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Author post-print (accepted) deposited by Coventry University's Repository

Original citation & hyperlink:
https://dx.doi.org/10.1016/j.technovation.2020.102123

DOI 10.1016/j.technovation.2020.102123
ISSN 0166-4972
ESSN 1879-2383

Publisher: Elsevier

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Editorial of SI
Mechanisms behind China’s Innovation Achievements: A Multi-level View

Prof. Yu XIONG and Dr. Senmao XIA

Abstract: The aim of this special issue was to investigate the mechanisms behind China’s innovation ecosystem by viewing the key participants at multi-level: firms, research institutes, universities, intermediaries, supply-chain systems, governments and so forth. There were interesting threads connecting research on innovation participants throughout the submitted papers. Briefly, the following topics were addressed: 1. evaluation of China’s innovation performance at a regional (provincial) level and recognition of successful practices as well as problem issues; 2. the influence at a micro level of uniquely Chinese factors on firms’ innovation performance - for instance, how has the regulatory context (e.g., state ownership, industry policy) shaped corporate innovation activities? 3. the relative importance of government and industry support mechanisms; 4. the roles of Chinese state research institutes and the significance of their network positions (e.g. structural hole and centrality) on innovation performance.

Global Innovation Index 2019 placed China at No.14, up 3 positions from 2018. The index is a sophisticated evaluation of numerous factors so it is unsurprising that the ranking is dominated by developed countries/regions. China was the only developing country in the top 20. Innovation has been seen as a key driver to development and economic growth (Xiong et al., 2020, Fernandes et al., 2018). In recent years innovation-driven development has become a national strategy to guide China’s development. In particular, the concept of ‘independent innovation’ has been advocated by the Chinese government, but despite the title it cannot be successfully achieved without technology/knowledge transfer and open innovation across organisational and national borders. Interaction and collaboration among innovative participants are significant. In this special issue, thirty-five high-quality manuscripts were received. After several cycles of rigorous peer review, five outstanding papers were finally accepted for publication. These are summarised below.

The first paper in this special issue is by Chen et al titled ‘Performance evaluation of China’s high-tech innovation process: Analysis based on the innovation value chain’. Recent years witnessed the rapid growth of China’s high-tech industries but the innovation capability in some areas is still weaker than some global leading players. This study seeks to evaluate the innovation efficiencies to figure out how China can catch up. Based on the concept of innovation value chain, this paper introduces a two-stage conceptual model, which simultaneously estimates the R&D and commercialization efficiencies of high-tech industries. The R&D process is in the upstream of the innovation chain, linking idea creation to conversion. The commercialization process is in the downstream, which introduces innovation to markets. Network data envelopment analysis (DEA) was conducted based on the regional-level data of 29 provinces of China. This study finds that most of the 29
regions have low efficiency in the commercialization sub-process compared to the R&D sub-process. This study argues that R&D investments should not be the only measurement when evaluating innovation efficiency and that the balance and coordination between R&D and commercialization deserves more attention when designing policies to boost the efficiency of regional innovation systems. Also, findings show that the R&D sub-process is not closely correlated to the commercialization sub-process in terms of efficiency. More policies should be introduced to help convert R&D to commercialization. As some disparities exist in the efficiency of the R&D and commercialization process among the 29 provinces, this study argues that more region-specific policies should be designed. In contrast to most previous studies, which have considered the regional innovation process as a black box, this study attempts to focus the internal structure of innovation process and links the R&D and commercialization with a relatively solid theoretical foundation and feasible mathematical methods. This model considers the inputs of shared resources in DEA, which to some extent, was ignored by previous studies. Finally, this study contributes to the regional studies literature by analyzing the high-tech industry innovation activities from the perspective of the regional innovation system.

