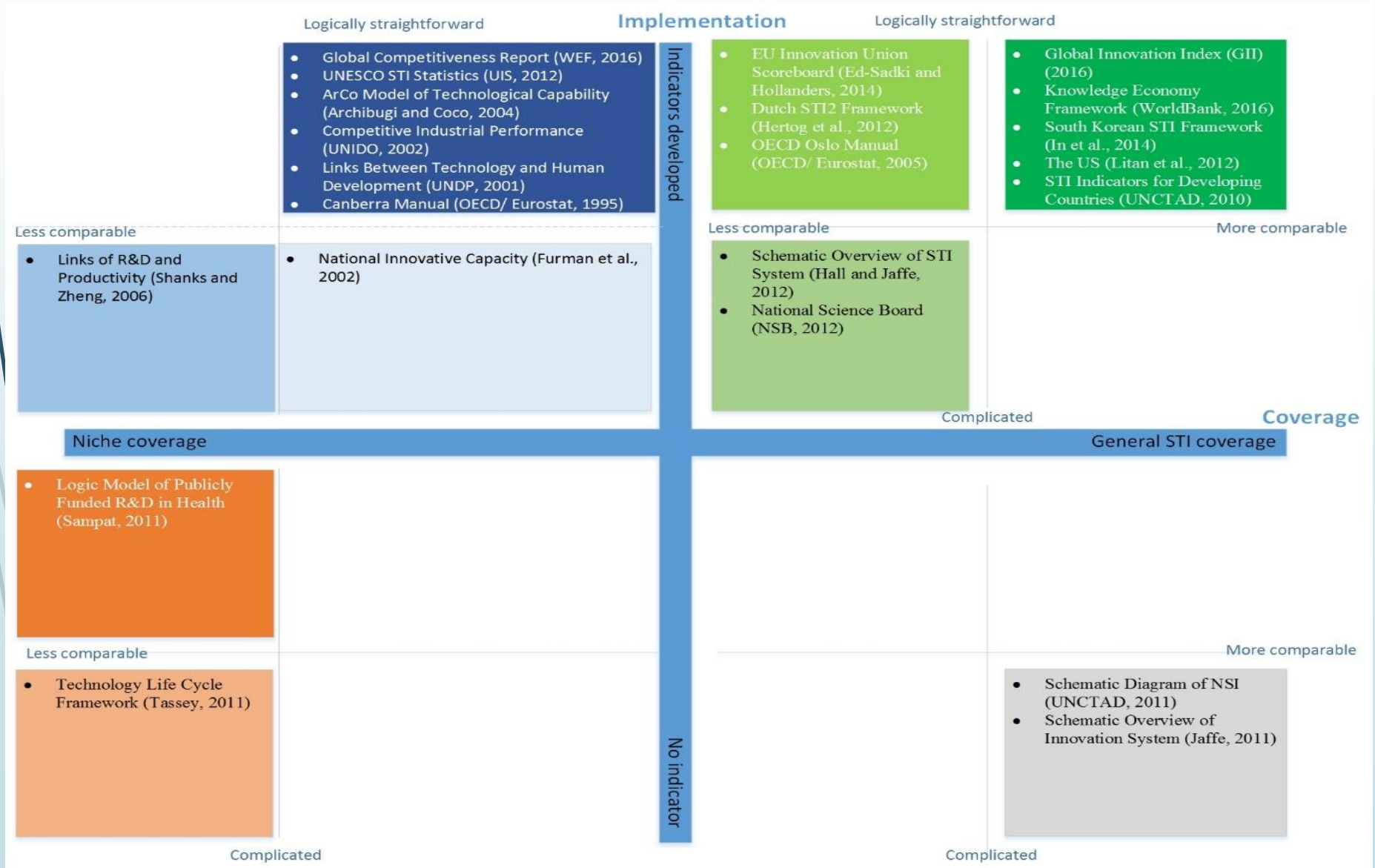
3. *Simplicity*

- **Simplicity indicates** that a S&T framework should be as simple as possible while maintaining essentials.
- Although simplicity criterion is more familiar for indicators (e.x., Bornmann, 2013), **here the simplicity of an overall framework is meant**.
- **A logically straightforward (simple) STI framework** avoids inclusion of causal/ correlation linkages, i.e. unknown unknowns as referred by Litan et al. (2014), between components or indicators, uses less number of components and indicators, and a straightforward design.
- Global Innovation Index (GII) (Dutta and Lanvin, 2013), Knowledge Economy Framework (World Bank, 2016), EU Innovation Union Scoreboard (Es-Sadki and Hollanders, 2014) and Dutch STI2 Framework (Hertog et al., 2012) could be considered as **logically simple examples**
- National Innovative Capacity (Furman et al., 2002), Schematic Overview of STI System (Hall and Jaffe, 2012) and Schematic Overview of Innovation System (Jaffe, 2011) could be classified as **complicated examples**.

4. *Comparability*

- **Utilized by** National Research Council of the National Academies of US (NCSES) to improve its current S&T indicators' program (refer to Litan et al., 2014).
- **Stressed by** Barré 2009, 2001; Lepori et al. 2008; Reale et al. 2012.
- A STI framework is **defined** as more comparable when the main components, sub-components and also the indicators are more comparable with a considerable number of well-known frameworks out there.
- Logic Model of Publicly Funded R&D in Health (Sampat, 2011) or Schematic Overview of STI System (Hall and Jaffe, 2012) as **examples of least comparable**
- South Korean STI Framework (In et al., 2014), Global Innovation Index (GII) (Dutta and Lanvin, 2013) and Knowledge Economy Framework (World Bank, 2016) as **examples of most comparable**
- Having considerable number of **native, customized and synthetic indicators** and components makes a STI framework less comparable.

CISC (Coverage, Implementation, Simplicity and Comparability) model comparing 22 STI frameworks



Some Remarks

- Rationales could be defined **at different levels** of overall framework, components or indicators (but specified)
- Initial rationale of ***Overlapping Components* was omitted** due to being disputable when assigning to frameworks. Also, Initial rationale of ***Native Factors* was *omitted*** *by being merged with Comparability rationale.*
- *Model is based on **binary scaling** on each rationale, for the sake of visualizations. Of course, ternary and higher scaling is possible and of utility.*
- The model was limited to our experience, and thus **is open to other probably useful rationales** such as robustness of methodology and framework, transparency of methodology and data, replicability, logically overlapping components, availability of data and use of synthetic indicators.
- The utility of CISC model and the contribution could best be indicated as:

  It leverages previous efforts regarding development of STI Indicator Frameworks and restricts search agenda, when a country or organization is seeking development, design or revise a framework.

Thank You

DISREGARDING HISTORY AND CONTEXT: INNOVATION POLICY IN LATVIA POST 1990

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Aim of the research

- **To explore changes in Latvia's innovation and research policy after the collapse of the Soviet Union and discuss the approach that has been used to improve the country's performance**

- We aim to contribute to the discussion of government incentives for boosting innovation in countries with poor innovation performance

Current problems

- Latvia - a small country in transition, with a relatively poor innovation performance and with a **pressure to shape its industrial and research policies towards industrial development and sustainable growth**

- Despite implementing major structural changes, **R&D spending is low (0.62% of GDP in 2015)** and a historical background continues to influence the economy resulting in low innovation absorption capacity among other things

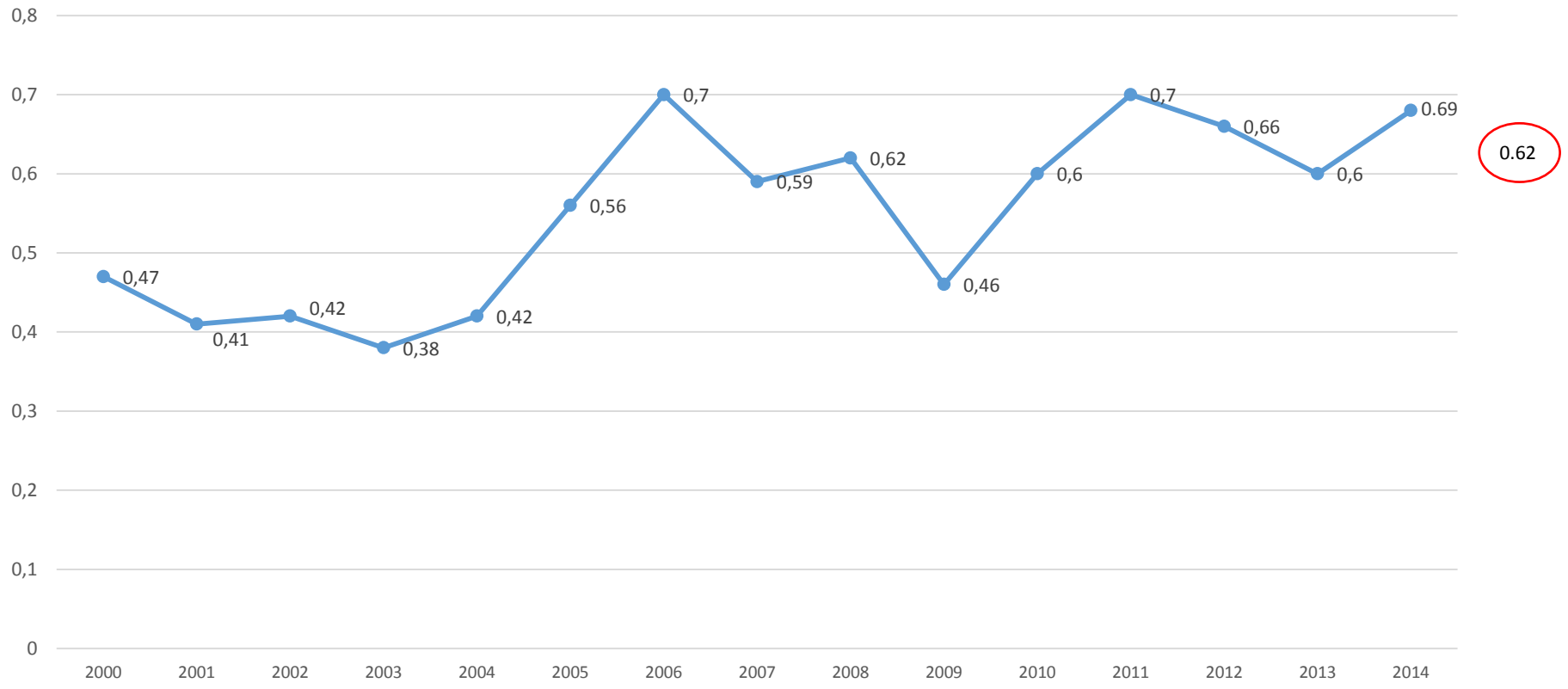
Current problems

- **Private sector R&D spending** is lagging behind public investment
- Substantial part of public **investment comes from European Structural and Investment Funds** (ESIF)
- **Fragmented** national innovation system
- **Lack of commitment** from policy makers

