University-industry collaboration on innovation

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Abstract The knowledge base of universities and companies are complementary, with university R&D activities focusing on basic and applied research, while the proportion of experimental research is higher in firms. University-industry (U-I) collaboration is conducive to exerting the benefit of knowledge complementarity and facilitating knowledge transfer. Governments seek ways to encourage collaborations between universities and companies with the expectation that such collaborations will improve production processes and competitiveness in the national or regional settings. This thesis investigates the growing phenomenon of U-I innovation communities, and unravels the black box of community structure, dynamics and their influence on member firms’ innovation performance. Patent-level, university-level, and firm-level panel data are used in our analysis.

The first chapter unveils the explicit structure and dynamic characteristics of U-I communities and examines the relationship between community dynamics and university knowledge transfer. The results indicate that U-I innovation communities in China present single- and multi-center structures and are evolving from “localizing” to “specializing”. The community dynamics significantly affect university knowledge transfer in a curvilinear manner. Moreover, this inverted U-shape relationship is moderated by the university’s within-community position. The second chapter analyzes how the static (average geographical distance, within-community knowledge diversity) and dynamic community attributes (membership turnover) affect member firms’ invention production. Our results show that average geographical distance negatively affects firm invention production while within-community knowledge diversity positively affects firm innovation. Moreover, the U-I community membership turnover affects member firms’ patent production in an inverse U-shaped manner. In addition, a firm’s within-community network position exerts a moderating effect on the relation between community membership dynamics and firm innovation. The third chapter discusses the interaction of universities and firms inside the community. Results show that university technology transfer positively mediates the relationship between community dynamics and firms’ innovation performance. The fourth chapter investigates the influence of external environmental factors on the U-I collaboration. We focus on the financial steering of institutional arrangements and intellectual property rights enforcement (IPR). Our analysis shows that IPR enforcement positively moderates the relationship between industrial funding and university technology transfer.
This thesis concludes that practitioners could seek to work closely with local universities to promote the formation of the U-I innovation communities and advance them to transcend geographical boundaries. Firms could pin their hopes for innovation performance and profitable growth on community-based collaborative innovation platforms. Moreover, policymakers could support the establishment of porous community boundaries in the U-I collaboration network and guide moderate membership turnover to reach the optimum for member firm innovation.