



Firms' innovation capacities in a metropolitan context

The example of Karlsruhe

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Background and Research Questions

Initial Hypothesis:

- The deepening of the international division of labor and its dynamics lead to new structural and organizational measures that address the entrepreneurial innovation process with the aim of securing the innovation ability of enterprises

Key questions:

1. How does globalization affect the entrepreneurial innovation process?
2. Where do innovation and R&D activities take place and how is the interaction between domestic and foreign activities?
3. What are the qualification structures enterprises rely on? Are there any changes to be expected?
4. How are the internationalization activities of important research institutions in the region?

Work Programme

1. Literature review and analysis
2. Empirical analysis of the innovation capability in the context of globalizing markets
 - Personal interviews with major companies in the region
 - Preparation and execution of a written survey
3. Quantitative analysis of the Internationalization activities of research institutions
4. Assessment and conclusions

Conducting the Surveys

- Personal interviews with major companies in the region of Karlsruhe to intensify the working hypotheses
 - 15 personal interviews
 - Key aspects were related to the entrepreneurial innovation strategies and activities as well as to qualification structures of the workforce
- Preparation and execution of the written survey
 - Questionnaire in consultation with the Chamber of Industry and Commerce
 - Return: 99 usable questionnaires



Personal interviews to refine our written survey

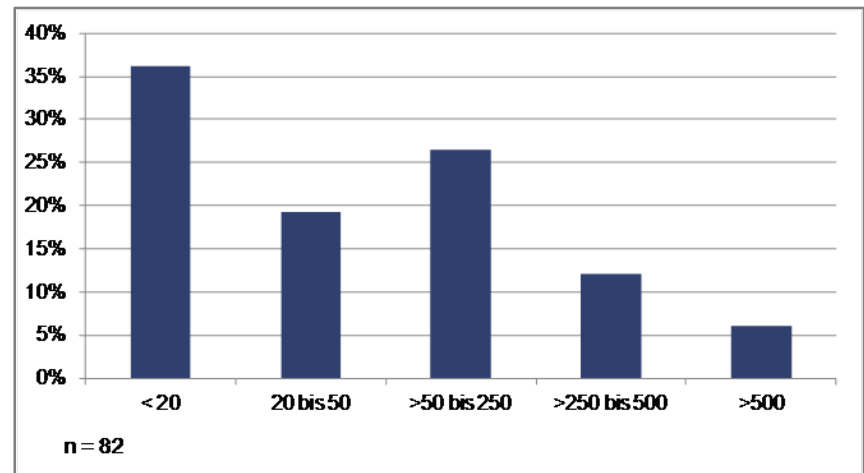
Structure of the Sample: Industry and Company size

Industry membership

- 48% of the sample belongs to the processing sector, followed by the service sector
- 12% of the sample are assigned to the sector energy, water supply and construction
- Broken down to individual sectors: a very large share of knowledge-intensive services has been observed (almost 30%)

Company size

(average number of employees in 2012 (%))



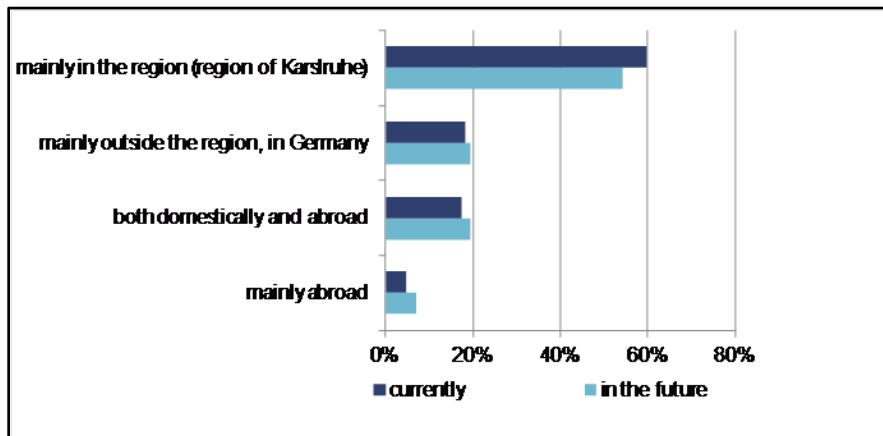
Source: Survey Fraunhofer ISI, July 2013

