Knowledge transfer via cooperative research

How *Universities* and *Universities of Applied Science* are positioned in the German research network
Agenda

• RegTrans – regional transfer effects: a comparative study of universities and universities of applied science
• a model of knowledge transfer mechanisms
• cooperative research
  – data: the FÖKAT
  – intensity of transfer
  – network position
  – spatial dimension of network linkages
• results and future prospects
RegTrans

• presented work is part of the research project: „RegTrans“, funded by the German ministry of education and research

• goals: (1) revealing differences between universities and universities of applied science regarding knowledge transfer mechanisms and (2) identifying room for improvement
A model of knowledge transfer mechanisms (1)

Effects of HEIs:

Knowledge-based Impacts

Knowledge and Technology Transfer

- Basic Transfer
- Spin Offs
- Research projects

Human Capital

Quality of Location

Expenditure Effects
- Higher Education Institution
- Students
- Staff

Influencing Factors

Effects

Higher Education Institution

Region

Expenditure-based Impacts

Source: Hamm et al., 2012
A model of knowledge transfer mechanisms (2)

• 4 mechanisms are differentiated:
  – basic transfer e.g. publications,
  – human capital e.g. graduates,
  – formation of enterprises, in this case spin offs and
  – via research, e.g. especially cooperative research

• questions:
  – differences regarding the intensity of knowledge transfer
  – differences regarding the spatial dimension of knowledge transfer
Cooperative research: The FÖKAT

• FÖKAT → Förderkatalog (an online catalogue containing information about nearly 110,000 research projects funded by the German government)

• using all currently funded projects

• cooperative projects have been used to unveil the network
Time length of projects

Frequency distribution – length of projects

Universities

Universities of applied science
The research network (1)

4 centrality measures have been used

– degree:
  • number of direct linkages
  • cooperative activity

– closeness:
  • average path length to every other actor
  • efficient information spreading/gathering

– betweenness:
  • probability of being located on the shortest path between other actors
  • gatekeeper-position

– eigenvector:
  • Central position, when directly connected to other central actors
    (circular logic → Algorithm in the used PAJEK software)
  • contacts to important actors
The research network (2)

- the (reduced) network unveiled by the FÖKAT data
- 62 UoAS and 85 universities
- 1139 actors altogether and 3622 linkages between them

### Difference of centrality values

<table>
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<th>variable</th>
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<th>1=universities; mean</th>
<th>difference statistically significant at 1 percent level</th>
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<td></td>
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The research network (3)

• shown are 85 universities and 62 UoAS
  – not shown: the 992 remaining actors
  – A dense network between universities
  – UoAS in more peripheral positions and nearly unconnected among each other

• UoAS connected to the network of universities via the local university

• the intensity of cooperation of universities and UoAS with the remaining actors
  – 992 actors and the 85 universities
  – 992 actors and the 62 UoAS
The research network (4)

Universities (green dots) and UoAS (red dots)
The research network (5)
The research network (6)
The spatial dimension

- Looking at the *Main Component* of the network
- average distance of cooperation partnerships for 62 UoAS and 85 universities in the component

<table>
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<th>hei_type</th>
<th>Av_dis_km</th>
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<th>median</th>
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<td>264</td>
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<tr>
<td>Universities</td>
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<td>329</td>
<td>311</td>
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</table>

SDIN | Glasgow | Falk Strotebeck | 9.4.2013
Conclusion

• Universities are much more involved in cooperative research (based on FÖKAT data)
• Universities are in more central positions within the research network (regarding every used measure)
• Universities cooperate with each other more than UoAS do
• Cooperation links of universities are more spatially dispersed, ...but the links to partners of UoAS show a greater distance than expected
Further research

• awaiting results of three surveys
  – Online questionnaire → 3000 professors
    • Formation of cooperation linkages
    • Spin-Offs
    • Publications, etc.
  – Online questionnaire → graduates
    • Tracking graduates: residence, 1st job, actual job, location of the university
    • Reasons for choices: regarding university, UoAS, job, region and so on
  – By postal service → about 23000 companies
    • Awareness of located HEIs
    • Reasons and intensity of cooperation with (non-)local HEIs
    • Valuation of effects of HEIs on a region
    • Valuation of graduates (e.g. more practical experience in case of graduates from UoAS?)
Thank you very much for your attention

For more information visit the following the homepages:

http://www.ruhr-uni-bochum.de/wiwi-forschung/drittmittel/RegTrans.html.de

http://www.hs-niederrhein.de/forschung/niers/forschungsprojekte/regtrans/