The second paper in this special issue is by Yi et al. titled ‘the role of state ownership and institutions in the innovation performance of emerging market enterprises: Evidence from China’. The topic on how institutions affect the innovation of firms in emerging countries has become hot in recent years. This study seeks to explore whether and how regulatory institutions affect the innovation performance of emerging markets enterprises (EMEs). Specifically, this study tries to take an institution-based view to explain why some capability-constrained EMEs have become innovative leaders in a context where institutional voids are common. The answers lie in the regulatory environment in emerging markets. It is the government-related institutions that provide advantages to EMEs to do innovation. This study divides the regulatory institutions into three types: state ownership, region-specific institutions and industry specific institutional policies. The extant literature usually has limited understanding of how the ownership influences the relationship between firms’ internal capability (e.g. R&D) and their innovation performance. To add insights to the existing literature, this study takes a sample of 193,506 firms in China and finds that the state ownership of EMEs positively moderates the effect of R&D intensity on the innovation performance. However, state ownership is not equally beneficial to all EMEs. Region-specific marketization and industry-specific institutional policies enhance the innovation-enhancing effect of state ownership. First, this study shows that the effect of state ownership on firms’ innovation performance is stronger in regions with a higher level of marketization than in regions with a lower level of marketization. This suggests a complementary effect between government involvement (state ownership) and market development. These findings are different from the prior thinking which either implies that the role of government will diminish as markets evolve or sees the regulatory forces in emerging markets as hindrance to innovation. Second, this study finds that the impact of state ownership on innovation is stronger in industries where innovation is a strategic priority for the state than in other industries. This demonstrates that the industry specific regulatory policies might lead state ownership to have contingent effects on firms’ innovation in emerging countries. This finding, to some extent, might help explain why some firms in some specific industries can become innovative while other firms cannot, although they might share similar state ownership and stay in the same country. All in all, these
findings enrich the literature on the role of institutions in innovation by documenting how regulatory rules, rather than the internal capabilities of firms, help boost innovation of emerging market enterprises. Also, this study proves the importance of adopting the industry and subnational region as the unit of analysis, when doing research in a massive emerging country like China. These findings of this study could guide managers to consider a portfolio of institutional factors when developing firms’ innovation strategies.

The third paper is by Wang and Hu titled ‘Knowledge Sharing in Supply Chain Networks: Effects of Collaborative Innovation Activities and Capability on Innovation Performance’. To respond to the growing pressures on the development of new products and services, firms seek to do more innovation collaboration across participants in the supply chain. This study digs into the mechanisms behind the relationship between collaborative innovation and innovation performance in supply chains. The prior literature has highlighted the separate importance of knowledge sharing and collaborative innovation capability for increasing innovation performance but it lacks a holistic perspective. Moreover, academics still have limited insights into the rationale by which collaborative innovation, knowledge sharing, and collaborative innovation capability simultaneously affect different levels of innovation performance. This leads to the confusion that although many people agree that collaborative innovation can bring significant benefits to participants, yet many firms actually do not capitalize on the potential benefits thereof. Wang and Hu extend the literature by exploring how three factors (collaborative innovation activities, knowledge sharing and collaborative innovation capability) jointly shape firms’ innovation performance. Based on a sample of 236 firms in China, this study finds that knowledge sharing partially mediates the relationship between collaborative innovation activities and firms’ innovation performance in supply chains. In addition, collaborative innovation capability can positively moderate the influences of collaborative innovation activities on firms’ innovation performance. This study not only enriches the extant literature on value of knowledge sharing, but also adds insights to the research on supply chain innovation management. Further, the investigation on the moderating role of collaborative capability enables this study to provide new ideas to the boundary conditions of collaborative innovation activities. Managers can refer to this study to design the portfolio of innovation capability and knowledge sharing when their firms are doing collaboration with suppliers or customers.