Cutting R&D exp. during recession = unique among member states

R&D environment

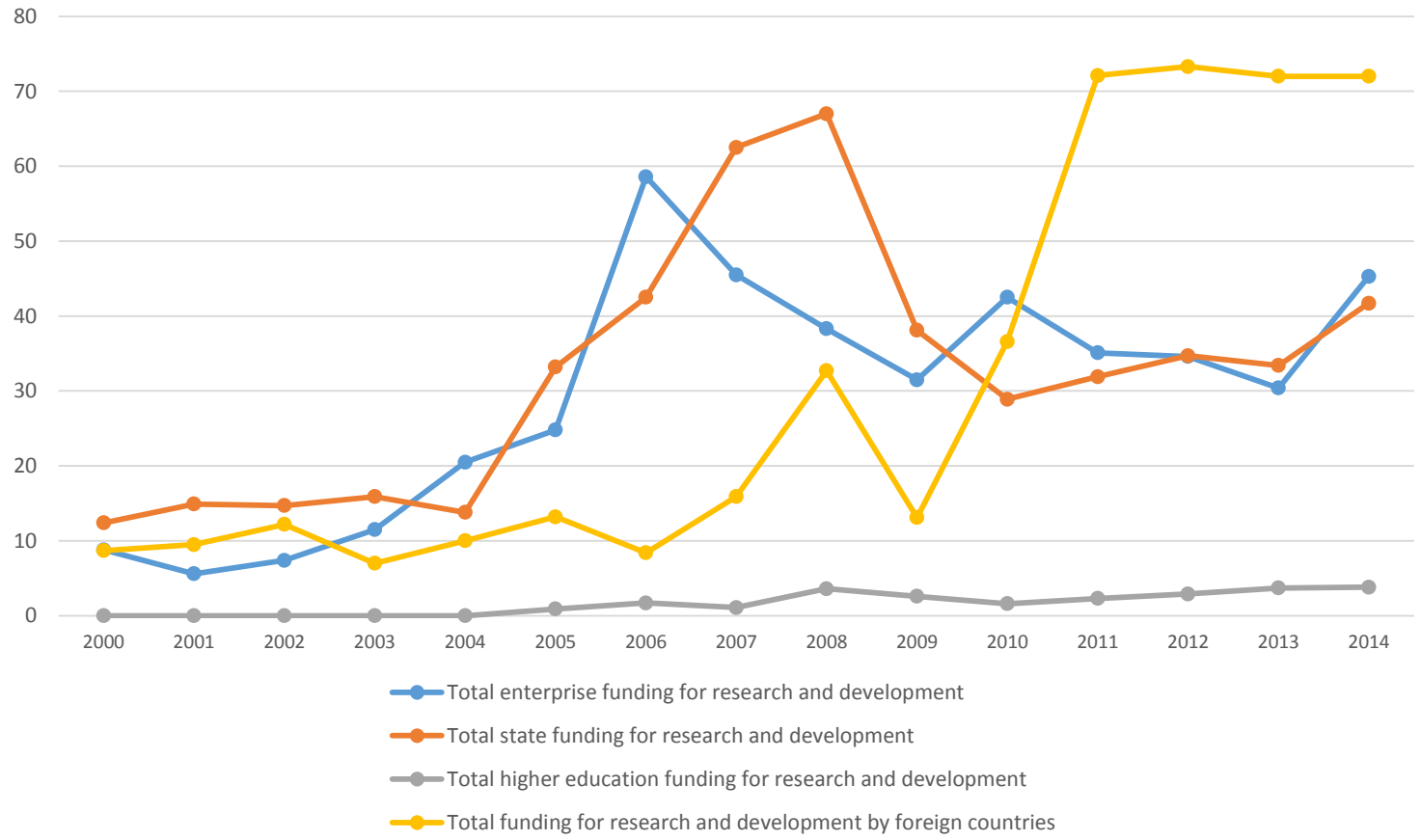
Figure 1. Gross domestic expenditure on R&D, 2000-2014, % of GDP



Source: Central Statistical Bureau of Latvia (CSB, 2015)

R&D environment

Figure 2. Expenditure on R&D by sector, 2000-2014, mln euro



Source: Central Statistical Bureau of Latvia

R&D environment

Problems stretch all the way back to the time when Latvia regained its independence in 1991 and almost instantly found itself:

- without previously accessible markets
- with excess R&D capacity, which could not be utilised by local industry alone; introduction of competitive funding
- with most of the industry with relatively high value added – the only natural partner for R&D and technology transfer, declining at a faster pace

R&D environment

Most of the local industry relies on what Lundvall (1992) called **«doing-using-interacting» type of innovation**, requiring engineering skills and sophisticated customers as first users and not formal R&D inputs more relevant for more high-tech industries (ICT, pharmaceuticals, space)

Research an Innovation policy

- Liberal policy focused **on providing basic “life support”** to the research system as well as integrating research with higher education and linking researchers with existing needs

- System for research funding is developed in a way that it would provide at least the **bare minimum horizontally across all fields** of research

Research an Innovation policy

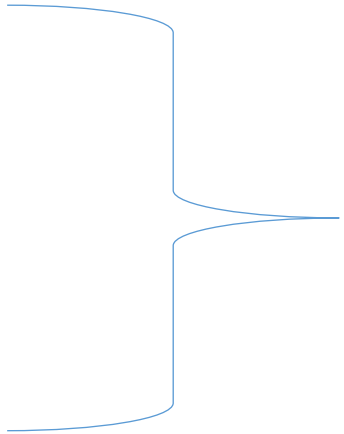
- Because of accession to the EU, R&D was directed towards European and national priorities, however, **no decisions regarding specialization** in certain domains in science were made so the priority areas were very broad and inclusive

- The **scarce funding was divided among the fragmented institutions**, the **capacity of companies to absorb innovation was reduced**

Main policy documents

National priorities and courses of action to promote innovation have been set in:

- The Guidelines on National Industrial Policy for 2014-2020
- The Science, Technology Development and Innovation Guidelines 2014-2020



RIS3

Main policy documents

National priorities and courses of action to promote innovation have been set in:

- The Guidelines on National Industrial Policy for 2014-2020

Ministry of Economics

- The Science, Technology Development and Innovation Guidelines 2014-2020

Ministry of Higher Education and Science

Policy result	Aim reaching indicators
Position in the European Innovation Index Group	European Innovation Index Group
Investments in R&D in the amount of 1.5% of gross domestic product in 2020	Proportion of high and medium-high technology industries in Latvian merchandise export
	Proportional increase of the private sector investments in research and development (private sector investments in research and development, % of total investment)
	The number of scientific personnel in research and development
	The number of researchers employed in the private sector (% of the total, according to full- time equivalent)
	Number of students that earned degree in universities or colleges (thousands/people)
	Proportion (%) of population aged 30-34 with a higher education.
	Granted European patents, applied from the scientists that reside in Latvia
Creation and implementation in production of innovative and internationally competitive products with high added value	The proportion of innovative companies (% of all companies)
Promotion of international competitiveness in science	A smaller number of stronger State- funded scientific institutions
	Scientific articles published in international databases
	Success rates for membership in the EU framework program

Research an Innovation policy

- Latvian government has mostly concentrated on supporting **formal ways of technology transfer** such as contract research and licensing, not taking into account the lack of market
- **Creation of research output is funded while the commercialization phase is not**
- **Research output produced by domestic R&D institutions is often not relevant for local businesses** and needs to be exported
- The scarcity of state funding prevents implementation of internal motivational instruments at universities thus **innovation support is largely funded by external programmes**

Conclusions

- Latvian policy makers are mainly applying the “Out-the-door” criterion when developing support incentives - the **results of research are predefined and motivates to deliver quantity instead of creating the most possible impact**

- **Governments use quantitative data** on e.g. tech transfer cases or patent applications **as indicators of how the national innovation system is improving** and therefore applying this criterion is rather convenient

Conclusions

The increasing focus on various scoreboards and benchmarking is promoting this kind of approach in countries with a poor innovation performance

As a result, **universities and other research organisations have so far focused on reaching the planned goals instead of motivating and creating entrepreneurial spirit among research groups**

Conclusions

2 innovation system evaluations (1992, 2014)

=

very similar conclusions and recommendations

Future research

- Interviews with key policy makers
- Detailed comparison between changes in target indicators over years
- Detailed analysis of the structure of R&D expenditure

Thank you!

Vienna | November 2016

University of Sussex

PROCESS OF DEMOCRATIC ENGAGEMENT

WITH AND WITHIN EMERGING REGULATOR SPACES OF THE IRISH WIND ENERGY SYSTEM

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SPRU – Science Policy Research Unit

1 OF 4 STI THEORY:
SELECTION AND DIRECTION

RESEARCH AGENDA

HOW AND WHY REGULATORY ACTORS AND STRUCTURE INFLUENCE THE DIRECTION OF EMERGENT TECHNOLOGY SYSTEMS.

SELECTION IN A GIVEN DIRECTION

DIRECTION AND DIRECTIONALITY

- What is innovation for?
- Goes beyond, issues of prioritization across sectors such as health, energy and military
- **Directionality:** the need for more open academic and policy attention to the fact of there being alternative possible orientations for progress
- Beyond scalar drivers and barriers

WHICH DIRECTION: DISTRIBUTION AND PROCESSES OF DEMOCRACY

- Democracy: the best means by which we can address asymmetrically structured agency

    - and so address imbalances in the distribution of benefits.

- Democracy: an open-ended relational struggle — Not as an endpoint, but as a process

- Despite urgencies, there are still choices e.g. green not the only direction *Johnstone and Stirling (2015), Stirling (2009)*

2 OF 4 REGULATOR SPACES

FROM REGULATORS...

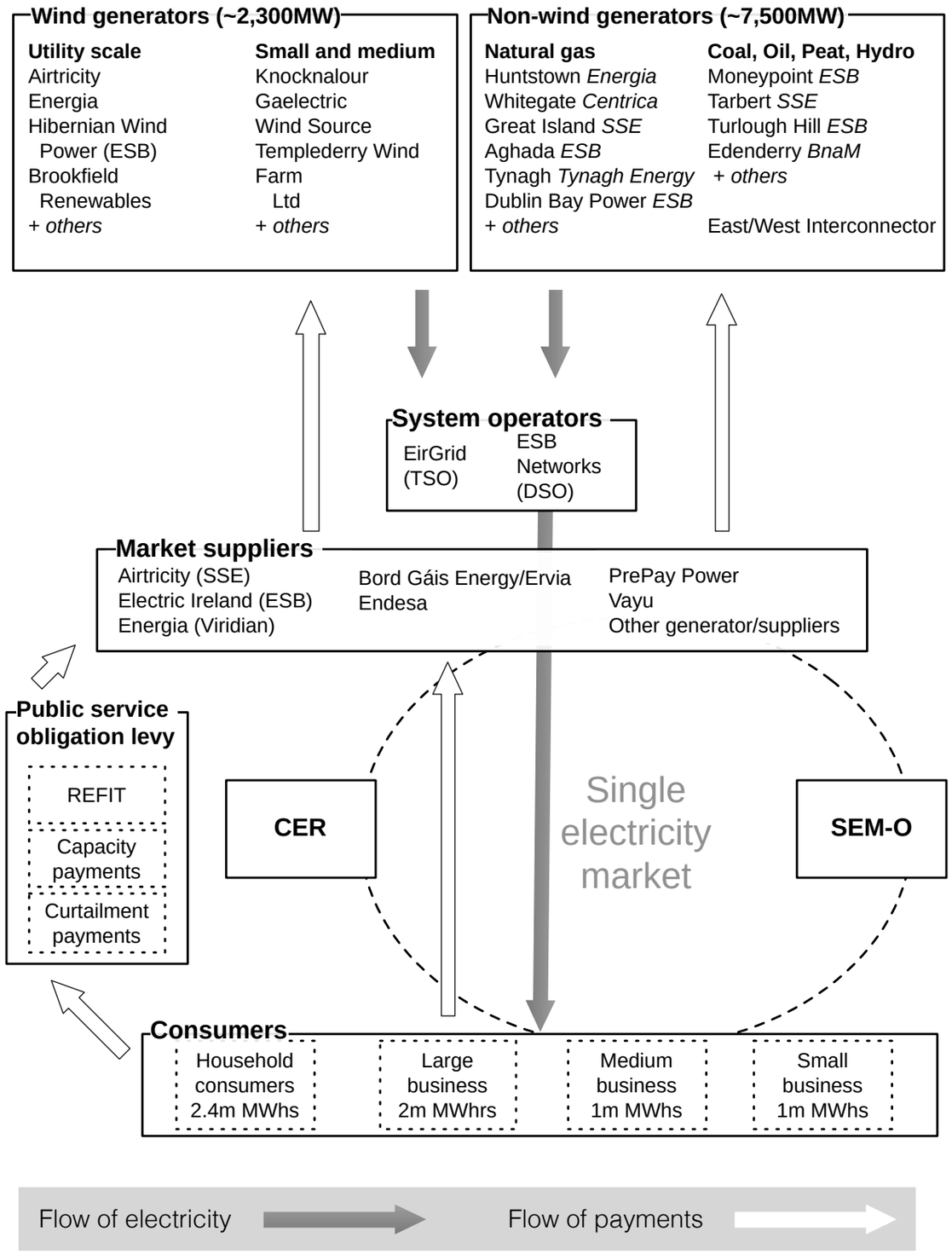
WHO ENACT POLICY, MEDIATE BETWEEN ACTORS, DISTRIBUTE RENTS AND OTHER INCENTIVES, "MANAGE" MARKETS, COORDINATE THE ACTIVITIES OF SYSTEM PARTICIPANTS, HAVE THE POWER TO LEGITIMISE NEW TECHNOLOGIES, MIGHT SELECT NEW TECHNOLOGIES.

