

COLLABORATIVE PROJECTS

The challenge of breaking the academia-business firewall in Czechia:
comparing the role of differentiated knowledge bases





Introduction

Collaboration drives innovation



- Innovation processes increasingly involve a large number of **networked actors**
- Cross-fertilization between knowledge institutions and firms

Differing nature of R&D in particular sectors



→ **Knowledge-bases approach**

Data on **collaborative projects**



- Mutual activity, R&D as vital source for innovation
- Patterns of academia-industry linkages
- Specific institutional context



Test the concept of differentiated knowledge bases **in Czechia** with its heritage of an academia-industry 'firewall' and describe actual pattern of collaboration



Innovation system approach



- Science-industry relations and a role played by policy (Cooke et al. 2004)
- Interaction in networks that diffuse knowledge (Freeman 1987)
- Institutional set-up influences system's behaviour (Tödtling, Tripl 2011)
- Role of past **evolutionary trajectories** (Tripl et al. 2014)

Institutional setting of former state-socialism countries

- Fundamental institutional change and sudden openness to global competition
- **Fragmented system**, significant institutional and sectoral lock-ins
- Separation of academic research from the rest of the economy
- Low level and quality of interaction, differences in mentality





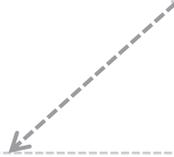
Differentiated knowledge bases



→ Analytical tool for explaining **variation of innovation patterns**
(Trippel et al. 2014)

→ Insights into the way in which companies source knowledge
(Tödting et al. 2013)

→ Important element in constructing (regional) advantage



Key arguments



→ Innovation process differs according to prevailing character of knowledge
(Asheim, Gertler 2005)

→ Not to explain the R&D intensity but to characterize **nature of knowledge inputs**
and explain the organisational and geographical implications (Asheim et al., 2011).



Three **ideal types** of knowledge bases

Three **ideal types** of differentiated knowledge bases

	Analytical (science based)	Synthetic (engineering based)	Symbolic (arts based)
Rationale, goals	Developing knowledge, applying scientific laws, know why	Combining existing knowledge in novel way, know how	Creating meaning, symbolic value and impression
Knowledge in use	Scientific knowledge, models, deduction	Problem solving, testing, induction	Understanding conventions, experimentations
Knowledge types	Predominantly codified, universal	Predominantly tacit, context specific	Rather tacit, handicraft, creativity, interpretation, context specific
Actors involved, attributes of collaboration	Intensive formal R&D collaboration between research units (in-house and academic)	Long-term, trust-based and strategic between actors along the value chain	Short-term, creative inputs from diverse sources
Importance of spatial proximity	Rather low	Rather high	Rather high



Research questions



Aim to **evaluate collaborative networks** in the Czechia with respect to the prevailing KB.

Disharmony between academia and businesses



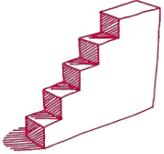
- Extent to which the state support programmes have been successful in stimulating mutual cooperation
- The inconsistency between the knowledge supply and demand was expected to prevail, resulting in a fragmented national IS
- Immature science-industry linkages were foreseen, with uneven geography centred upon a limited number of key actors

Dissimilarities with respect to **predominant knowledge base**



- Analytical knowledge network would feature more frequent connections, as innovation exploits mostly R&D inputs
- The linkages should span over longer distances compared to a synthetic KB

Structuralist approach



→ **Social network analysis (SNA)**

→ Describe topography of knowledge networks by identifying central nodes and the spatial reach of linkages

→ Innovation networks represent an important driver of knowledge diffusion (Ter Wal and Boschma, 2009)

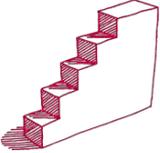
→ Risk of favouring the structure of a network while neglecting content of linkages and characteristics of actors

Real **networks are non-random in some revealing ways** (Giuliani 2007)

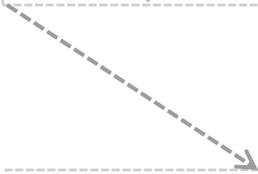


→ Spatial aspects of networks for understanding the role of geography in knowledge sourcing

