REGIONAL ENGAGEMENT OF UNIVERSITIES - STARTING POINTS FOR STRATEGIC PARTNERSHIPS WITH INDUSTRY

Presentation at the Faculty of Business Studies and Economics, Bremen

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Fraunhofer ISI - Facts and Figures

Broadly based know-how
Number of staff: 230

Clients*
Budget 2012: over € 21 million
350 research and consultancy projects per year

* as a percentage of the total

- 21% Economists
- 16% Industrial engineers
- 18% Engineers
- 24% Social scientists
- 21% Natural/life scientists

- 54% Public sector national
- 13% European Union
- 23% Industry
- 8% Other R&D
- 2% Research promotion
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Outline / Research issues

- Most prominent forms of regional engagement of German universities
- Evolution of new organisational models in university-industry interaction in the German research and innovation system
- Implications for universities
Underlying papers and projects

- Regional network participation and their implications on the internal governance of universities (BMBF 2010 - 2013)
- Research Campus pro active - Exchange of experiences and integration: Accompanying research to the Research Campus programme (BMBF 2012-2016)
Orientation of universities concerning their regional environment has already been subject to many economic or social scientific research projects (Bleaney et al. 1992; Cooke 2002; Gunasekara 2006a; Keane und Allison 1999; Kitagawa 2004; Thanki 1999).

Many universities actively engage in their environment in a strategic manner (Krücken et al. 2009; Krücken and Meier 2006; Nickel 2004).

Emergence of "entrepreneurial universities" (Clark 1998, Gibbs 2001), triple and quadruple helix configurations (Etzkowitz and Leydesdorff 2000, Carayannis and Campbell 2009), "boundary-spanning roles" of new university units (Youtie and Shapira 2008), and the "third role of universities", i.e. their active contribution to regional development through knowledge spillovers from teaching and research (Gunasekara 2004; Westnes et al. 2007) are discussed.

In the wake of the regionalization of RTD policies the expectations of policy makers towards HEIs to engage in regional/local networks, clusters and other initiatives have significantly increased (Fritsch et al. 2007).
Regional governments try to **engage universities in joint strategic undertakings** of the industry, the science and the public sectors in a region.

Such initiatives can relate to the initiation of large scale cluster projects, to the formation of public-private-partnerships, as to urban development activities.

Source: Kroll et al. (2012) based on Goldstein/Mayer/Luger (1995), Uyarra (2010) and others
Forms of regional engagement

Starting point
- No broad empirical basis on the full scope of activities
- Mostly econometric or case studies

Objectives of the study*
- Establish an empirical basis
- Take an actor based view
- Understand the reasons for researcher’s choice

Study Details
- Between April and June 2011
- Survey of about 14,000 professors (of ~40,000 German Total)
- around 1,600 questionnaires with relevant entries returned (response rate 11.4 %)

*financed by BMBF within the research programme 'New governance of science'
Definitions

- **Regional**: Wider environment of the location of a university that can be reached within two hours driving (car or train).
- **Regional activities** of universities: Engagement of university staff or the university in total which is based on regional networking according to the typology of regional engagement.
- **Networking / network**: z.B. “a number of actors who are linked via a number of relationships with a specific content” (Wald and Jansen 2007: 93).
Scope of activities with regional partners

Frequency of activities in co-operation with regional partners

- Organizing information events and further education courses for diverse groups (e.g. pupils, teachers, pensioners etc.)
- Research cooperations with regional organizations
- Consulting and expert reports for regional organizations
- Supporting or placing students at regional companies and institutions to complete their studies
- Contribution to local communities / social involvement
- Exchanges of staff between university and regional partners (e.g. interns, external teachers etc.)
- Other
- Allowing third parties to use university-owned premises or services
- Allowing third parties to use university-owned machines, appliances or laboratories

Source: Own Figure, based on own survey

n = 1441
Different forms of regional engagement of universities in Germany

| Research collaboration with regional partners | *0,50 |
| Advice and expertise for regional organizations | *0,43 |
| Temporary exchange of personnel between HEI and regional partners (interns, teaching) | *0,44 |
| Support of final theses conducted by students in regional firms and organizations | *0,54 |

| Use of machinery, equipment, laboratories in HEIs | *0,57 |
| Use of rooms, infrastructure and services of HEIs | *0,61 |

| Information and further education for different groups (e.g. pupils, teachers, elderly people) | *0,51 |
| Contribution to social life of the region / social engagement in the region | *0,55 |

* The highest of the respective factor loadings are shown; Fitting of the sample according to Kaiser-Meyer-Olkin criterion = 0.78