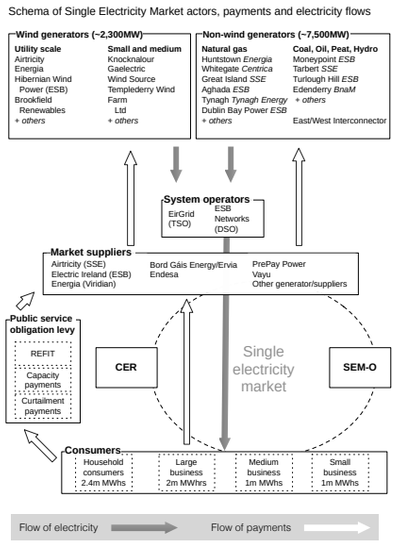
REGULATORS ARE OFTEN POWERFUL ACTORS IN LOCAL CONTEXTS, WITH POWER TO ARBITRATE DISPUTES AND CREATE OR MAINTAIN PROTECTIVE DEVELOPMENTAL SPACE FOR NEW ACTORS.

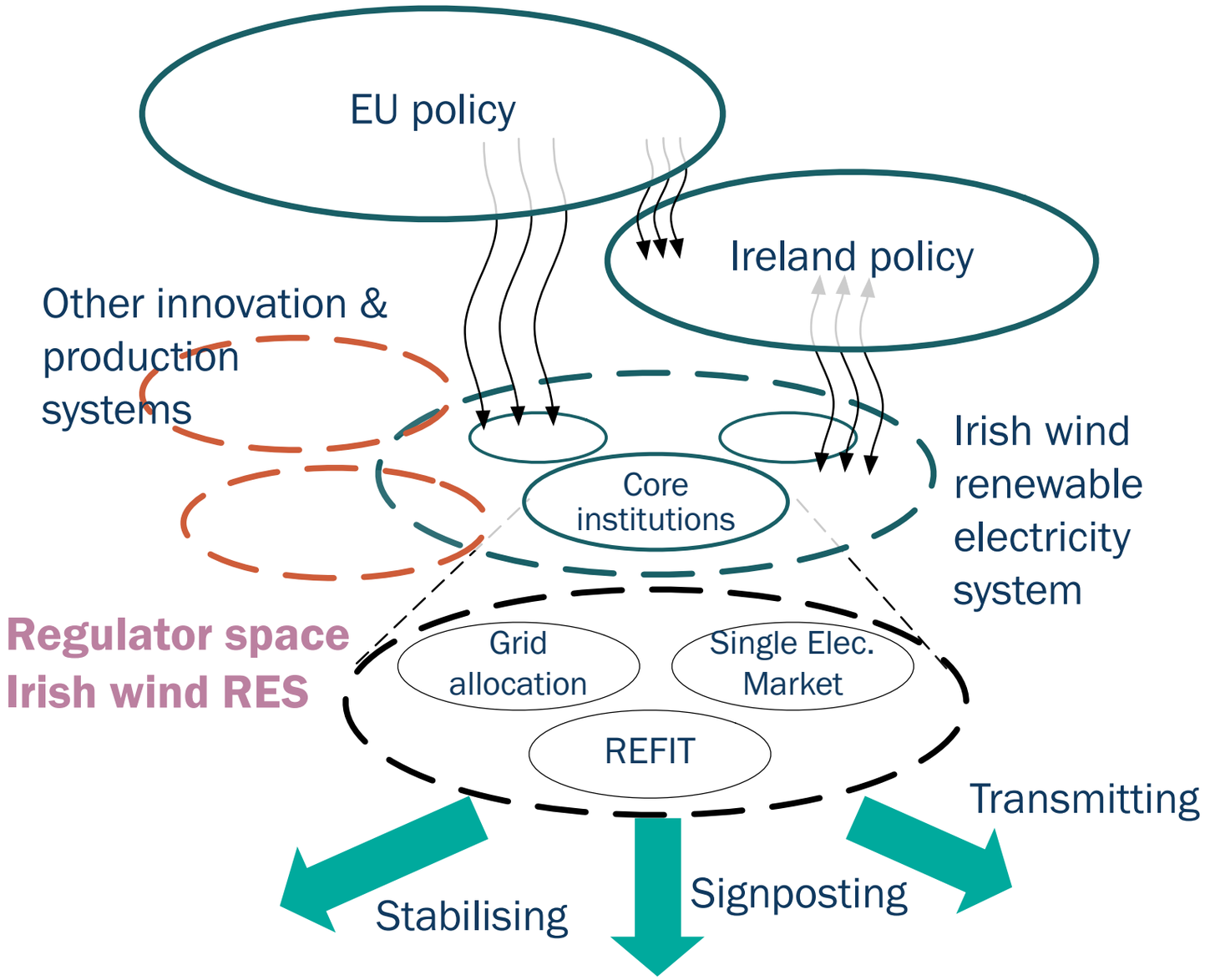
TO REGULATOR SPACES…

- The rise of the regulator: post-liberalised / marketised energy systems
- Minimum government intervention… ideological lock-in (Mitchell (2008)
- Gatekeepers and enforcers of regimes
- Regulators est. to promote competition…
  - …can they shape technologies in socially appropriate directions?

Schema of Single Electricity Market actors, payments and electricity flows







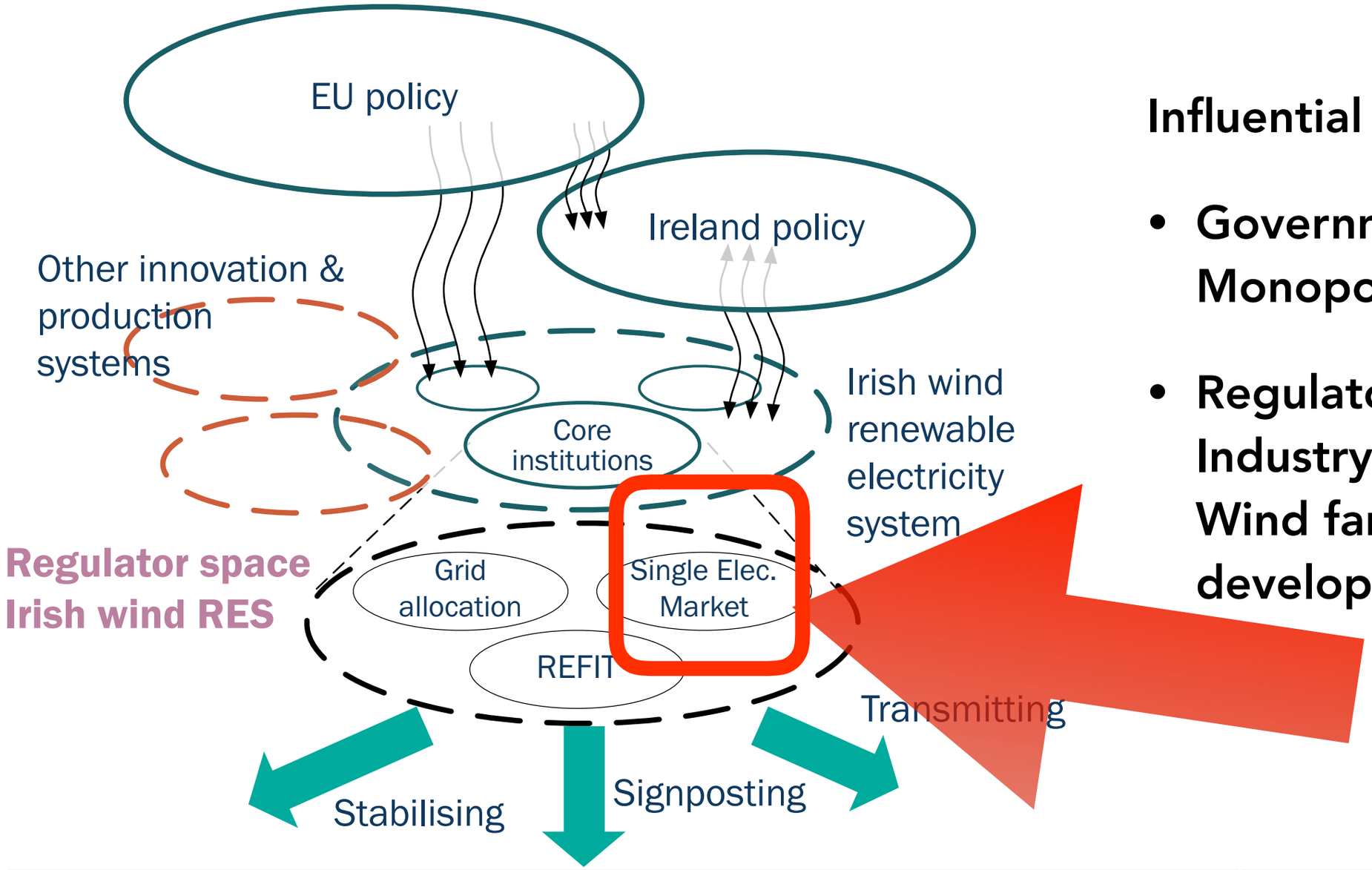
Innovation systems account for direction of the search through…

- Visions and beliefs that raise expectations
- Government targets
- Regulatory pressures
- Articulation by leading customers
- New entrants in the market

Processes of democracy

- National and informal institutions
- Role of civil society and public opinion
- Qualities of democracy

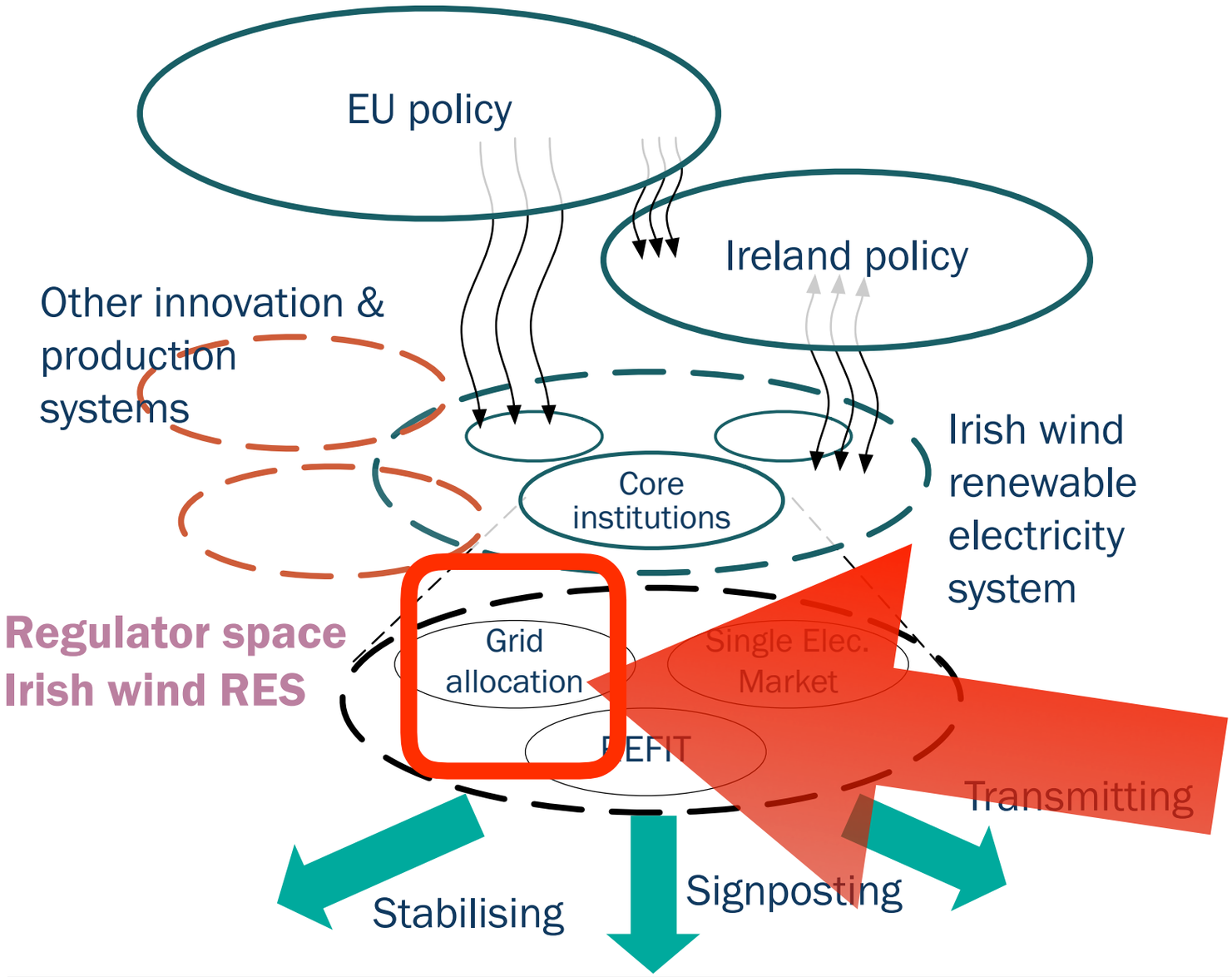
3 OF 4 CASE FINDINGS



Influential actors

- **Government / Monopoly incumbent**
- **Regulator, SO, ESB, Industry association, Wind farm developers**