Czech RDI information system



- Unique database of all RDI supported by public resources
- Records on actors, projects and results - joint projects in RDI initiated since 2004
- Entities = nodes, linkages = edges (weight of linkages is based on frequency counts of co-presence of entities in joint projects)



Tracing the **knowledge bases**



- Specialisation of actors on the bases of RDI results – share of each of 123 research branches
- Expert linking knowledge bases and research branches
- Final product – predominating knowledge bases for each entity

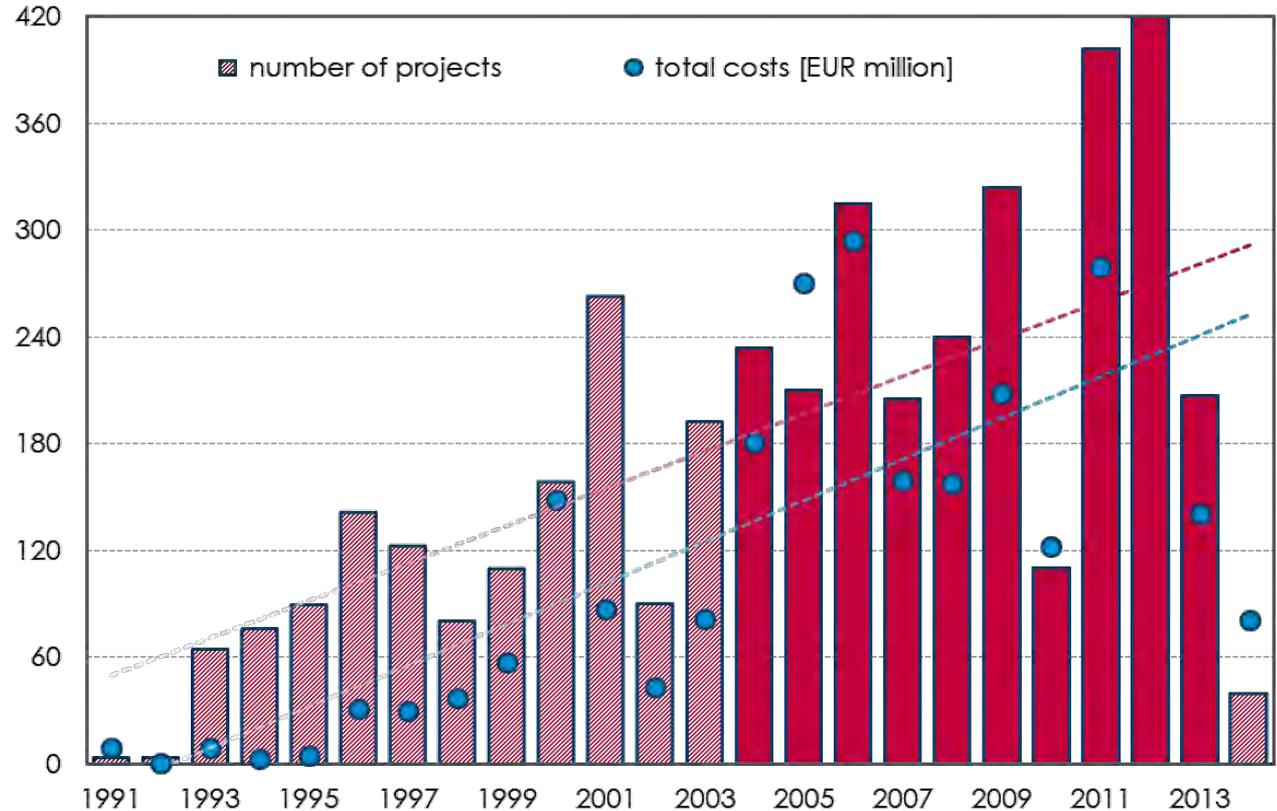


Data | Initial population

- 2,707 collaborative projects
- 1,962 unique participants (82% firms)
- 4,103 edges of the weight reaching up to 32

Initial population

Collaborative projects initiated in particular years



Geography of knowledge collaboration

Prague



- Concentrates 31% of entities, which attracts 60% of all linkages
- Central node, gateway function