Structure of the Sample: Innovation Activities

Innovation Activities

- Spectrum of entrepreneurial innovation activities ranges from product innovations to process and service innovations.
- Almost 60% of the companies in the sample belong to the group of high-technology companies (measured in R&D intensity)

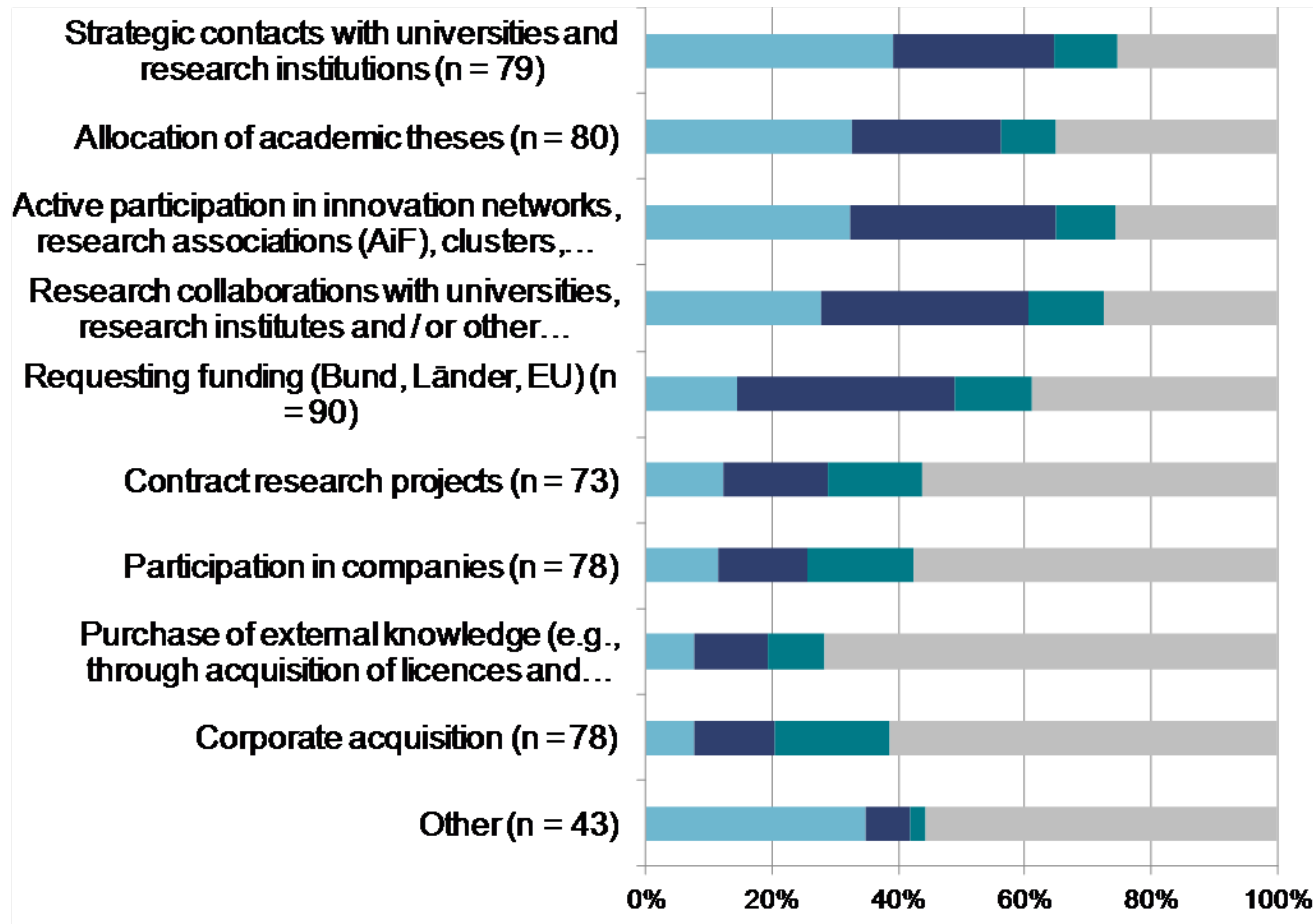
Spatial Distribution of Innovation Activities



Source: Survey Fraunhofer ISI, July 2013

- The region of Karlsruhe has the most important relevance regarding innovation activities (currently and in the future).
- However, it also becomes clear that the enterprises expect a decrease in the importance of the location of Karlsruhe.

