

Innovation Systems Knowledge and Talent Development Program

Gemeinsam mit der TU Wien/ Institut für Managementwissenschaften wird folgende Dissertation ausgeschrieben:

Dynamics and determinants of science-industry relations in Europe: Evidence from patent citations to science

Background

Science-Industry relations have attracted considerable attention over the past two decades, both in the scientific realm as well as from a policy perspective (see, e.g., Narula 2003). One of the most fundamental questions of this research stream is whether and how academic science is fostering industrial innovation, and what role geographical proximity plays for science industry interactions? While there is some empirical research in this direction reported for the US, we do not find comprehensive empirical work focusing on dynamics and determinants of science-industry relations for Europe. Most of the empirical research focusing on Europe investigate specific sectors or cases, and usually utilize formalized R&D interactions, e.g. as captured by survey in a specific domain. However, the wider array of knowledge flows between academia and industry has not been investigated so far, both in terms of thematic and technological dynamics and in geographical terms.

Objective, research question and significance

This thesis focuses on addressing the research gap described above. The objectives are, first, to develop a systematic science-industry interaction database by linking citations to scientific articles in patents for the years 1995-2015. Second, the study aims to analyse the thematic dynamics of knowledge flows from science to industry, eliciting to what extent specific technological fields benefit from scientific research, and how this has changed over the time. Third, the geographical distribution of science-industry knowledge flows at the level of European regions will be investigated, shifting attention to the (changing) role of geographical proximity as determinant for the interaction intensity between science and industry. Insights in this direction are not only relevant in a scientific context, but are also urgently needed in a policy context, given its consequences on, e.g., the design of policy programmes supporting knowledge diffusion from science to industry. Further, the developed science-industry interaction database will be of great relevance for both future research and policy.

Approach and methods

The objectives will be realised by using large-scale databases on patenting activities of firms (PATSTAT), and on scientific publications (ISI Web of Science). The main task in empirical terms will be to develop the database described above. Given the flaws citation data have, a large sample size is essential to reduce bias related to spurious signals in the data (see, e.g., Scherngell 2007). For linking of the databases, matching algorithms are to be utilized, e.g. provided by the RISIS SMS platform (<http://sms.risis.eu/>). Linking patent inventors and publication authors to organisation, and organisations to regions, enables us to construct region-by-region science-industry interaction matrices. The matrices have to be disaggregated by year and thematic area to be used for the thematic analysis, e.g. by Social Network Analysis (SNA) techniques, as well as for the modelling of determinants by employing spatial interaction modelling techniques (see Scherngell and Lata 2013).

Qualifications of the candidate

Given the highly advanced technical and methodological requirements, the candidate must have a strong focus or affinity to data science, data analysis, data visualisation and multivariate statistical modelling. Database programming, web-crawling skills and statistical programming are necessary qualifications. Further, the candidate should have a strong interest in innovation economics and questions related to research and innovation policy.

References

Narula R (2003). Understanding the Growth of International R&D Alliances. In Cantwell, J. & Molero, J. (eds.) Multinational Enterprises, Innovative Strategies and Systems of Innovation (pp. 129-152). Cheltenham: EE

Scherngell, T. and Lata, R. (2013): Towards an integrated European Research Area? Findings from Eigenvector spatially filtered spatial interaction models using European Framework Programme data, Papers in Regional Science 92, 555-577

Scherngell, T. (2007): Interregionale Wissensspillovers in der europäischen High-Tech Industrie. Eine empirische Analyse. Wiesbaden, Deutscher Universitätsverlag

Für die Bearbeitung der Dissertation wird ein Stipendium für die Dauer von 3 Jahren (1500 Euro pro Monat) in Form eines Freien Dienstvertrags vergeben.

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