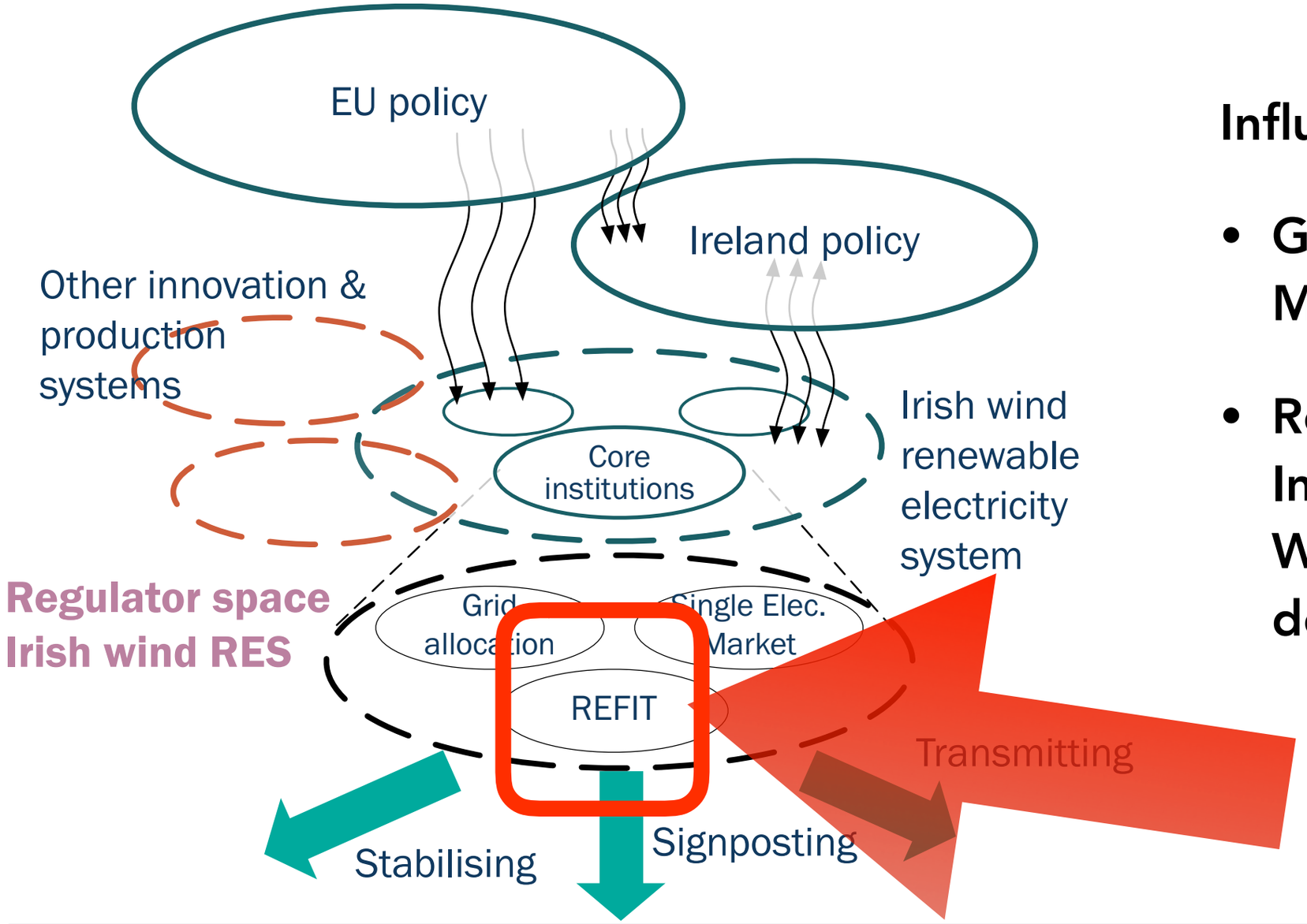
Regulator space: structure and actors			
	Characterisation of regulatory space	Dominant actors	Implications of and opportunities for democratic processes
Electricity market	• Locks-in direction • Misaligned planning permissions and PPAs • Corporatist approach to industrial relations	CER, electricity wholesalers, SEM-O (market operator), actors with specialised knowledge	• It's a 'market'! • Locks in legitimacy, negating need for exogenous legitimacy



Influential actors

- **Government / Monopoly incumbent**
- **Regulator, SO, ESB, Industry association, Wind farm developers**

Regulator space: structure and actors			
	Characterisation of regulatory space	Dominant actors	Implications of and opportunities for democratic processes
Grid allocation	• Space in which to effect direction in-running, after primary legislation has been developed. • Highly technical closed space: wider publics have no direct representation	CER, Eirgrid (TSO), developers, planners, IWEA, some powerful developers	• Allocation rules benefit incumbent wind developers over funders • The post-allocation process provides a collaborative space for participation and knowledge sharing



Influential actors

- **Government / Monopoly incumbent**
- **Regulator, SO, ESB, Industry association, Wind farm developers**

Regulator space: structure and actors			
	Characterisation of regulatory space	Dominant actors	Implications of and opportunities for democratic processes
RE-FIT	• Democratic processes initially mediated through EU policy agendas. • Significantly influenced national level innovation processes	CER, Energy dept. wholesalers, EU state aid lobby, IWEA	• Signposting of future directions achieved inside and outside of focal jurisdiction through multi-level system-governance interactions.

FINDINGS: DIRECTION INFLUENCED BY...

- **Industrial relations / corporatist model** + low-agency energy dept.
- **EU:** overarching direction, locally mediated
- **Opposition**: scale and distribution of benefits (may) matter to civil society orgs
- Voice of 'industry': IWEA's inclusion and evolution (Dynamic asynchronicities?)
- **Where democracy processes happen counts** — Feed-in tariff as an accelerator, not a direction setter

4 OF 4 WHY THIS MATTERS

DISCUSSION 1: WHAT I FOUND IN THE CASE

- New regulatory processes can newly entrench actors who in turn capture rents and occupy newly created powerful positions, locking-in new directions

- Power and politics is deeply implicated in not only the construction of the RE system and regulator, but its ongoing maintenance, repair and re-making

- Wider questions of political economy of green transitions and transformations

- Steering by government is not only accomplished by creating demand through the provision of incentives

DISCUSSION 2: WIDER IMPLICATIONS

- Curtailed agency of government within transnational innovation systems (state aid and “picking winners”)
- The construction of new boundary spaces within infrastructure systems
  - Space for knowledge creation / exchange
  - Space for formation of coalitions
- Democracy more generally, including aspects of participation (work in progress)

thanks!

University of Sussex

PROCESS OF DEMOCRATIC ENGAGEMENT

WITH AND WITHIN EMERGING REGULATOR SPACES OF THE IRISH WIND ENERGY SYSTEM

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SPRU – Science Policy Research Unit

How does ‘undone science’ get funded? A bibliometric analysis linking Rare Diseases publications to national and European funding sources

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EUSPRI Early Career Researcher Conference 2016, Vienna, Austria

Priority Setting

Undone Science: “areas of research identified by social movements and other civil society organizations as having potentially broad social benefit that are left unfunded, incomplete, or generally ignored” (Frickel et al., 2010, 445)

Missing = The impact of undone science agenda setting on the knowledge production of scientific communities (Glaser & Laudel 2016)

Bibliometrics provides useful perspectives on a number of questions

CWTS

Rare Diseases

Conditions affecting small numbers in the population

Portrayed as being on the margins of science and medicine – ‘rural’ science (Becher and Trowler 2001)

Risen to prominence as a priority theme in science policy and funding

The role of ‘grass-roots’ movements is described as important in STS

Who funds rare disease research?

*“There is no disease so **rare** that it does not deserve attention”*

CWTS

Objectives

- What kinds of funding flows are most visible in rare disease research publications?
- To construct a typology of different kinds of funding sources and map their visibility in leading research papers on RD
- Question: to what extent are ‘traditional’ actors in the science system (i.e. national and EU funding agencies) associated with leading research publications?
- EU member states (MS): UK, Netherlands, France, and Spain