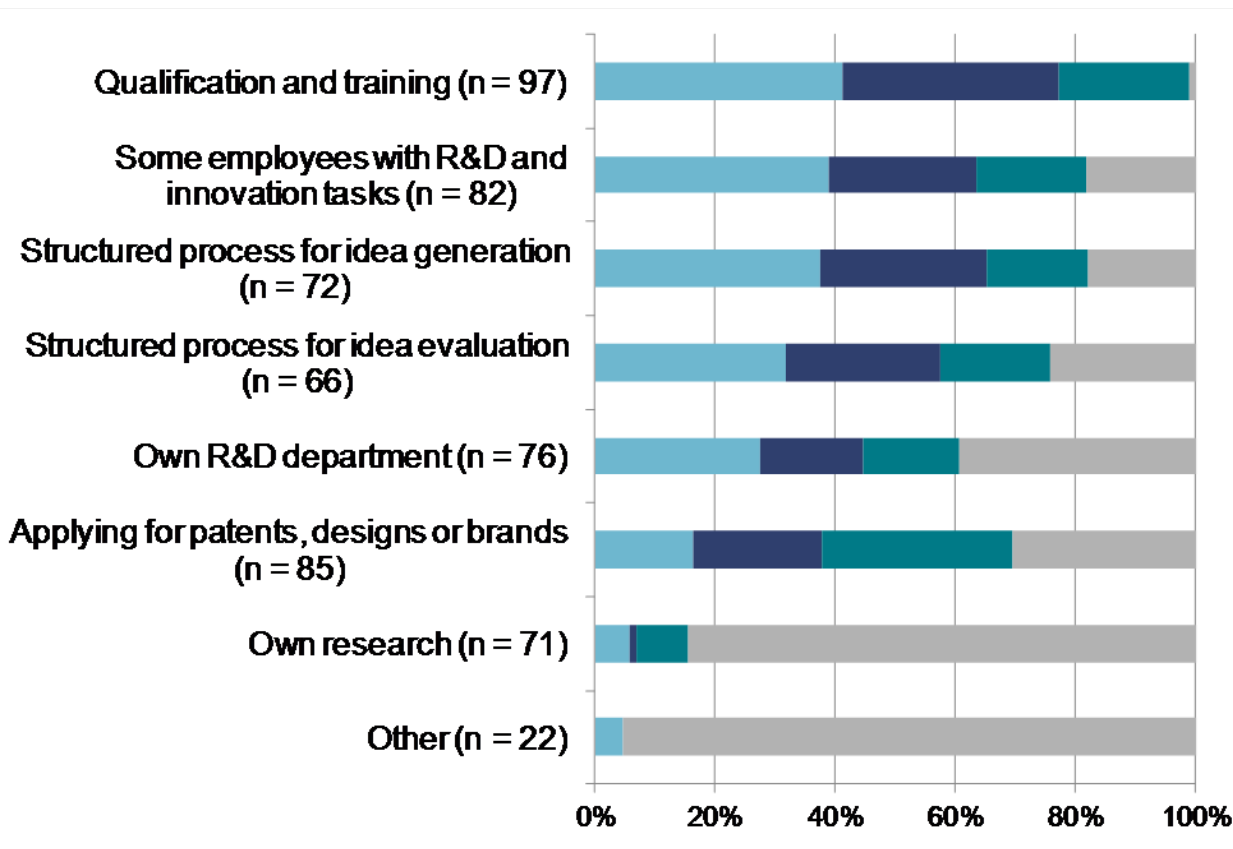
Securing Innovation Capability: External Measures



Securing the ability to innovate is to be understood as a continuum of different measures

