How to create supportive systems of innovation in different types of regions?

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The changing framework for innovation

- Innovation as the key factor for economic development & growth in the globalizing knowledge economy

- Broad & comprehensive view: innovation is more than R&D

- Innovation systems perspective: innovation as evolutionary, non-linear, collective learning process

- Knowledge & innovation have become increasingly complex: variety of knowledge inputs / sources are necessary; both regional knowledge circulation and global knowledge connections are fundamentally important

Innovation Policies

**Innovation high on policy agendas & increasing emphasis on regions:**

- National innovation policies: more attention to territories / incorporation of the regional dimension

- More emphasis on innovation in regional (development) policies

Linear model of innovation policy:
- R&D infrastructure, technology transfer
- Financial innovation support for companies

Shortcomings:
- Neglect of absorption capacity of firms
- Neglect of demand for innovation support in LFRs
- Instruments adressed to individual companies
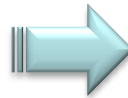
One size-fits-all policy model:
- R&D, high-tech clusters
- Research excellence, stimulation of spin-offs

Shortcomings:
- based on analysis of top regions
- used in undifferentiated manner for all kinds of regions
- neglect of specific strengths & weaknesses of regions and their innovation problems & potentials

Moving away from a "one size fits all" regional innovation policy approach

There is **no one „best practice" innovation policy approach** which could be applied to any type of region

(Isaken 2001, Nauwelaers & Wintjes 2003, Tödtling & Trippl 2005, Boschma 2009, Asheim et al. 2011, OECD 2011, Camagni & Capello 2012)

Regions differ with respect to: their preconditions for innovation, networking & innovation barriers

Enormous variation:
institutions, structures, knowledge bases, potentials, strengths, weaknesses

→ calls for a differentiated approach to address the specificities of regions and their innovation systems
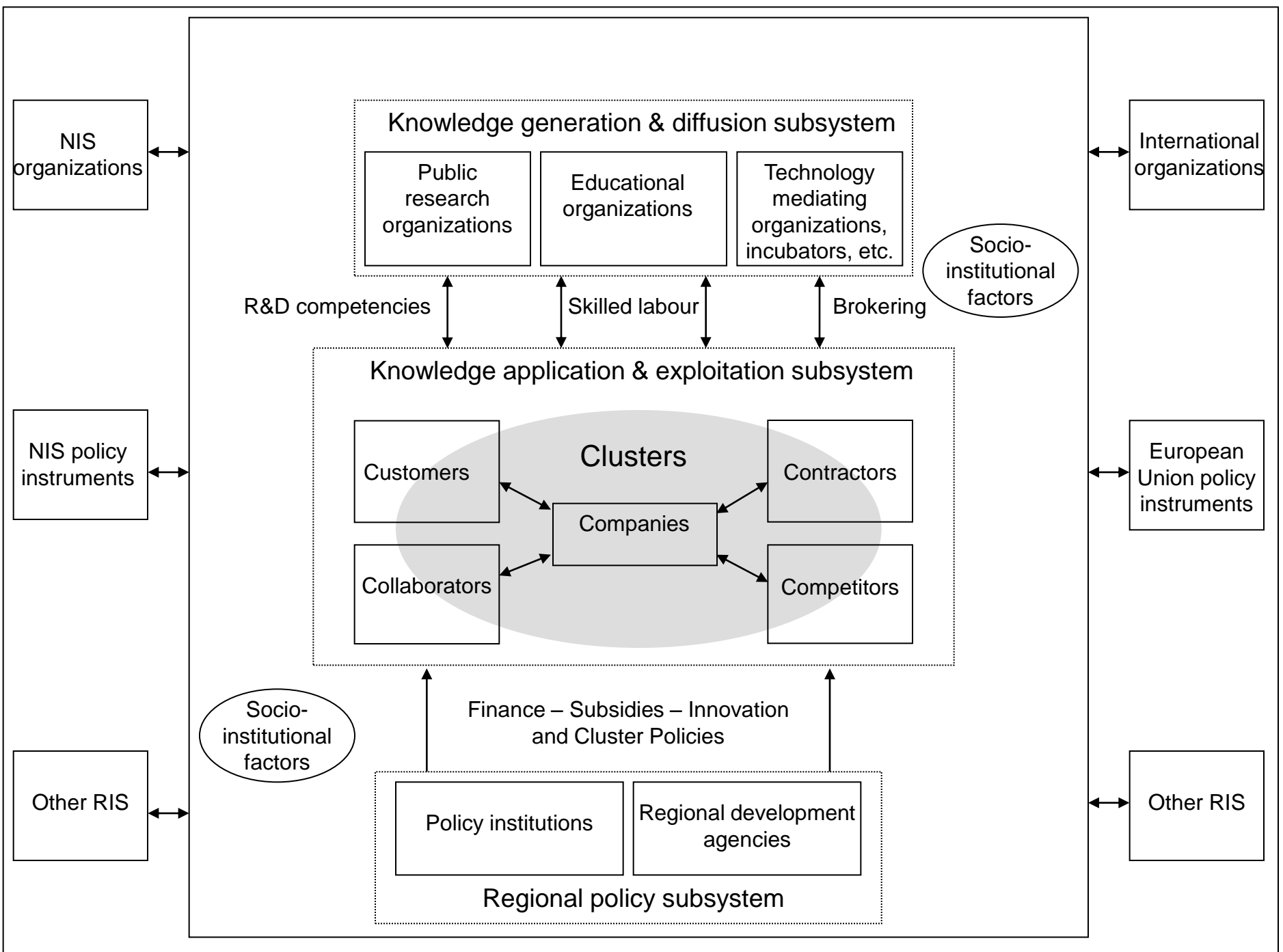
Example: OECD (2011)