Source: Koschatzky et al. (2013)
Differences between scientific disciplines

Profile of engagement according to disciplines

- Contribution to local communities / social involvement
- Organising information events and further education courses for diverse groups (e.g. pupils, teachers, pensioners etc.)
- Supporting or placing students at regional companies and institutions to complete their studies
- Exchanges of staff between university and regional partners (e.g. interns, external teachers etc.)
- Allowing third parties to use university-owned premises or services
- Allowing third parties to use university-owned machines, appliances or laboratories
- Consulting and expert reports for regional organisations
- Research cooperations with regional organisations

Legend:
- □ HASS - Humanities, Arts and Social Sciences, N = 544
- □ Medical Sciences, N = 123
- ■ MINT - Mathematics, Informatics, Natural and Technical Sciences, N= 497

Source: Own Figure, based on own survey
Interim conclusions

- **Research collaborations, consulting activities** and **exchange of human capital** via students, graduates and business people are important forms of regional engagement in which spatial and cultural proximity are of high relevance.

- Also important is the **supply of resources** (infrastructure and services).

- **Social engagement** (contribution to social life, further education) plays also a role.

- **Conclusion:** The "third role" of German universities is a strong starting point for policy measures.
Distributed innovation processes

- The recent understanding of innovation as an interactive and systemic process can also be interpreted as a **distributed knowledge sourcing and combining process between different agents**.

- Knowledge generation and implementation processes are supposed to result from **social interaction** between economic actors.

- Distributedness of innovation depends on different influential factors: the **modes** of interrelationships between agents (knowledge base and specialization), the **dynamics** in the distribution patterns of the agents (changes in the distribution patterns), and the **scales** which address the levels of innovation (incremental steps $\leftarrow\rightarrow$ fundamental changes) (Coombs et al. 2003, p. 1126).

- The advantages of distributedness depend on the **absorptive capacity** of firms (Cohen/Levinthal 1990) and on a proper **gatekeeper function** in the firm (Tushman/Katz 1980).
R&D needs in the industrial sector

- In the course of globalization and the increasing science orientation in technology development, the complexity in technology and product development increases further.
- Own entrepreneurial resources (knowledge, capital) are often insufficient to master this complexity.
- This results in changes in the interface between science and industry in the innovation system - (large) companies are looking for access to long-term strategic research.
- Universities and non-university research institutions are attractive research partners in this context.
Structural changes in industrial R&D spending in Germany

Since the mid 1990s, total R&D expenditures and the share of external R&D expenditures has increased (outsourcing)

- Other firms and universities profited most
- Most of industrial funded R&D is short-term and market-oriented development
- Only recently, the tendency towards more long-term oriented research increased

Source: Stifterverband Wissenschaftsstatistik, several years
## Transfer Indicators

### Selected indicators of knowledge and technology transfer in international comparison

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<th>DE</th>
<th>FRA</th>
<th>GBR</th>
<th>AUT</th>
<th>JAP</th>
<th>KOR</th>
<th>USA</th>
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<tr>
<td><strong>Contract research</strong></td>
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<td>R&amp;D activities at universities financed by industry (2009, in %)</td>
<td>14,2</td>
<td>1,6</td>
<td>4,5</td>
<td>5,7</td>
<td>3,0</td>
<td>14,2</td>
<td>5,6</td>
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<td>R&amp;D activities at non-university research institutes financed by industry (2009, in %)</td>
<td>10,8</td>
<td>6,8</td>
<td>9,5</td>
<td>9,3</td>
<td>0,8</td>
<td>4,2</td>
<td>2,7</td>
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<td><strong>Innovation cooperation</strong></td>
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<td>Share of innovative firms which cooperate with universities (2004, in %)</td>
<td>53,2</td>
<td>25,5</td>
<td>32,7</td>
<td>57,6</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>Share of innovative firms which cooperate with non-university research institutes (2004, in %)</td>
<td>25,9</td>
<td>18,4</td>
<td>24,7</td>
<td>30,1</td>
<td>n.a.</td>
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</table>

Source: OECD: MSTI 2 (2010); Eurostat CIS 2006
Cooperations are 'heterogeneous' when actors from different sectors of the research system are involved in R&D cooperations (university-industry, industry-public research institution, industry-public organisation), or when different types of cooperation partners with clear distinctions from one sector collaborate (like competitors, suppliers, or other firms serving different markets).