Local/regional national international not relevant

Securing Innovation Capability: Internal Measures

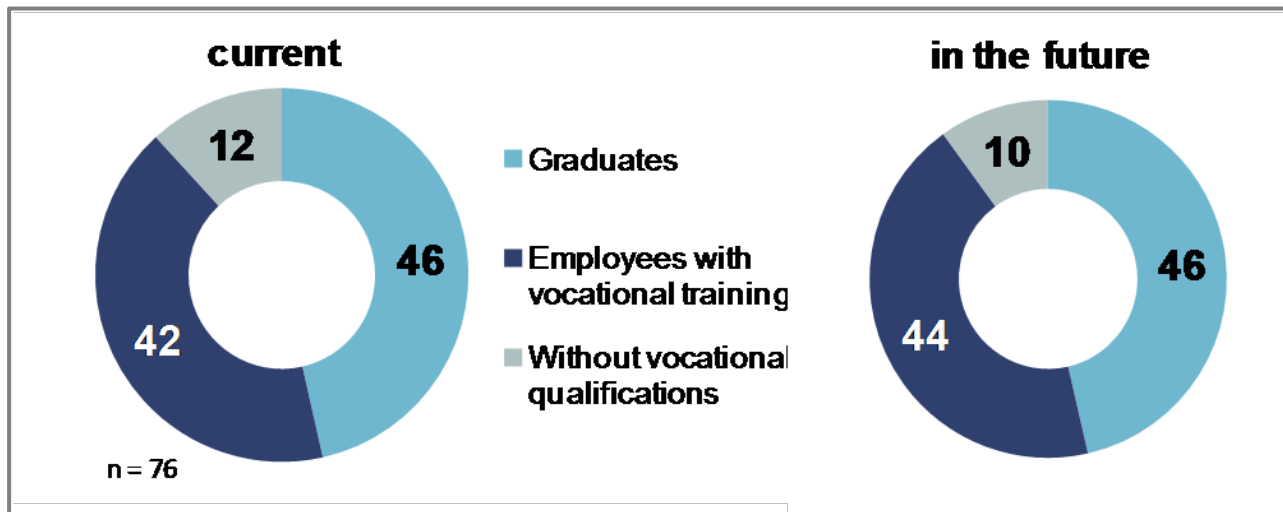


Securing the ability to innovate is to be understood as a continuum of different measures

Local/regional national international not relevant

Education and Innovation

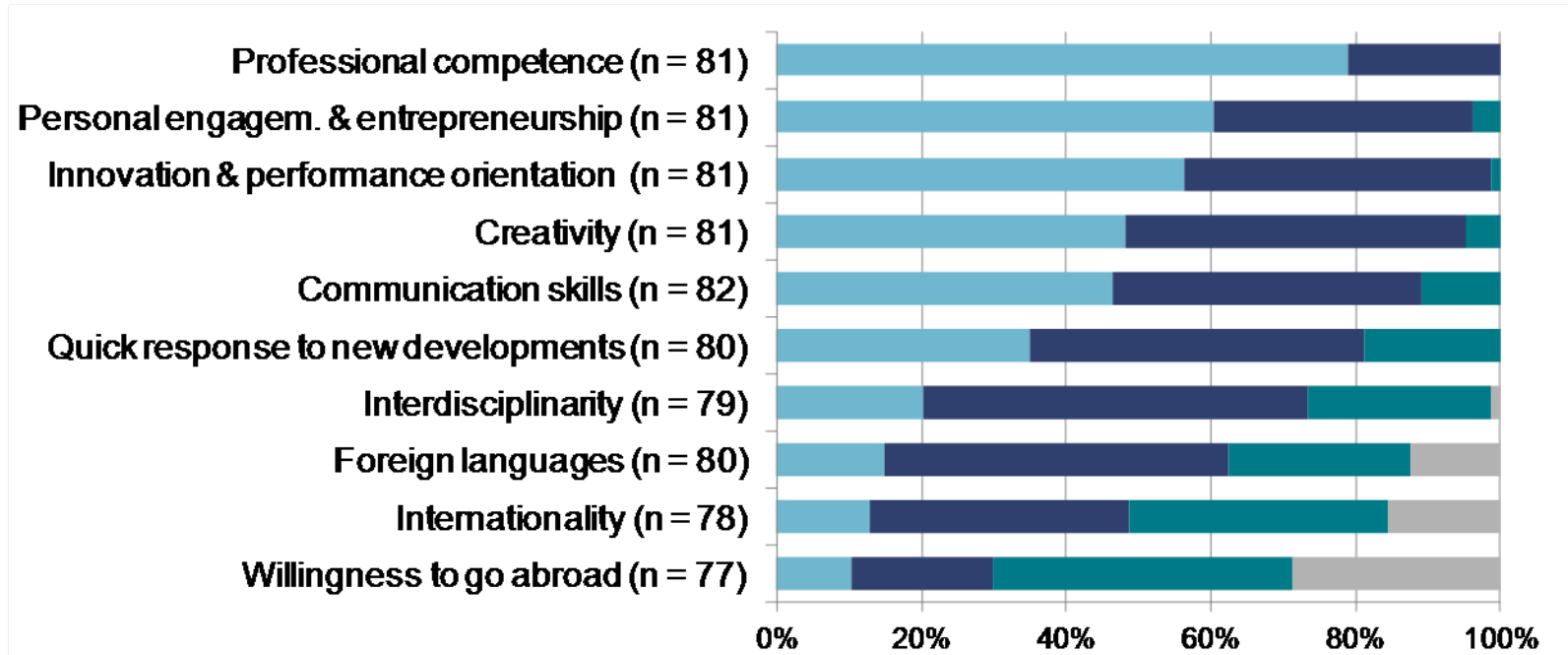
Average qualification structure currently and in the future (in %)