	Building on current advantages (science push/technology-led)	Supporting socio-economic transformation	Catching up: towards the creation of knowledge-based capabilities
Knowledge hubs			
Knowledge & technology hubs	X		
Knowledge-intensive city / capitial district	X		
Industrial production zones			
Medium-tech manufacturing and service providers		X	
Traditional manufacturing regions			X
Non-S&T-driven regions			
Structural inertia or de-industrialising regions		X	
Primary-sector-intensive regions			X

Regional innovation policy instruments: a taxonomy

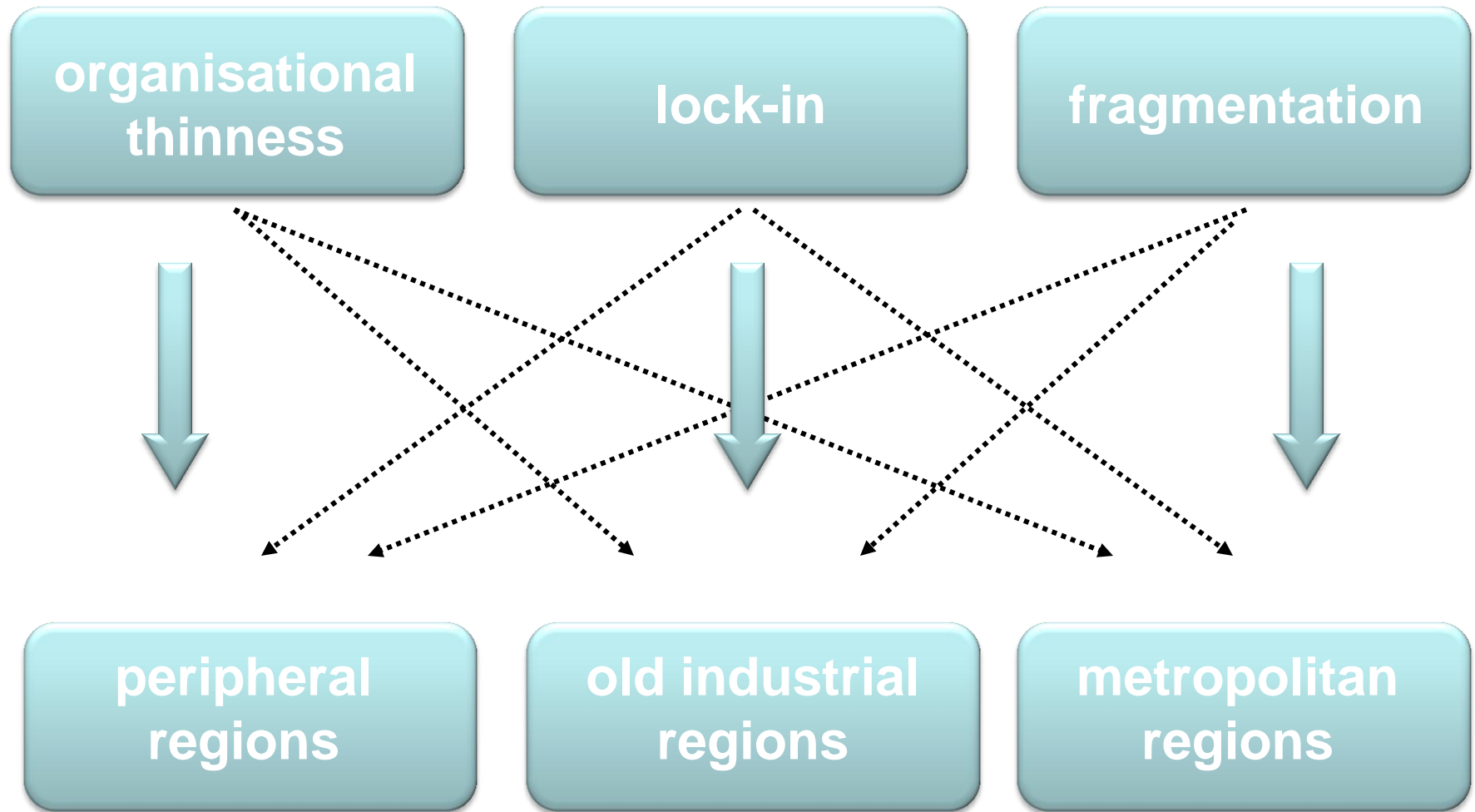|	**Knowledge generation**	**Knowledge diffusion**	**Knowledge exploitation**
Traditional instruments	Technology funds, R&D incentives/grants Support for scientific research & technology centres Support for infrastructure development Human capital for S&T	Science parks TT offices and programmes Technology brokers Mobility schemes, talent attraction schemes Innovation awards	Incubators Start-up support Innovation services Training & raising awareness for innovation
Emerging instruments	PPP for innovation Research networks/poles	Innovation vouchers Certifications/accreditations	Industrial PhDs Support for creativity and design Innovation benchmarking
	Competitiveness poles Competence centres New generation of scientific and tech. parks and clusters Venture & seed capital		
Experimental instruments	Cross-border research centres	Open source-open science markets for knowledge	Regional industrial policy Innovation-oriented public procurement

Source: OECD (2011)

Knowledge generation & diffusion subsystem

- Public research organizations
- Educational organizations
- Technology mediating organizations, incubators, etc.

Socio-institutional factors

R&D competencies · Skilled labour · Brokering

Knowledge application & exploitation subsystem

Clusters

- Customers
- Contractors
- Companies
- Collaborators
- Competitors

NIS organizations

International organizations

NIS policy instruments

European Union policy instruments

Other RIS

Other RIS

Socio-institutional factors

Finance – Subsidies – Innovation and Cluster Policies

- Policy institutions
- Regional development agencies

Regional policy subsystem

Three types of system failures as basis for regional innovation policy

Type of system failure	Key problems
Organizational thinness	Crucial parts of an innovation system are missing: low levels of clustering & weak endowment with key organizations
Lock-in	Over-embeddedness & over-specialization
Fragmentation	Lack of interaction & networks between the organizations in an innovation system

Source: Tödtling & Trippl (2005)

Main innovation barriers / RIS deficiencies

Types of „problem regions"