Physical distance

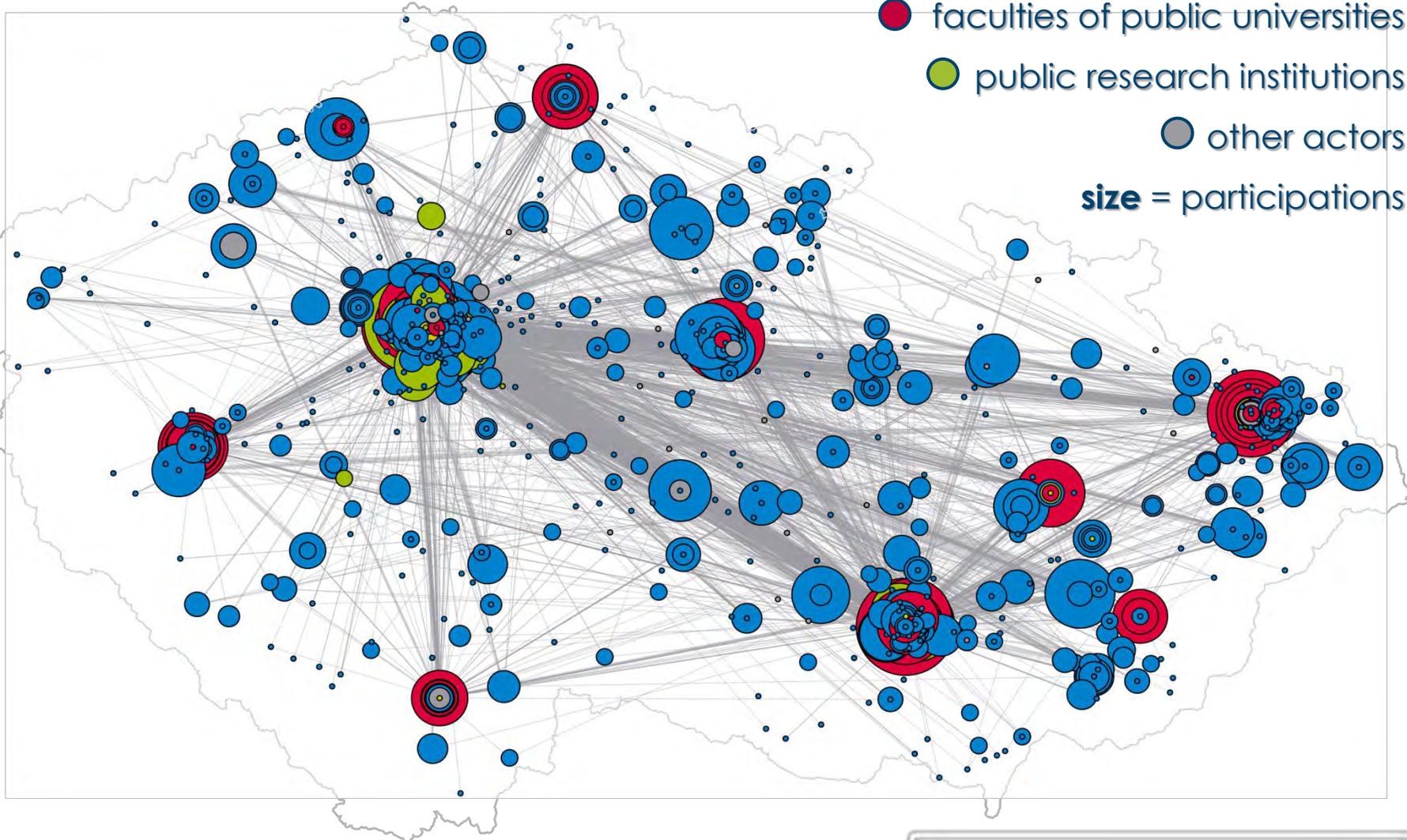


- Geographical proximity is far from being decisive, rather the quality of the knowledge supply (individual characteristics of actors)
- Majority of collaborative linkages cuts across the existing regional borders, only 35% of linkages have intra-regional character (19% inside Prague)

- Persisting **dominance of national innovation system**, not establishment of the regional ones

Geography of knowledge collaboration

- private firms
 - faculties of public universities
 - public research institutions
 - other actors
- size** = participations





Nature of science-industry linkages

Position of nodes based on **attractive and repulsive forces**

→ The geographical distance is completely disregarded

→ Size of a node - number of direct connections (= degree)