- **Typical industry-related differences** in qualification structure:
 - Manufacturing sector: skilled workers in production and management, graduates in research and development
 - IT sector and other knowledge-intensive services: mainly graduates

Source: Survey Fraunhofer ISI, July 2013

Key Skills that Employees should provide in the Future



- **Qualification requirements generally increasing**; likewise, requirements for special skills as tasks become more complex and more expertise is required
- **Shortage of skilled workers** in the future

■ very important ■ important ■ less important ■ unimportant

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Internationalization Activities of important Research Institutions

Research Institutions

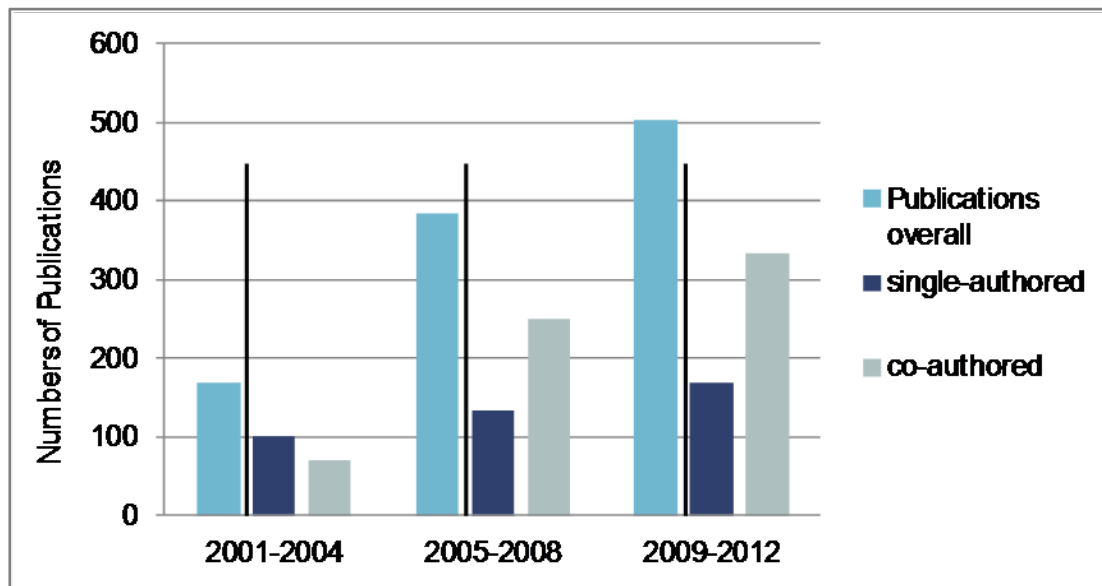
- Fraunhofer-Institute for Systems and Innovation Research
- Fraunhofer Institute for Optronics, System Technologies and Image Evaluation
- Fraunhofer-Institute for Chemical Technology
- Karlsruher Institute of Technology
- Hochschule Karlsruhe – Technology and Economics