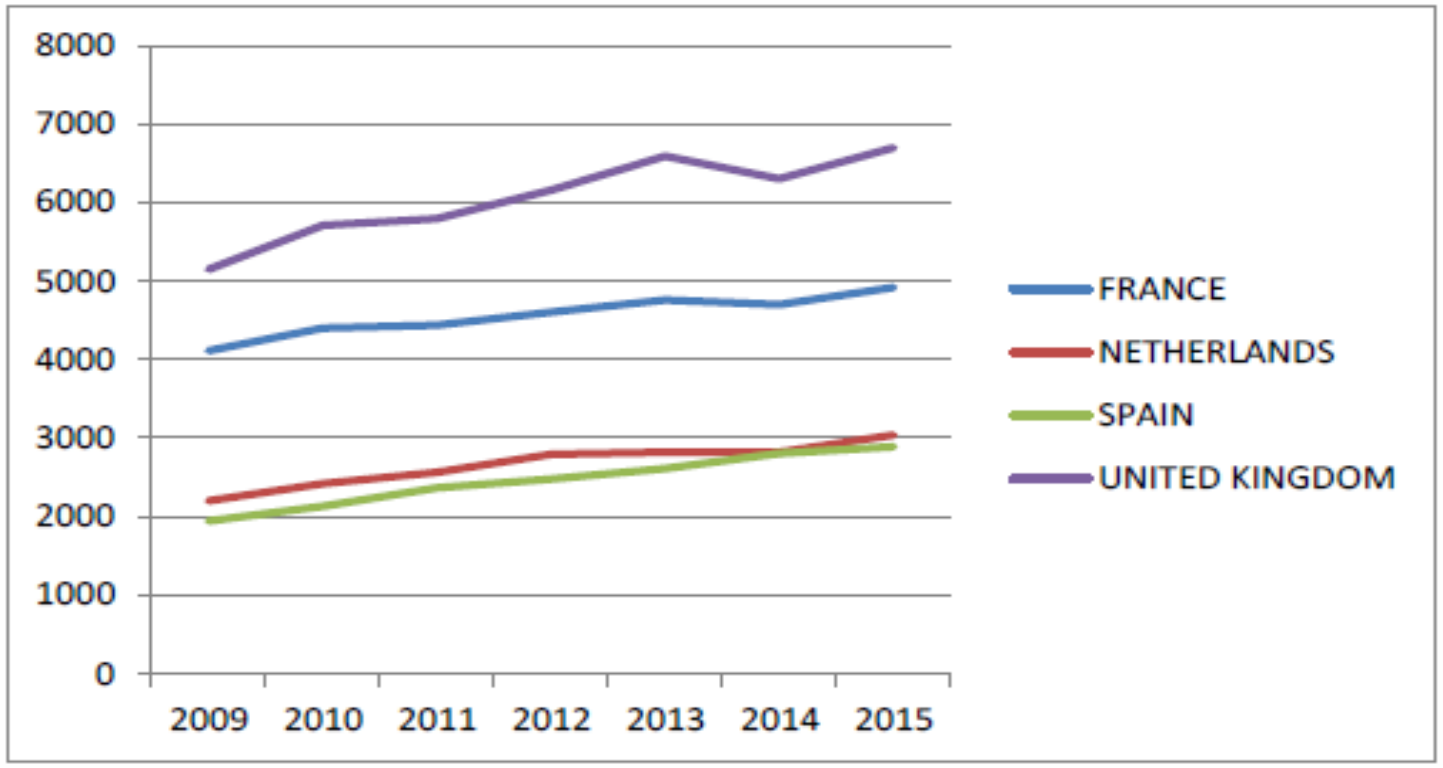
CWTS

Preliminary Typology

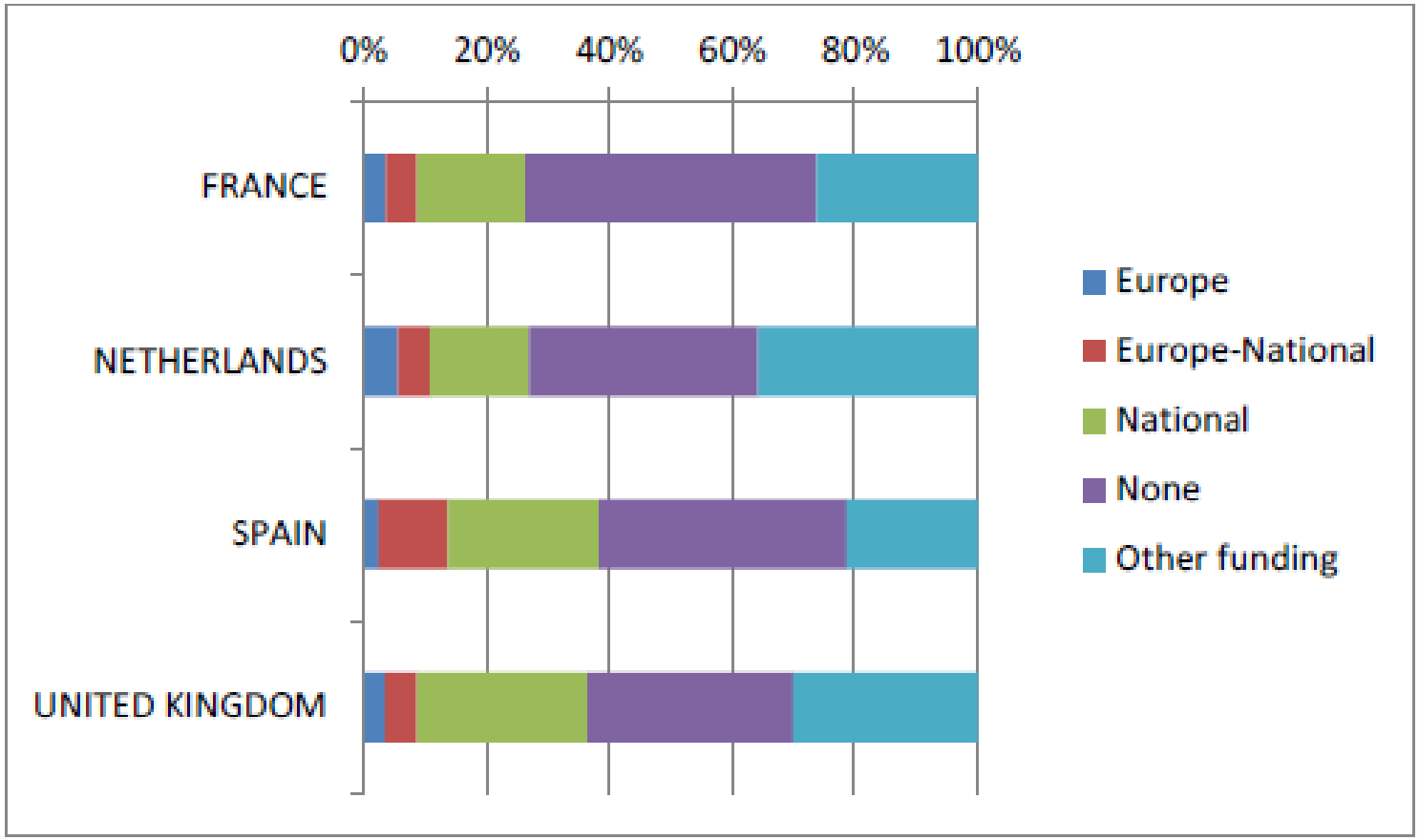
- FA dataset using CWTS in-house database (van Honk, Calero, & Costas 2016)
- 5 *provisional* categories based on CWTS FA dataset:
  - Europe
  - National
  - Europe-National
  - Other funding
  - No Funding
- Output by category, per 4 MS
- Impact by category, per 4 MS using MNCS (Waltman et al. 2011)

CWTS

Absolute growth in RD publications, 2009-2015 by country



Share of MS publications by funding acknowledgment type (2009-2015)



Output Numbers & Impact Scores per country, by funding type 2009-2015 (1/2)

Figure 4a: Output numbers, France

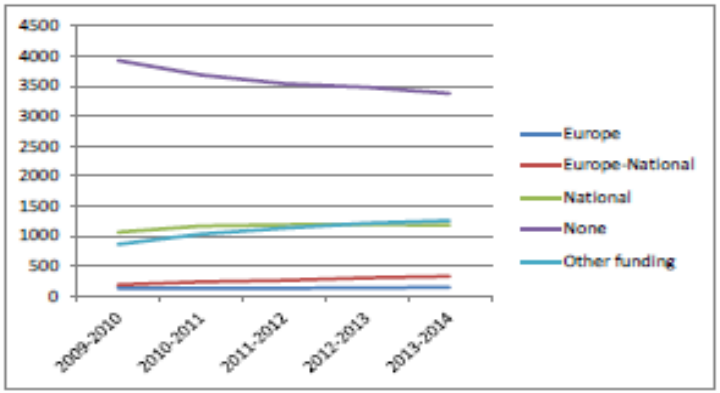


Figure 4b: Impact scores, France

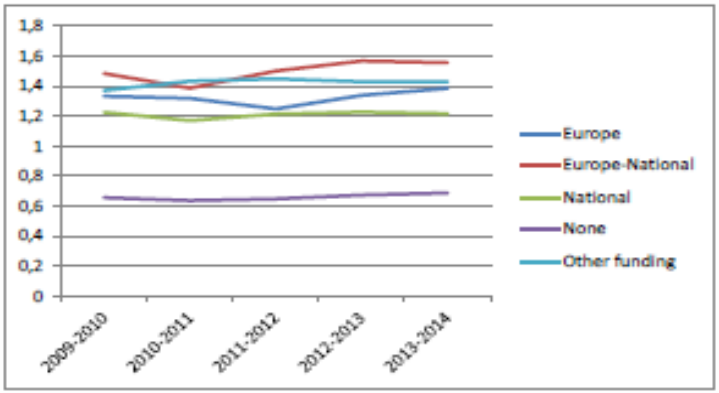


Figure 5a: Output numbers, Netherlands

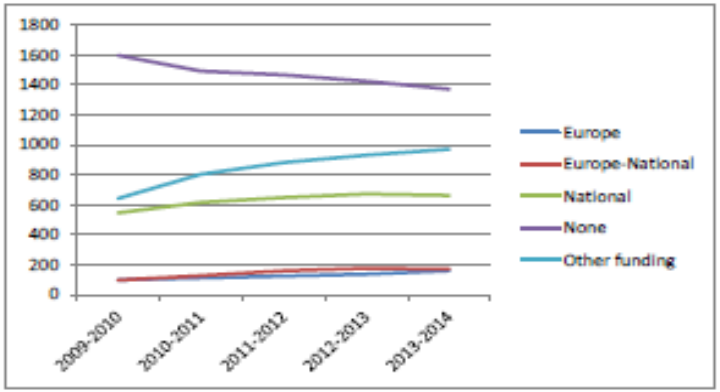
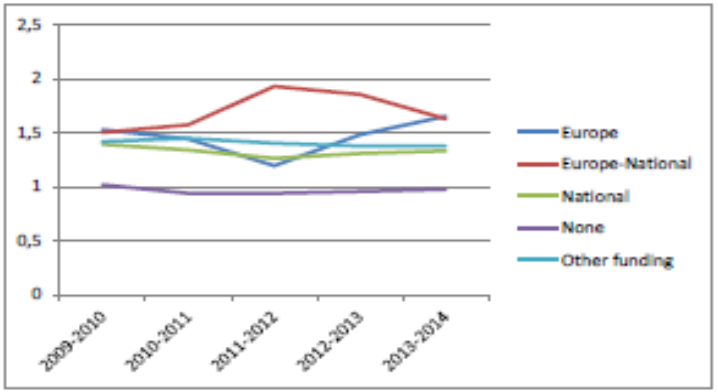


Figure 5b: Impact scores, Netherlands



CWTS

Output Numbers & Impact Scores per country, by funding type 2009-2015 (2/2)

Figure 6a: Output numbers, Spain

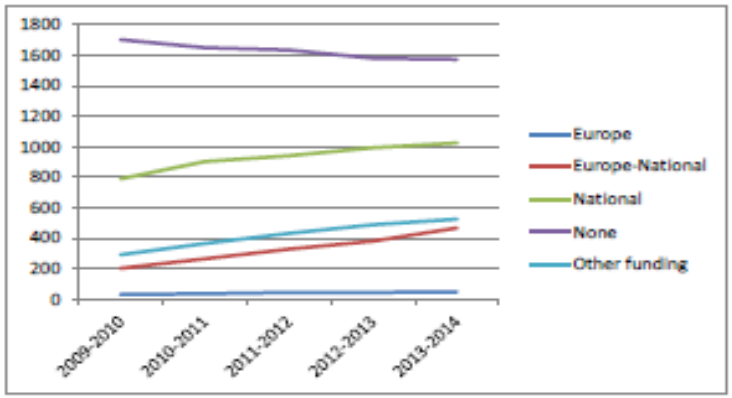


Figure 6b: Impact scores, Spain

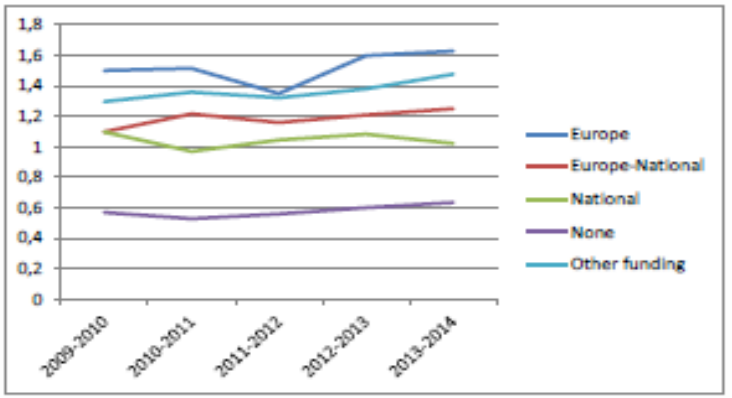


Figure 7a: Output numbers, United Kingdom

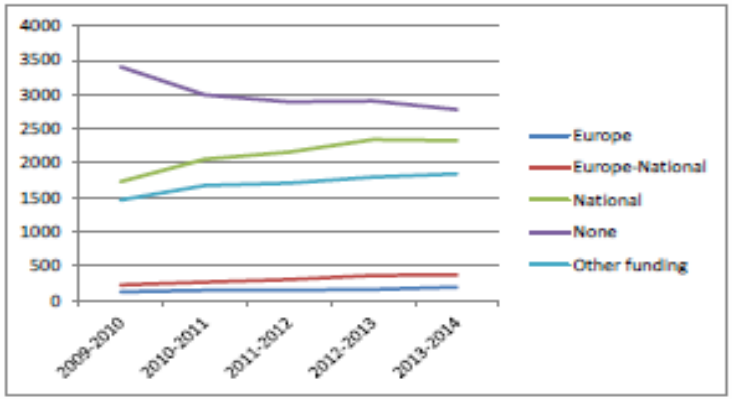
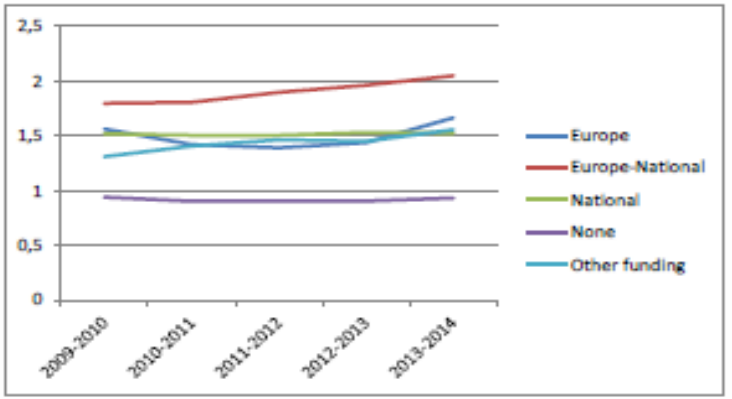


Figure 7b: Impact scores, United Kingdom



Next Steps

- To construct a more refined typology:
  - European level = Framework Program Initiatives
  - National level = public funding agencies (e.g. MRC, NWO etc.)
  - Other = Charities

Hypothesis = The leading research on RD will be associated with European and National Funding agencies (i.e. traditional actors in the science system)

Societal goals, STI policies and socio-technical transitions:

The case of the Dutch smart mobility policy

Edgar Salas Gironés

TU/e Technische Universiteit Eindhoven University of Technology

Where innovation starts

About my PhD research

Source: low-carbonscotland.scot

- **PhD in a project co-sponsored by TU Eindhoven, IenM Ministry, and RWS.**
- **Research project "Transition from (auto)mobility towards smart mobility"**
  - **Socio-technical transition perspective.**
  - **Smart mobility: traffic management, traffic information, and in-vehicle technology fields.**
- **My PhD topic: Emerging *governance frameworks* for the smart mobility policy.**

Why emerging governance frameworks?