RIP approach	peripheral regions	old industrial areas	metropolitan regions
Strategic orientation	- Upgrading of regional economy - Catching up learning	- Renewal of regional economy - Transition to new trajectories	Improve position of the region in the global knowledge economy
Firms & clusters	Strengthen potential clusters; attraction of innovative firms	Support clusters in new / related sectors; new firms formation; attraction of cluster-related FDI	- Support emerging clusters related to region's knowledge base - Support start-ups in KBS
Knowledge providers & education	- Attract branches of national ROs - Build up medium level skills (technical colleges, manag. schools)	- Set up ROs in new but related fields - Build up & attract new skills (technical, schools, universities)	- Expand & set up high quality ROs - Set up univers. / schools for highly specialized qualification
Networks	Link firms to knowledge providers (inside the region & beyond)	Stimulate networking with respect to new industries / techn. (various scales)	Promote university-industry links

Knowledge base approach

Innovation process of firms is strongly shaped by their specific knowledge base, which tends to vary by industrial sector

(Asheim & Gertler 2005; Asheim et al. 2011)

Three types of knowledge base: analytical, synthetic, symbolic

- different mixes of tacit and codified knowledge & different codification possibilities and limits

- Different qualifications & skills

- Reliance on different knowledge sources & institutions

- Contrasting innovation challenges and pressures

Differentiated knowledge base approach (Asheim et al. 2011)

	Analytical (science based): genetics, biotech, IT	Synthetic (engineering based): plant engin., industrial machinery, shipbuilding	Symbolic (arts based): film, TV, publishing, music, design, fashion
Rationale for knowledge creation	Developing new knowledge about natural systems by applying scientific laws	Applying or combining existing knowledge in new ways	Creating meaning, desire, aesthetic qualities, affect, symbols, images
Development and use of knowledge	Scientific knowledge, models	Problem solving, custom production	Creative process
Actors involved	Collaboration within and between research units	Interactive learning with customers & suppliers	Experimentations in studios, project teams
Knowledge types	Strong codified knowledge content, highly abstract, universal	Partially codified knowledge, strong tacit component, more context specific	Creativity, cultural knowledge, sign values; strong context specificity
Importance of spatial proximity	Meaning relatively constant between places	Meaning varies substantially between places	Meaning highly variable between place, class and gender

Policy implications
(Asheim 2007, Plum & Hassnik 2011)

Needs & demands for policy support differ between industries depending on their knowledge base

Analytical industries:

- Advanced knowledge infrastructure
- SMEs, start-ups: access to scientific knowledge sources
- Support of university-industry links, TTOs
- Counselling services: Patent strategies, commercialisation of research

Synthetic industries:

- Strengthen existing specialisations and new combinations
- Inter-firm cooperation
- Links to applied science

Symbolic industries:

- Support face-to-face contacts & short-term project teams
- Promote the people climate: quality of place
- Promote diversity & tolerance