The fourth paper is by Lin et al. titled ‘Bridging the gaps or fecklessness? A moderated mediating examination of intermediaries’ effects on corporate innovation’. To maintain competitive advantages in the ‘knowledge economy’, firms need to improve their innovation. The help from the external knowledge-intensive services is significant. Intermediaries are external institutions (e.g. technology service firms, accounting and financial enterprises) to bridge knowledge gaps and enlarge innovation search. Although many scholars argue that the ties with intermediaries have a positive impact on firms’ innovation performance, it is still unclear about the mechanism by which these intermediaries drive corporate innovation in an effective and efficient way. Therefore, this paper seeks to explain how intermediaries influence firms’ innovation performance in different conditions. Based on a survey of 289 manufacturing firms in China, Lin et al. adopt capacity-based view and find that the ties with intermediaries can bring positive innovation performance to firms. The authors then go one step further by investigating the effect of firms’ dynamic
capability and organisational strategies on the relationship between the ties to intermediaries and innovation performance. Specifically, this study finds that intermediaries facilitate the development of a firm’s dynamic capability, which plays a mediating role in the relationship between the ties with intermediaries and innovation performance. Further, the strategic conformity (structural formalization) negatively moderates the above mediation effect. This study adds insights to the literature on innovation intermediaries by conceptualizing and testing the direct and indirect influences of intermediaries on firms’ innovation performance. In addition, this study provides new ideas to the literature on the internal mechanism of firm innovation by revealing the moderating effects of strategic conformity and structural formalization on the mediation effect played by dynamic capability. This study extends the research on innovation intermediaries in the context of an emerging and transforming country-China. Managers might find the above findings useful when they are designing appropriate dynamic capability and strategies to amplify the positive effects of intermediaries on firms’ innovation performance.

Other than firms, the innovation performance of research institutes deserves attention as well. The last paper in this special issue is by Chen et al. titled ‘Do research institutes benefit from their network positions in research collaboration networks with industries or/and universities?’ Inter-organizational research collaboration has become quite important for innovation systems to cope with the increasing open and competitive environment. However, there is scarce empirical evidence on the impact of inter-organizational collaboration positions (across research institutes, industries or/and universities) on the innovation performance of research institutes. Many academics ignore the importance of research institutes and usually regard them as a subsidiary unit attached to the category of universities. This study seeks to fills this research gap by revealing the mechanisms by which the Industry-University-Research Institute (IUR) collaboration influences the scientific performance of research institutes. More specific, Chen et al. adopts Social Network Analysis (SNA) to investigate what types of IUR network positions can benefit research institutes’ innovation performance. Based on the longitudinal data of the inter-organizational research networks of Chinese Academy of Sciences, study finds that the impact patterns of the network positions of innovative organizations (research institutes) on their performance likely vary with the network structure and composition in different inter-organizational contexts. Specifically, in the “University-Research Institute” collaboration network, the degree centrality and the structural holes of the research institutes affect their scientific performance respectively in an inverted U-shaped manner and a positive linear one. On the contrary, in both the “Industry-Research Institute” and the “Industry-University-Research Institute” collaboration networks, the degree centrality and the structural holes of research institutes affect their scientific performance respectively in a positive linear pattern and an inverted U-shaped one. In a summary, the impact pattern that network positions (degree centrality and structure holes) exert on research performance is contingent in different collaboration network. This study adds insights to the literature on inter-organisational research collaboration by taking a new perspective, the research institutes. This is different from previous studies which usually focus on universities. In addition, this study contributes to the innovation network studies through revealing the diverse patterns between the network positions and innovation performance in different types of networks. Further, this study is among the first to investigate the inter-organizational research innovation across
research institutes, universities and industries in China’s circumstance. Universities, industries, and research institutes can refer to this study to design their appropriate network positions to get the best possible outcomes from inter-organizational collaborations.

In addition to the topics covered by the above published articles, we feel there are still some promising and worthwhile areas for future research. For instance, the influence of new collaborative and competitive relationships between China and western countries on the innovation performance of firms, universities and research institutes across countries. We hope to see high-quality studies on them in the future. Finally, we would like to thank Editor-in-Chief, Prof J. Linton, Area Editor J. Butler, and all the authors and referees contributing to this special issue.

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