Smart mobility policy:

- **Has a strong focus on societal goals,**
- **Incorporates a socio-technical transition perspective.**

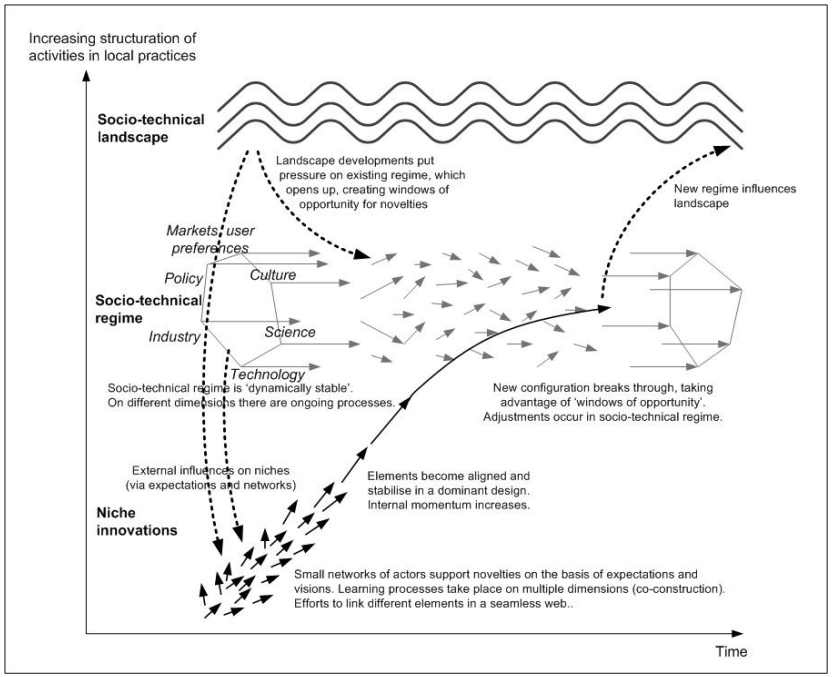
Until recently, current STI frameworks did not incorporate these aspects in its analysis.

Why? Recent research suggests that these shortcomings are the result of the dominant NC and SI *paradigms.*

Source: corporate-eye.com/

Looking into new paradigms

- **Paradigms, provide policy makers rationales and suggest instruments for policy intervention.**
  - **E.g. 'Market failure' → investment in science.**
- **Several authors have explored emerging paradigms for overcoming current limitations, e.g.:**
  - **New mission oriented policies,**
  - **Transformative policies.**



Source: systeminnovationforsustainability.com/

Aim & Research question

Aim:

- Give an overview of paradigms for STI policy governance.
- Use these paradigms to study the smart mobility policy.

Research question:

- Which are the rationales and instruments used from emerging paradigms to achieve the societal goals of the smart mobility policy?
  - How societal goals are incorporated in the STI policy?
  - What type of rationales and instruments have been used to govern it?

Methods

- Developing an analytical framework to compare and contrast different paradigms in STI policy.
- Applying this framework to the case study.
- Used a qualitative software for coding.

Source: images.google.com

Analytical Framework

For each paradigm (selection):

Meta-rationales	Operational rationales	Policy instruments
• Main rationale, • Role of policy makers, • Understanding of innovation • …	• Specific rationales • Main policy area • …	• Type of policy instruments • Instruments beneficiaries • ….

Source: Based on literature review

Distinguishing between paradigms

(source: literature review)

Paradigms	Neoclassical	SI	Novel (?)
Main rationale	Market failure	Systemic problems	Transformational failures
Role of policy makers	Optimizers	Problem solvers	Provide legitimation and direction
Specific rationales	Appropriability, externalities, knowledge	Infrastructure, networks, institutions	Directionality, legitimization, unsuitable socio-technical configurations
Main policy area	Science policy	Innovation policy	Implementation
Types of instruments	Least disruptive to markets	Aiming at collective performance of STI actors	For disruption of socio-technical barriers

Data sources

Source: blogs.lse.ac.uk/

- **Primary documents.**
  - **Overheid.nl,**
  - **Smart mobility programs websites,**
  - **Specialized reports.**
- **Unstructured interviews with policy makers (circa 15), e.g.:**
  - **Policy officials,**
  - **Strategists from IenM,**
  - **Regional officers.**

Findings
Case study

Technische Universiteit
Eindhoven
University of Technology

Where innovation starts

Introduction to case study

- **Policy 2013-2023.**
- **Societal goals as policy goals:**
  - **Improving the reachability, quality of life, and safety of NL.**
- **Acknowledges that policy interventions are beyond traditional STI boundaries.**
  - **This policy requires new institutions, services, user practices, etc.**

Preliminary findings (i): How societal goals are incorporated?

- **Societal goals remain abstract for policy makers, who 'translate' their goals to their respective programs, e.g. quality of life:**
  - **Better travel information services, better comfort in the design, doing societal cost-benefit analysis, less costs to tax-payers…**
- **Societal goals are increasingly shaped by market parties.**
- **Societal goals can be achieved by different types of innovations.**

Preliminary findings (ii): New intervention rationales

- **Implementation barriers → Policy makers intervene to overcome legal and operational limitations, as well as user preferences.**
- **Directionality: Societally desirable innovations → How to guarantee public wellbeing?**
- **Legitimization → Convince wider audiences about smart mobility.**
- **Long term stability → Transitions are by definition long-term. How to guarantee that the path will be followed?**

Preliminary findings (iii): Intervention rationales

Specific rationales	Instruments
Implementation barriers	Exception procedures, consultation arenas with market parties, behavioral change.
Directionality	Funding restrictions, foresight exercises (‘decision moments’).
Legitimization	BGOW roadmap, structural platforms for consultation, involving wider audience by intermediaries (ANWB), Connecting Mobility, European Platooning Challenge.
Long term stability	BGOW roadmap, Declaration of Amsterdam, evaluation.

Preliminary discussion

- **Evidence suggest policy makers use new rationales and instruments not fitting into current paradigms.**
- **However, diverse paradigms coexist → *policy mix.***
- **Need for better operationalization guidelines for societal goals.**
- **Methodological issue:**
  - **How to identify a emerging paradigm? Policy makers intervene using a mix (or no) paradigms in mind.**

Exploring the effects of academic patenting activity on publication and collaboration among heterogeneous researchers in South Korea

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INCHER-Kassel
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22-23 Nov 2016, EU SPRI Early Career Conference Vienna, Austria

I. Research Objectives

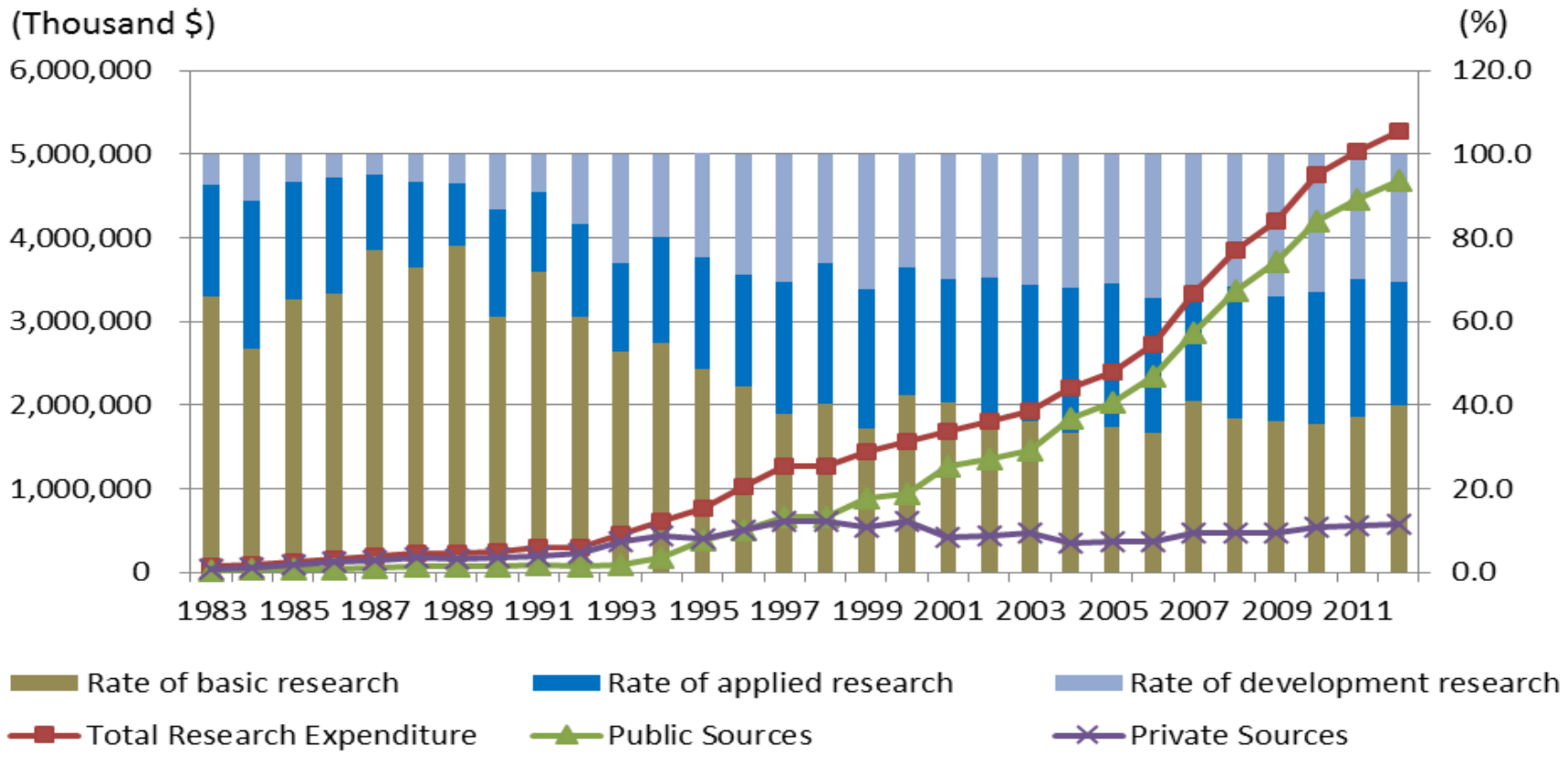
- Korean university research has developed **under government-driven policy** that is based on the perspective that science should benefit the nation, and thus has been shaped by government policy.

- **Academic entrepreneurial culture** spread throughout the Korean universities before Korean academia fully developed the academic communism culture described by Merton (1973).

- Korean government and universities enforce the evaluation approach based on research performance measured by **simple and calculable indicators such as number of publications or patents**.