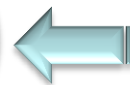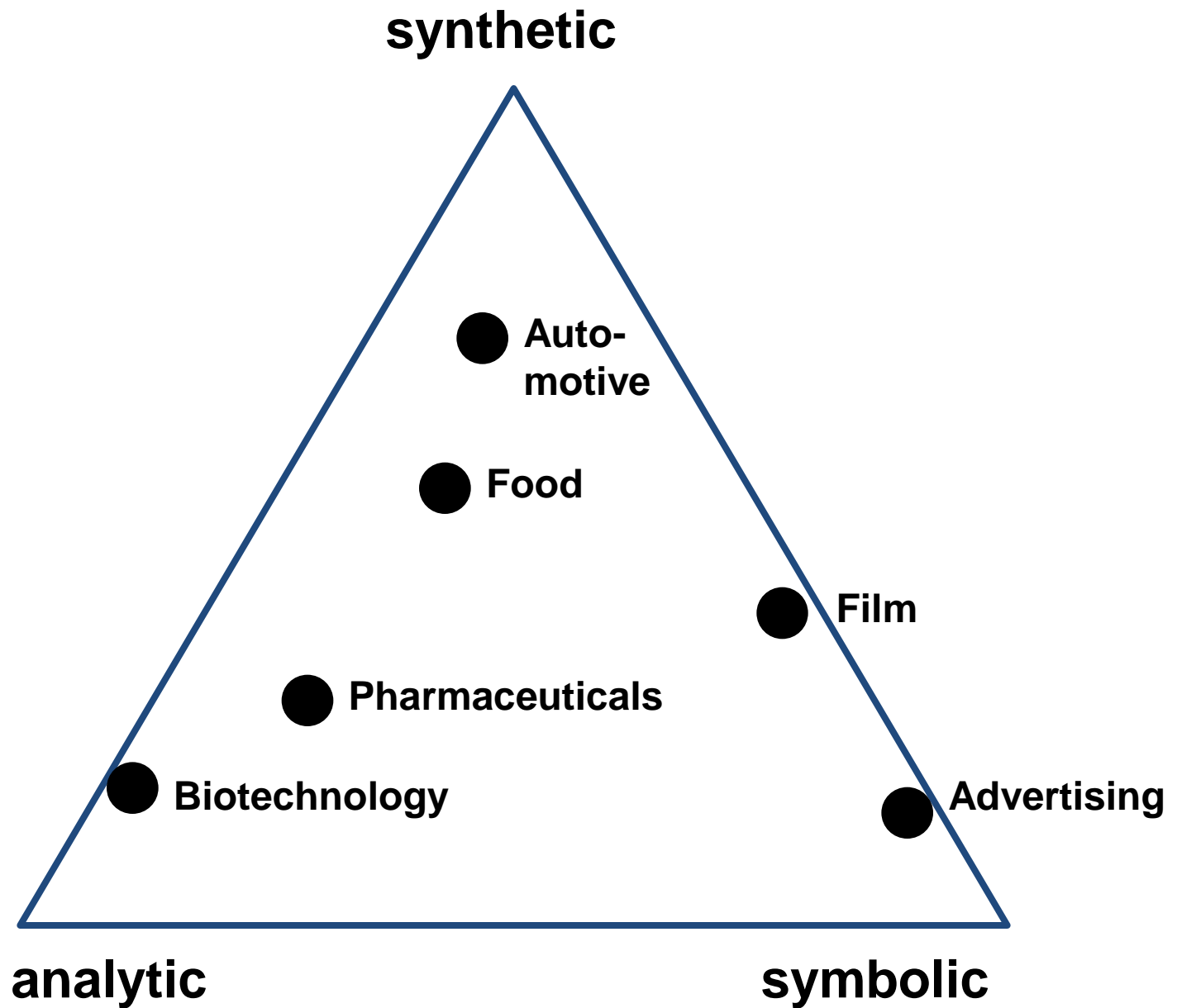Support links to & combination with other knowledge bases
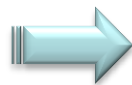
Conclusions

Regional innovation policies:

- Beyond one-size-fits-all formulas

- RIS concept and knowledge base approach →
  Fine-tuned regional innovation policies (considering institutional structures, innovation potentials, knowledge bases, RIS strengths & assets, systemic failures)

- Necessity of good policy coordination
  (vertical & horizontal)

Thanks for your attention!

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Problem dimensions	Peripheral regions	Old industrial regions	Fragmented metropolitan regions
Firms, clusters & innovation activities	▪ Lack of clusters, low levels of R&D ▪ Incremental & process innovation	▪ Clusters specialized in old sectors ▪ Incremental & process innovation; narrow technological trajectories	▪ lack of knowledge based clusters ▪ R&D in isolated HQ of large firms; product innovation & firm formation below expectation
Knowledge infrastructure	▪ ROs: few or low profile ▪ Education / training: low / medium level qualifications ▪ Knowledge transfer: thin structure, too little orientation on demand	▪ ROs: oriented on traditional industries ▪ Education / training: modern qualifications lacking ▪ Knowledge transfer: specialized structures, but weakly coordinated	▪ ROs: weak links to industry ▪ Education / training: large variety of schools / HEIs ▪ Knowledge transfer: high density of organizations
Networks	▪ Few in the region due to weak clustering & thin institutional structure	▪ Technological & political lock-ins	▪ Market links dominate; lack of collective learning

Rationale for Innovation Policy

From market failure to systemic problems / system failure

Examples for systemic problems:

- infrastructure provision & investment problems

- transition problems

- lock-in problems

- hard and soft institutional problems

- network problems

- capability and learning problems

- unbalanced exploration-exploitation mechanisms