Database

- Publications, Scopus Elsevier Data Base
- Patents, PATSTAT

Internationalization Activities: Publication Activity

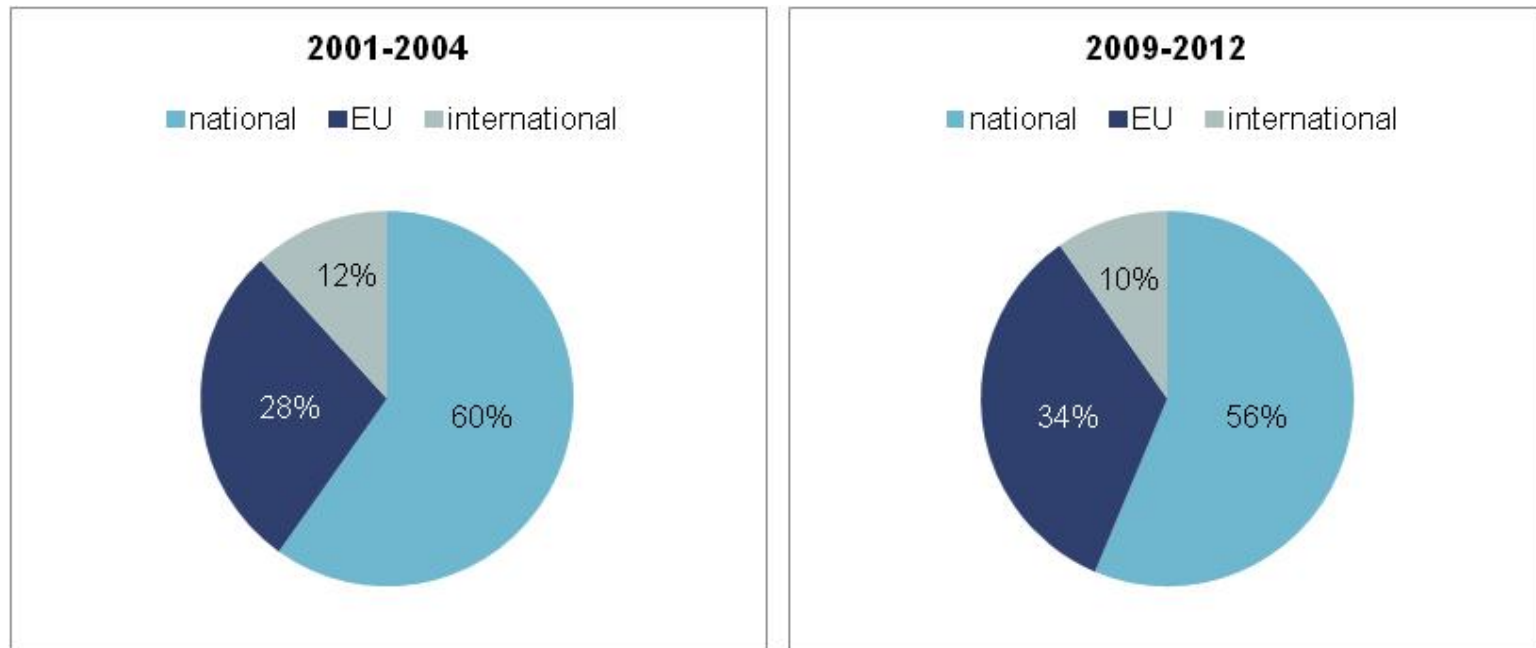
Publication activity of the three Fraunhofer-Institutes 2001-2012,
absolute numbers



Source: Scopus 2013

Internationalization Activities: Spatial Distribution

Spatial distribution of the co-authors of the three Fraunhofer-Institutes 2001-2012, absolute numbers

