The role of R&D networks in strengthening knowledge base and S&T capabilities

The case of
Regional University Knowledge Centre for Vehicle Industry

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Overview

- Theoretical background
- Research question, methodology
- Case study
  - Background information
  - Structure and characteristics of R&D collaborations of the firms
- Summary
Theoretical background

Economic growth

Technology progress

Innovation

Innovation is an increasingly complex process just like knowledge production that feeds innovation

Growing number of R&D collaborations

“...innovation is most effectively undertaken as a collective process in which networks play a central role.”

Fagerberg 1994, Link & Siegel 2001

OECD 2003

Griliches 1992, Fagerberg et al. 2004


Hagedoorn 2000, ’02

Özman, 2006
Selected theoretical approaches

- **Evolutionary economics**

- **‘System of innovation’ approach**

- **Knowledge-based economies**
  (David & Foray, 2001; Archibugi & Lundvall, 2002, Castells, 1996)

- **Taking into account the social environment:**
  embeddedness, social capital (network capital), structural holes, trust, actor-network theory...

- **Social network analysis (SNA):**
  systematic collection of relational data, study of the flows through the network, graphic images, mathematical or computational models
Research questions

What are the main characteristics of R&D and innovation networks in Hungary?

How and how much could the Hungarian companies benefit from these collaborations?

Is there any national specificity behind the overall low level of collaborative activities?
Research methodology

- Literature review
- Case studies (2-2 in 2 different industries) with *structured interviews*
  - General information on the organization (ownership, R&D activity, market situation)
  - R&D networking (partners, influencing factors, characteristics, output/outcome)
  - Specificities of Regional University Knowledge Centre
  - Experiences with R&D networking
  - (Slightly modified for faculties / enterprises)
  - (Complemented with table & graph to fill in)

- Social network analysis
- Data analysis (problem of availability, reliability)
Case study introduction

Target firms: Borsodi Ltd, Rába Axles Ltd, Sapu (VisioCorp) Lp.

- They form together with the ‘Széchenyi István’ University the Regional University Knowledge Centre for Vehicle Industry (JRET)

- Focus on their R&D&I collaboration network within and outside JRET

Environment

- Northwestern Hungary
- Automotive industry
- PANAC automotive cluster

Government support for R&D&I collaborations

- Regional University Knowledge Centres
Development of a network

Notes:
Black – core enterprises
Yellow – HE institutions
Pink – research centres
Red – HUN enterprises
White – foreign enterprises
Basic structure of the R&D network

Note: Red lines: JRET connections
Basic structure of the R&D network

Three relatively insular circle of partnerships
- Combination of different knowledge bases (so far unexploited)

Partnerships are mainly based on bilateral contracts

HE institutes are ‘in the middle’ of the activities, they provide broad background knowledge

Large MNCs collaborate with universities

JRET brought relatively little intensification or densification to existing partnerships
Comparing different approaches in Regional University Knowledge Centres

JRET:

EJJT:

Source: Each RUKC’s first year report

Notes:
Black – enterprises
Yellow – HE faculties
Pink – external partners / PRI
Characteristics of the R&D network

Notes:
Black – core enterprises
Yellow – HE institutions
Red – HU enterprises
White – foreign-owned enterprises
Pink – research centres
Size of vertices refers to enterprise size
Boldness of lines refers to strength of relation
Characteristics of the R&D network cont.’d

- Low density, ad hoc collaborations (lack of complex projects) but intention for durable linkages
- Importance of personal contacts but arms’ length relations are maintained
- Rába Axles Ltd. is the less embedded of the three investigated enterprises, relying on intramural R&D
- Sapu Lp. mainly commissioning R&D tasks, now building own R&D capacity, strong local management
- Borsodi Ltd. is the most active, both commissioning and performing different R&D tasks, development by knowledge intensive activities
Upgrading of S&T capabilities

- Lots of weak ties, big cognitive distance → modest benefits
- Raising awareness of R&D&I activities
- Knowledge accumulation (also about collaboration)
- R&D collaborations are judged by their contribution to competitiveness
- Quantifiable gains in cost savings, additional sales volume, in enhanced machinery and new job opportunities
Emerging findings

- Lack of strategic view about R&D and R&D collaborations
- Large enterprises tend to rely on intramural R&D and require only special services
- Low R&D expenditures, very few complex projects emerge (and those mainly with governmental support)
- JRET contributes to stabilizing existing relationships but could not help in increasing the number of affected firms
Thank you for your attention!

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