I. Research Objectives

1. R&D expenditure by Sources and by Types of Research in Korean Univ.

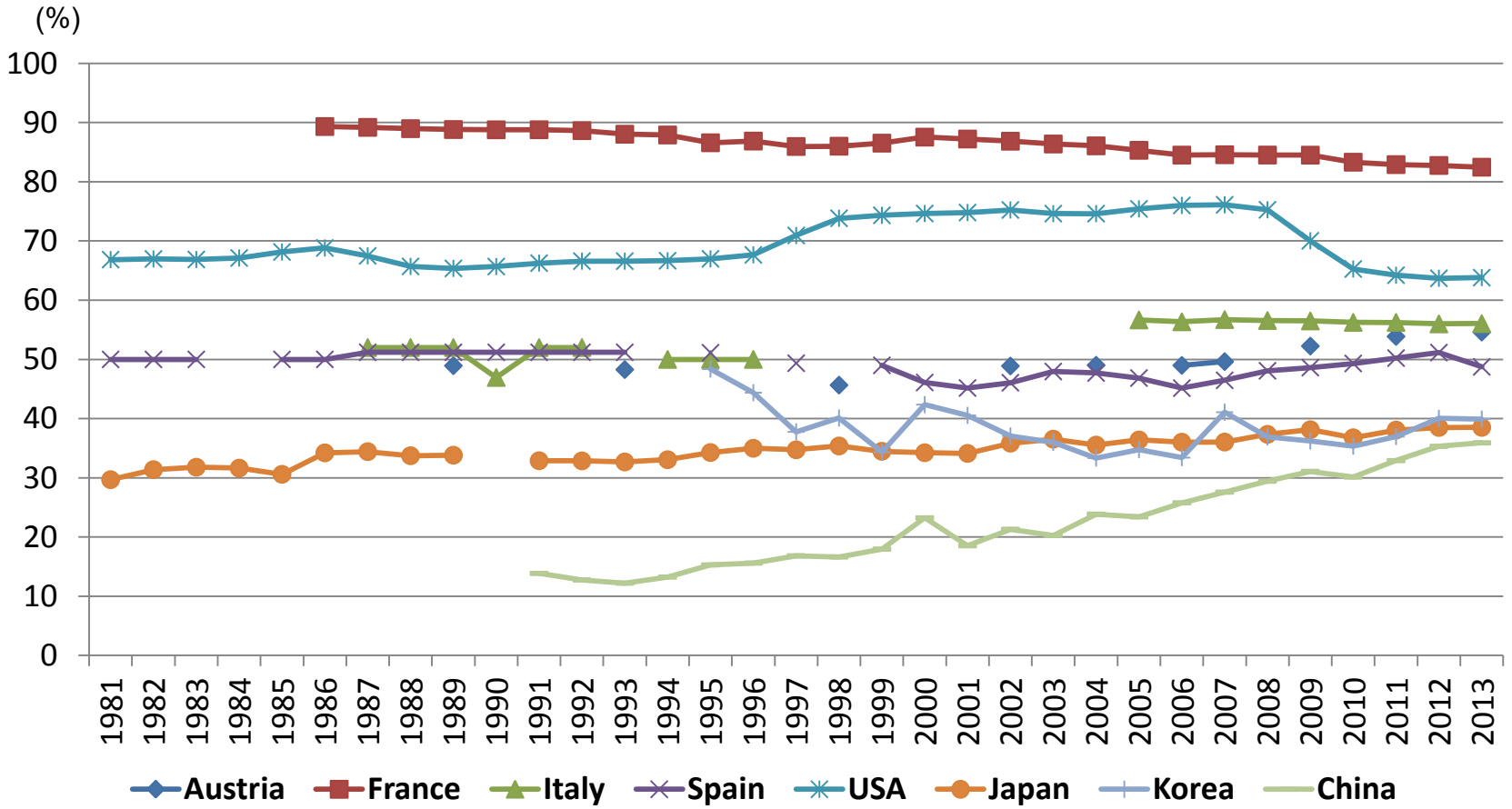


Data Source: Ministry of Science & KISTEP . Survey of Research and Development in Korea. (1983-2012)

Source: Shin, J. C., & Lee, S. J. (2015). Evolution of research universities as a national research system in Korea: accomplishments and challenges. Higher Education, 70(2), p.198.

I. Research Objectives

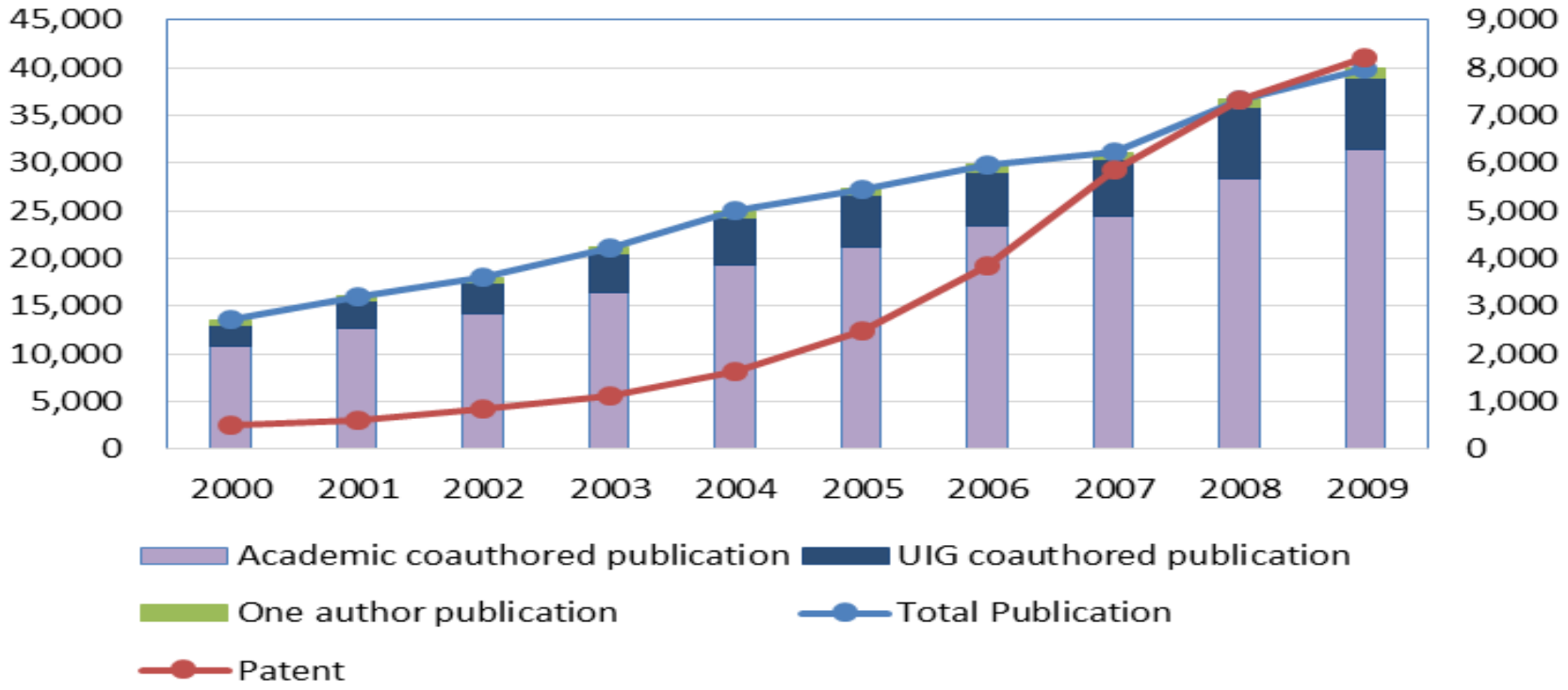
2. R&D expenditure by Basic Research in Univ. OECD countries



Data extracted on 15 Nov 2016 12:45 UTC (GMT) from OECD.Stat

I. Research Objectives

3. SCI publication, collaboration and patent in 46 Korean Univ.



Data Source: Web of Science; Korea Intellectual Property Rights Information Service

II. Literature Review

1. Social contribution of university research

- **Teaching and research nexus**
- **Reputation of university & academic evaluation**
- **Knowledge and technology transfer**
  - The ‘third’ academic mission (Clark, 1997; Etzkowitz *et al*., 2000)
  - Economic innovation (Etzkowitz & Leydesdorff, 1997; Nelson & Rosenberg, 1993)
  - Open source knowledge (Nelson, 2004; Scotchmer & Maurer, 2006)

II. Literature Review

2. Multiple channels for academic knowledge transfer

- **Publications and reports, attendance at meetings and conferences, personnel exchanges, patents, licenses, contract research, consultancy work, spin-offs, joint ventures, etc.**

  (Cohen et al., 2002)

- **Bekkers and Freitas (2008) suggested the relative importance of multiple channels of academic knowledge transfer according to different contexts such as disciplinary origin, the characteristics of researchers, and the environment in which the knowledge is produced and used.**

II. Literature Review

3. Relationships between academic patents and publications

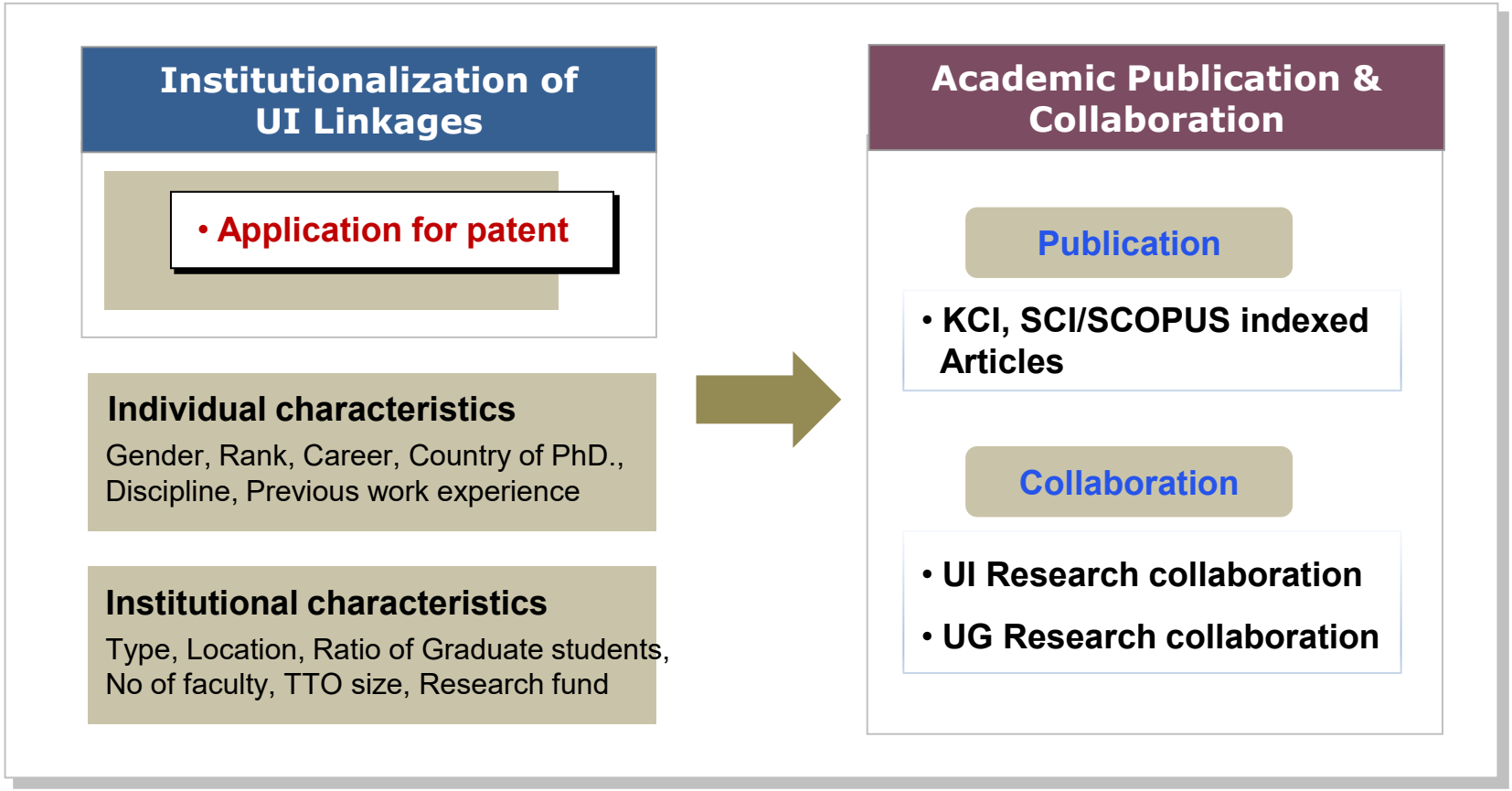
Complementary Relation	• Azoulay et al., 2007; Breschi et al., 2008; Grimm and Jaenicke, 2015; Thursby and Thursby, 2004
Substitutional Relation	• Agrawl and Henderson, 2002; Breschi et al., 2008; Calderini et al., 2009; Murray and Stern, 2007
Inverted U-shape	• Crespi et al., 2011; Fabrizio and Di Minin, 2008

4. Relationships between academic patents and collaboration

- **The effects of patents on other knowledge transfer channels have not been fully explained (Crespi et al., 2011), especially in the context of research collaboration with heterogeneous actors.**

III. Method

1. Research Framework



III. Method

2. Data and Analytical Strategy

- **632 faculty members in 46 universities**: stratified sampling according to the **STEM fields**
- **Panel data for the four year of 2008-2011** from multiple data sources
  - Korean Researcher Information (KRI) provided by the Korean Research Foundation (KRF)
  - Publication data provided by Korean Citation Index, Web of Science and SCOPUS
  - Korea Intellectual Property Rights Information
  - Higher Education Information provided by Minister of Education, Korea (*Daehakalimi*)

- Method
  - **A fixed/random effect negative-binomial regression**: the case that dependent variables are publications (count variables)
  - **A fixed/random effect regression model:** the case that dependent variables are UI research collaboration and UG research collaboration
  - **A One-year time lag between patenting activities and publications was considered** (Dornbusch et al., 2013; Wang and Guan, 2010).