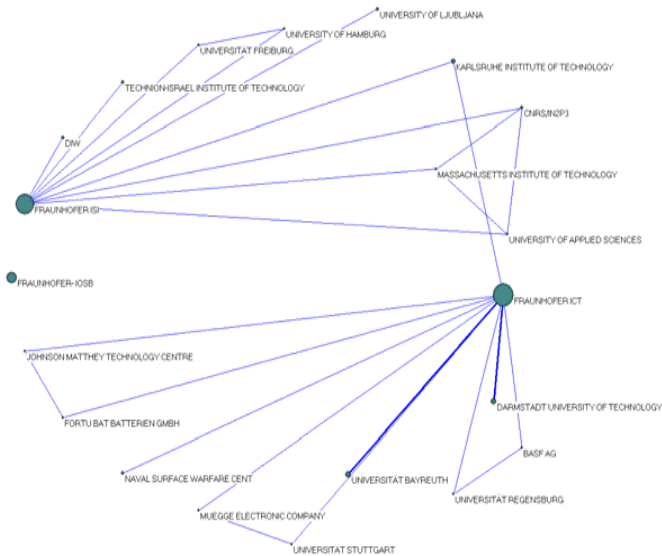


Source: Scopus 2013.

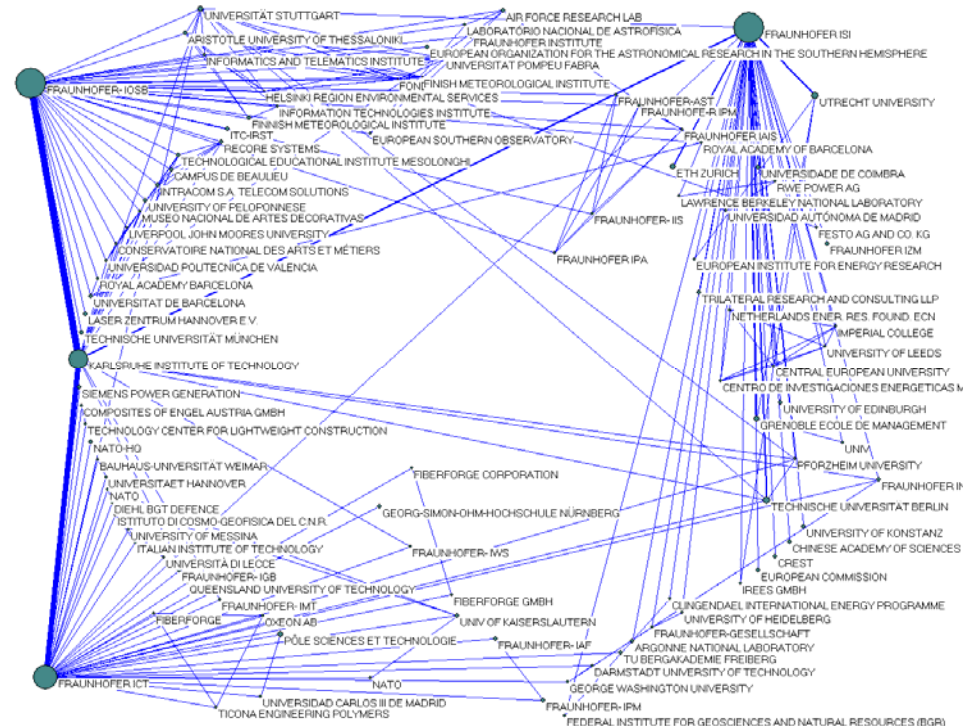
Internationalization Activities: Collaboration Network

Co-author network of the three Fraunhofer-Institutes

2001



2012



Source: Scopus 2013.

Conclusions I

- **Companies often act as globalization driver:** many measures to ensure capacity to innovate not to be understood as a reaction to globalization, but responsible for (innovation) success of companies in global markets
- **Relations between industry and science** will become closer in future; spatial proximity remains important
- **Instruments:** Strategic contacts with universities and research institutions, close network collaborations with research facilities, cluster and networks

Conclusions II

- **Critical variables:** Formal qualifications and specific key skills; some companies fear shortage of skilled employees in the future
- **Education policy** as key to future competitiveness of enterprises; **Innovation policy:** important to strengthen networks and cluster, to offer tools that promote (application-oriented) basic research in SMEs, to support elite promotion, internationality and soft location factors
- **Initial conditions very good in the region of Karlsruhe:** the internationalization of public research institutes also leads to better site conditions: Institutes as "hubs" of international knowledge flows