Knowledge relations

→ Faculties of technical universities attract principal attention of industry

→ Extremely centralised communities of small firms around them

→ Only 1/3 of companies more than one connection - fragmentation



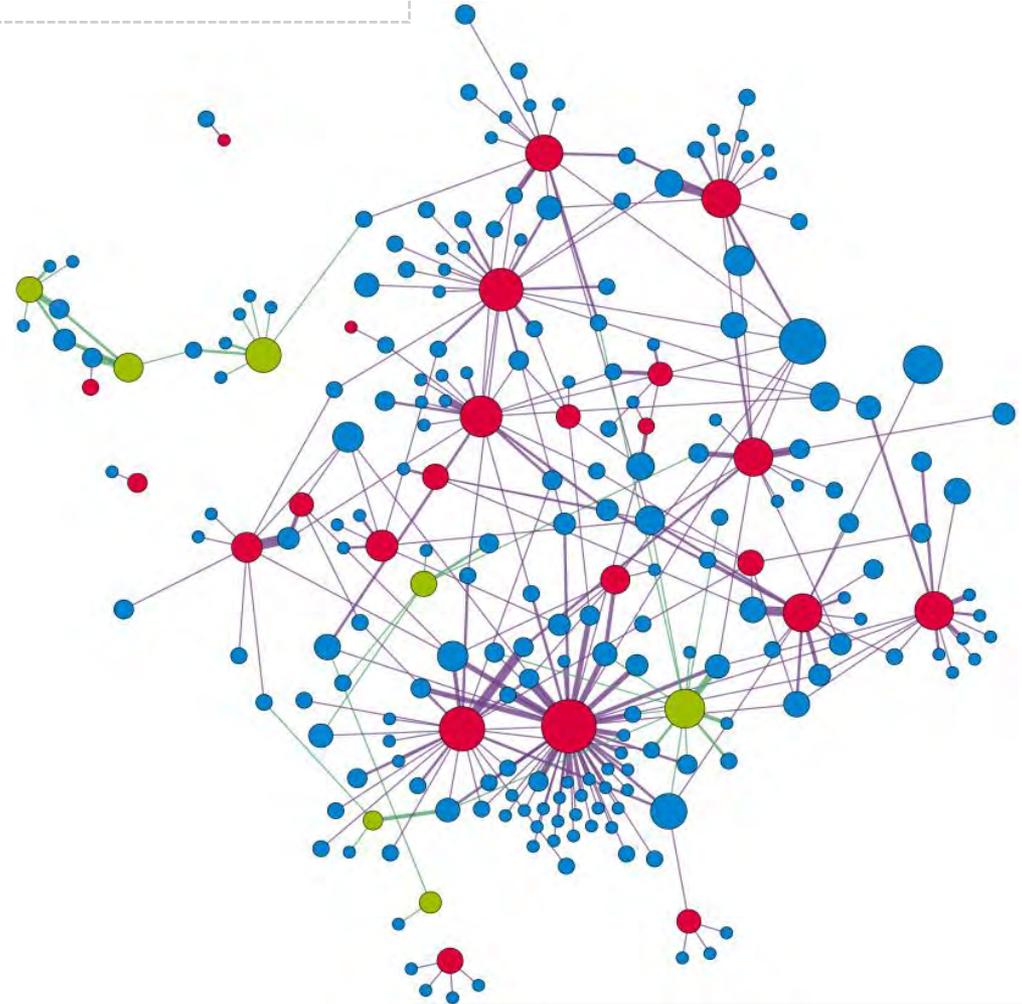


Collaboration in knowledge bases

Topography of **linkages differs significantly** according to predominant knowledge base

Synthetic knowledge network

- Concentration of firms around technical faculties
- Smaller role of public research organizations