Source: Koschatzky (2013)
# International Public Private Partnership Programmes

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<th>Name</th>
<th>Duration</th>
<th>Responsibility</th>
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<td>Australia</td>
<td>Cooperative Research Centres</td>
<td>1990-2010</td>
<td>Ministry of Industry</td>
<td>Competence Centre</td>
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<td>Austria</td>
<td>Kplus / Kind, Knet; COMET</td>
<td>1998-2009; since 2006</td>
<td>BMVIT/TiG, FFG BMWA/FFG</td>
<td>Competence Centre</td>
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<td>Estonia</td>
<td>Competence Centres Estonia</td>
<td>2004-2007</td>
<td>Ministry of Industry</td>
<td>Competence Centre</td>
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<td>Finland</td>
<td>Strategic Centres for Science, Technology and Innovation (SHOK)</td>
<td>since 2006</td>
<td>TEKE</td>
<td>Competence Centre / Cluster</td>
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<td>Canada</td>
<td>National Centres of Excellence (NCE)</td>
<td>since 1989</td>
<td>NSERC, CHIR, SSHRC</td>
<td>Network</td>
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<td>Norway</td>
<td>Centres for Research-based Innovation Scheme (SFI), Centres of Excellence scheme (SFF)</td>
<td>2006-2014</td>
<td>Research Council of Norway</td>
<td>Competence Centre</td>
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<td>USA</td>
<td>Engineering Research Centres (ERC), Industry/University Cooperative Research Center (IURCR)</td>
<td>since 1985 since 1979</td>
<td>National Science Foundation</td>
<td>Competence Centre</td>
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Source: Kaplun 2013
Public support of heterogeneous cooperations in Germany

- In its report 2009, the Expert Commission for Research and Innovation (EFI) suggested that strategic cooperations between industry and research organizations should be encouraged and "active political support should be provided for further partnerships" (EFI Report 2009, p. 41).
- Based on this recommendation, BMBF formulated and implemented the funding initiative "Research Campus" (Forschungscampus) which is part of the Hightech Strategy 2020.
- Its objective is to promote collaboration between partners from industry and research organizations by combining resources in order to develop new research fields in a middle to long-term perspective in the way of public-private partnerships located at the campus of a university or research institute.
- Strategic pre-competitive research should be strengthened and leverage effects by public funding for an increased private investment be created.
The German research system

Kind of research

- **Market oriented**
  - Fed. Gov./"Länder" institutes: 0.9
  - Max Planck institutes: 1.5
  - Helmholtz Association: 3.1
  - Leibniz Association: 1.1
  - External industrial research organizations (mainly East Germany): 0.3*
  - Institutes associated to a university: approx. 0.7*
  - Industrial research institutes (AiF): 0.4

- **Basic research**
  - Universities: 11.8
  - Fraunhofer: 1.6

Transfer bridges

- intra- and extramural R&D expenditures of the industrial sector: approx. 57

Institutes associated to a university: approx. 0.7*

*mainly private

*estimation

Source: BMBF 2012, Stifterverband 2012, other sources
Three distinct characteristics:

- **Proximity** – the bundling of research activities and competencies at one location, as possible on a university or public research campus,
- The medium- to long-term adaptation of a specific research topic, ideally in the frame of a research programme,
- A mandatory public-private partnership.

Preparation and main phases will be supported up to altogether 15 years with a maximal amount of 2 mill. Euro per year.

In September 2012, **ten ResearchCampus projects** were selected.
Impacts of regional engagement

n = 1.250 professors

Source: Own Figure, based on own survey
Relevance of central coordination

Professors' activities are result of centrally coordinated strategy processes

Source: Own Figure, based on own survey
Implications for universities

**Teaching**: profits most from regional engagement (e.g. many offers for students)

**Research**: Thematic enrichment through collaboration with research partners (if regionally available)

**Transfer**: Many transfer activities with social, sometimes also economic relevance

Conclusions from own survey
Conclusions

- Many **indications for a "third role" of German universities** exist.
- **Theoretical conclusions** derived from an international context describe also recent developments in Germany (third role, triple/quadruple helix configurations).
- **Policy expectations** towards university-industry linkages **increased** (e.g. in the form of networks, clusters).
- **Universities respond by manifold activities** and by changing internal governance modes (involvement of the university administration).
- Politics makes use of these activities by placing **universities at the center of strategic innovation supporting programmes** (e.g. Research Campus).
- A question in this respect is **the independence of research** due to stronger industrial influences.*
- How increasing flexibility and organizational fluidity will **affect the university system** is so far an open question.

*e.g., www.hochschulwatch.de
Thank you for your attention!

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