III. Method

3. Variables

• Dependent variables		
Research publication	Total article publications$_{it}$	Number of KCI, SCI/SCOPUS indexed articles by academic i in year t
Research collaboration	UI research collaboration$_{it}$	Percentage (%) of co-authored articles with private sector by academic i in year t
	UG research collaboration$_{it}$	Percentage (%) of co-authored articles with public research institutes by academic i in year t

• Independent variables		
Academic patent	Number of applications for Patents$_{it}$	Number of applications for domestic and international patents by academic i in year t
	Number of applications for patents$_{it-1}$	Number of applications for domestic and International patents by academic i in year t-1

III. Method

3. Variables

• Independent variables		
Demographic background	$Gender_i$	Male = 1, Female = 0
	$Rank_{it}$	Professor/Associate professor = 1, Assistant professor/Lecturer = 0 by academic i in year t
	$Career_{it}$	Years since full-time lecturer by academic i in year t
Academic background	Country of PhD $training_i$	Overseas university = 1, Korean university = 0
	$Discipline_i$	Bio-medical sciences, Engineering sciences, Natural sciences (criterion variable)
Previous work experience	Postdoctoral $fellowship_i$	Yes = 1 or No = 0
	Private $industry_i$	Yes = 1 or No = 0
	Public research $institute_i$	Yes = 1 or No = 0

III. Method

3. Variables

• Independent variables		
Physical characteristics of universities	Type of university$_j$	Private = 1, Public = 0
	Location of university$_j$	Major cities = 1, others = 0
	Ratio of graduate students$_{jt}$	No. of graduate students / No. of undergraduate Students in university j in year t
	No. of faculty$_{jt}$	Number of full-time faculty members in university j in year t
	TTO size$_{jt}$	Number of staff in Industry-Academic Cooperation Foundation in university j in year t
Research fund	Government funds$_{jt}$	Government research funds in university j in year t (log)
	Private funds$_{jt}$	Research funds from private sector in university j in year t (log)
	Internal funds$_{jt}$	On-campus funds in university j in year t (log)

IV. The Effects of Academic Patenting on Publication and Collaboration

1. Descriptive Statistics

	N	Mean	SD	Max	Min
Total article publications	632	4.25	4.72	50	0
UI research collaboration	632	5.91	16.39	100	0
UG research collaboration	632	17.34	27.79	100	0
Patents	632	0.76	2.21	32	0

IV. The Effects of Academic Patenting on Publication and Collaboration

2. Correlations between main research variables

	$Patent_{t-1}$	$Publication_t$	$UI\ collaboration_t$	$UG\ collaboration_t$
$Patent_{t-1}$	1.000			
$Publication_t$	0.215^{***}	1.000		
$UI\ collaboration_t$	0.100^{***}	0.069^{***}	1.000	
$UG\ collaboration_t$	-0.001	0.227^{***}	0.028	1.000

IV. The Effects of Academic Patenting on Publication and Collaboration

Publications	Fixed effect model				Random effect model			
	Model 1 (T)		Model2 (T-1)		Model 3 (T)		Model 4 (T-1)	
	Coef.	Std. Err	Coef.	Std. Err	Coef.	Std. Err	Coef.	Std. Err
$Patent_{it}$ ($Patent_{it-1}$)	0.026*	0.012	0.034**	0.011	0.050***	0.011	0.056***	0.011
$Patent_{it}^2$ ($Patent_{it-1}^2$)	-0.001	0.000	-0.001**	0.000	-0.001*	0.000	-0.002***	0.000
$Gender_i$					0.190	0.100	0.207*	0.1
$Rank_{it}$	0.188**	0.066	0.173**	0.066	0.185**	0.059	0.163**	0.058
$Career_{it}$	-0.022	0.012	-0.022	0.012	-0.022***	0.005	-0.022***	0.005
Overseas Ph.D. $_i$					-0.066	0.074	-0.063	0.074
$Bioscience_i$					0.395***	0.091	0.393***	0.091
$Engineering_i$					0.183	0.098	0.182	0.099
Postdoc. $_i$					0.163*	0.076	0.157*	0.076
$Private\ industry_i$					-0.119	0.096	-0.121	0.096
Public research $institute_i$					0.188*	0.078	0.174*	0.079
Type of univ. $_j$					-0.120	0.098	-0.128	0.098
Location of univ. $_i$					0.162	0.087	0.174*	0.087
No. of $faculty_{jt}$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TTO $size_{jt}$	-0.001	0.001	-0.001	0.001	0.000	0.001	0.000	0.001
Ratio of graduate $students_{jt}$	-0.268	0.177	-0.298	0.177	0.090	0.110	0.056	0.11
Government $funds_{jt}$	0.027	0.081	0.024	0.081	0.071	0.066	0.076	0.066
Private $funds_{jt}$	0.036	0.048	0.035	0.047	0.034	0.039	0.032	0.039
Internal $funds_{jt}$	0.032	0.03	0.039	0.03	0.012	0.026	0.022	0.026
Constant	1.337	1.209	1.356	1.214	0.251	0.938	0.116	0.94
N of groups (N of obs.)	591 (2,364)		591 (2,364)		632 (2,528)		632 (2,528)	
Log likelihood	-3,251.330		-3,248.944		-5,637.830		-5,635.796	
Wald Chi2	21.04*		24.14**		144.75***		147.08***	

IV. The Effects of Academic Patenting on Publication and Collaboration

UI research collaboration	Fixed effect model				Random effect model			
	Model 5		Model 6		Model 7		Model 8	
	Coef.	Std. Err	Coef.	Std. Err	Coef.	Std. Err	Coef.	Std. Err
$Patent_{it-1}$	0.265	0.341	0.229	0.342	**0.649***	0.268	0.533	0.272
$Patent_{it-1}^2$	-0.005	0.013	-0.004	0.013	-0.019	0.011	-0.016	0.011
$Publication_{it}$			0.162	0.129			**0.188***	0.082
$Gender_i$					-0.153	1.146	-0.274	1.146
$Rank_{it}$	-2.470	1.876	-2.612	1.879	-1.778	1.148	-1.892	1.148
$Career_{it}$	-0.221	0.466	-0.218	0.466	0.038	0.057	0.046	0.057
Overseas Ph.D. $_i$					0.489	0.852	0.614	0.853
$Bioscience_i$					1.728	1.047	1.468	1.052
$Engineering_i$					**5.226*****	1.139	**5.070*****	1.139
Postdoc. $_i$					-0.942	0.88	-1.082	0.881
Private industry$_i$					**4.479*****	1.104	**4.618*****	1.105
Public research $institute_i$					-0.671	0.908	-0.889	0.911
Type of univ. $_j$					0.134	1.198	0.171	1.197
Location of univ. $_j$					-0.206	1.017	-0.336	1.017
No. of $faculty_{jt}$	0.008	0.008	0.008	0.008	-0.001	0.002	-0.001	0.002
TTO $size_{jt}$	0.050	0.039	0.052	0.039	0.016	0.025	0.016	0.025
Ratio of $graduatestudents_{jt}$	**-10.654***	4.923	**-10.328***	4.929	-0.517	1.784	-0.637	1.783
Government $funds_{jt}$	0.771	2.171	0.782	2.170	1.883	1.108	1.814	1.107
Private $funds_{jt}$	-0.614	1.178	-0.645	1.179	-1.075	0.661	-1.064	0.661
Internal $funds_{jt}$	1.513	0.798	1.494	0.798	0.897	0.487	0.906	0.486
Constant	-18.955	35.623	-19.143	35.618	-25.688	15.777	-25.065	15.762
N of groups (N of obs.)	632 (2,528)		632 (2,528)		632 (2,528)		632 (2,528)	
F value	1.31		1.33		-		-	
Wald Chi2			-		105.45***		110.95***	

IV. The Effects of Academic Patenting on Publication and Collaboration

UG research collaboration	Fixed effect model				Random effect model			
	Model 9		Model 10		Model 11		Model 12	
	Coef.	Std. Err	Coef.	Std. Err	Coef.	Std. Err	Coef.	Std. Err
$Patent_{it-1}$	0.084	0.504	-0.066	0.504	0.350	0.431	-0.131	0.433
$Patent_{it-1}^2$	-0.010	0.019	-0.005	0.019	-0.017	0.017	-0.004	0.017
$Publication_{it}$			**0.683*** **	0.190			**0.963*** **	0.138
$Gender_i$					**6.260** **	2.234	**5.613** **	2.170
$Rank_{it}$	2.372	2.772	1.774	2.768	-1.149	1.978	-1.895	1.949
$Career_{it}$	-1.125	0.689	-1.116	0.687	-0.031	0.109	0.015	0.106
Overseas $Ph.D._i$					1.327	1.658	1.989	1.612
$Bioscience_i$					**8.439*** **	2.04	**7.055*** **	1.990
$Engineering_i$					0.682	2.214	-0.192	2.152
$Postdoc._i$					2.749	1.716	2.020	1.668
$Private\ industry_i$					-3.911	2.151	-3.246	2.090
$Public\ research\ institute_i$					**7.399*** **	1.769	**6.283*** **	1.724
Type of $univ._j$					-2.451	2.288	-2.216	2.225
Location of $univ._j$					1.543	1.974	0.874	1.919
No. of $faculty_{jt}$	0.001	0.011	0.001	0.011	-0.003	0.003	-0.003	0.003
TTO $size_{jt}$	-0.003	0.057	0.004	0.057	0.041	0.042	0.044	0.042
Ratio of graduate $students_{jt}$	9.758	7.275	11.130	7.262	-0.313	3.203	-0.807	3.138
Government $funds_{jt}$	**8.570** **	3.208	**8.614** **	3.197	**3.826***	1.934	3.447	1.901
Private $funds_{jt}$	-0.542	1.741	-0.674	1.736	**-2.606***	1.147	**-2.642***	1.128
Internal $funds_{jt}$	-0.048	1.179	-0.129	1.175	0.519	0.828	0.570	0.816
Constant	-116.209*	52.636	-116.995*	52.471	-26.394	27.565	-21.604	27.086
N of groups (N of obs.)	632 (2,528)		632 (2,528)		632 (2,528)		632 (2,528)	
F value	1.09		2.17*		-		-	
Wald Chi2	-		-		84.25***		137.88***	

V. Conclusions

Institutionalization of University-Industry Cooperation in Korea

- Korean university research and UI collaboration have developed **under government-driven policy**, and this policy is designed as a **competition-based funding mechanism**.

- Korean government and universities **enforce the evaluation approach** to enhance the UI cooperation, and this **lead to a rapid growth in the number of patents**.

- **Academic patenting activities have been strongly emphasized as incentives for technology transfer, but academics still seek to accumulate high numbers of patents to gain good evaluations of research performance rather than to activate technology transfer** (Yun et al., 2007).

- In this context, this study aimed to investigate whether active academic patenting enhances or reduces research collaboration with various researchers as well as academic publication in Korean academic case.

V. Conclusions

The Effects of Academic Patenting on Publication and Collaboration

- **The relation between academic patents and publications has a non-linear inverted U-shape**, in that academic patenting is positively associated with publishing up to a certain point, after which it is negatively related to publishing.

- **Academic patenting has weak positive effects on research collaboration with industry, but these positive effects of academic patents disappear when the publishing variable is added to the model. In addition, academic patenting activity does not have statistically significant effects on research collaboration with researchers in public research institutes.**

- These findings support the results of previous studies that show an inverse U-shaped relation between publications and patents (Crespi et al., 2011; Fabrizio and Di Minin, 2008), and expand the study on the effects of patents on research collaboration between heterogeneous researchers. This study shows that a strong emphasis on commercialization is a limited approach to transferring academic knowledge to society.

V. Conclusions

Reconsidering social contribution of university research

- The study suggests five ways that universities' academic research can contribute to the development of a knowledge network society by exploiting a variety of routes for diffusing academic research to the society.

- Government and universities should understand **the variety of channels** that are available to diffuse their research to industry and the society
- Considering the differences in knowledge transfer activities **according to disciplines**, it is necessary to develop various indicators to guide both university-industry cooperation policy and the evaluation of faculty members' performance in accord with such policy's purposes.
- **Researchers in academia should think of their research topics and channels in terms of how they can diffuse their research and the resulting knowledge to the society.**
- Government and universities should develop **medium- and long-term research policy.**
- It is necessary to understand universities' academic research as **open source knowledge based on public good perspectives.**

Thank You !

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