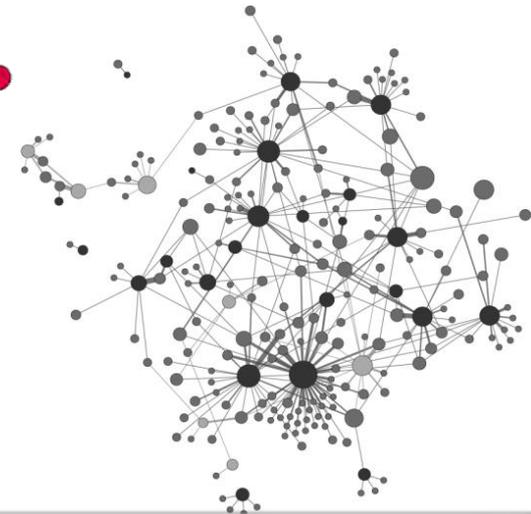
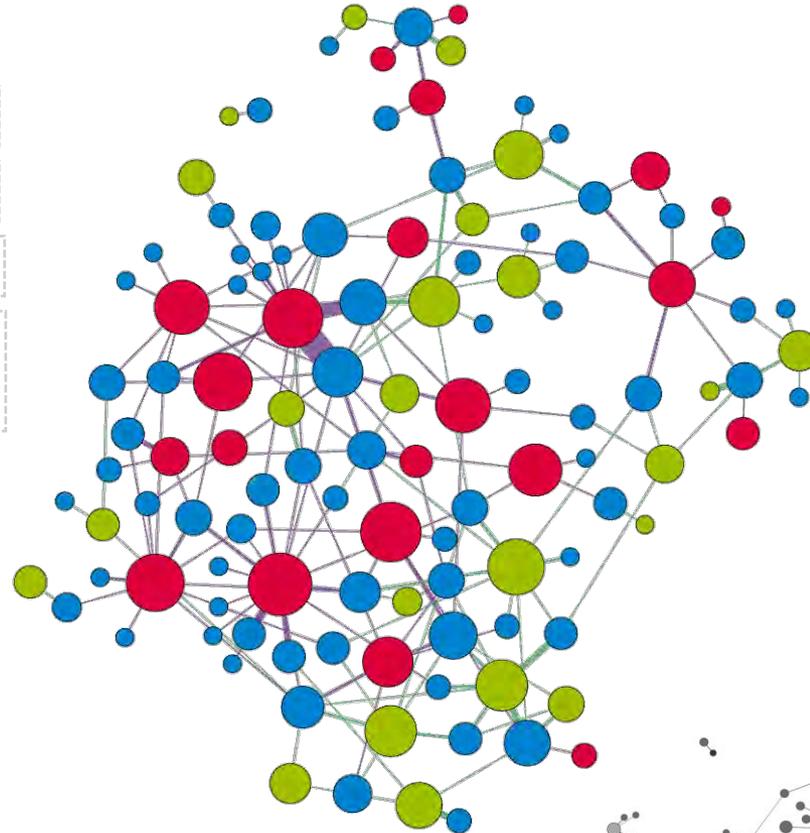




Collaboration in knowledge bases

Analytical knowledge network

- Even distribution of linkages
- Balanced position of nodes
- Stronger role of public research organisation



Nor analytical, nor synthetic network seems to be **more efficient** in transporting knowledge



Conclusions

Transition economies



- Science-industry cooperation limited and influenced by the past development
- Collaborative projects remain only minor part (13%) of all the RDI initiatives
- Short-term individual tasks, only fractional change in the collaboration culture

Geography of collaboration

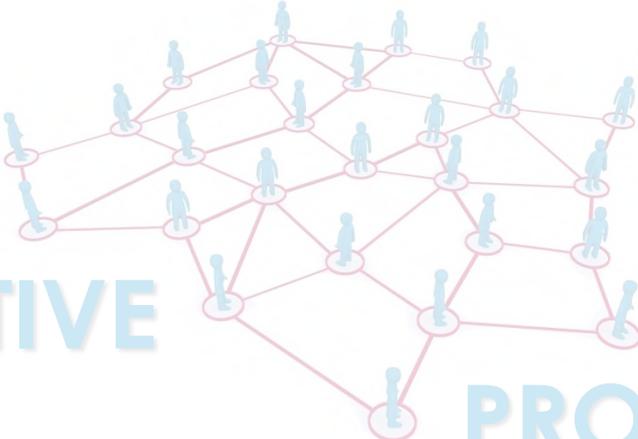


- Cross-regional linkages, need for policy coordination across multiple administrative levels
- Little repeating cooperation, inherited fragmentation still dominates

Knowledge bases - distinctive topography of networks



- Analytical more even distribution of linkages and position of nodes
- No effects to efficacy of knowledge transfer



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Thank you!

