



Paper to be presented at the DRUID Academy conference in Rebild, Aalborg, Denmark on January 21-23, 2015

Diversity, quality and originality in technology portfolios: The impact of corporate technological diversification on patent portfolio structures in German core industries

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Abstract

Technological diversification at the firm level has been identified as a persistent and industry-overarching phenomenon and its firm-endogenous and exogenous determinants have extensively been addressed from a broad spectrum of different perspectives of economic theory. Against a backdrop of the technology and innovation management literature, this empirical paper explores the effect of diversity within technology portfolios on technological capabilities and performance of firms. Hence, it provides a contribution to the still relatively small literature on capability and performance effects of technological diversification. Whereas prior research in the field predominantly conceptualizes and measures technological capabilities via the quantitative technological output of a firm, e.g. via the number of patent applications or grants, the qualitative component of technological capability and performance has been widely neglected so far. This contribution tries to fill this gap by expanding the scope of analysis: Various empirical indicators are used to assess the technological capabilities by means of technological quality and coherence in a firm's technology portfolio. The conceptual model that is developed assumes a non-linear relationship between technological diversity and technological capabilities, which is moderated by the level of coherence of the technology portfolio. Adopting a truncated regression model, the existence of an inverted U-shaped relationship of technological diversification and technological quality is tested empirically on a data set on patent applications at the EPO of 90 German firms (consolidated conglomerates) from the mechanical engineering and automotive industry over a period of 25 years (1984-2008) and data on patent quality indicators provided from the MTI Microdata Lab of the OECD Directorate for Science, Technology and Industry.