

A Review of the Factors Influencing the Performance of University-Enterprise Cooperation Innovation

Xi Li

Xi'an Aeronautical University, Xi'an, China

Email: wsl612@126.com

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Abstract

In the rapid development of today, enterprises only rely on their own ability has been difficult to adapt to market demand; many enterprises choose to cooperate with the university to innovate, in order to improve their innovation ability and competitiveness. Also the university will invert the scientific research into market, and achieve the purpose of win-win cooperation. In this paper, university-enterprise cooperation as the background, to explore the impact of university-enterprise cooperation innovation performance of various factors, and classified review, was mainly divided into three aspects, like cooperation network structure perspective, spatial geography perspective and social factors perspective.

Keywords

University-Enterprise Cooperation, Innovation Performance, Influencing Factors

1. Introduction

Today, with the rapid development of economic globalization and information technology, it is difficult for enterprises to adapt to the changing market demand only by their own capabilities, so enterprises should cooperate extensively with different types of objects for innovation activities, such as suppliers, competitors, users, universities and research institutions, among which the scientific research strength of universities cannot be ignored. More and more enterprises in the industry choose to cooperate with universities for innovation; this cooperation mode to a certain extent reduces the cost of innovation and the risks faced by enterprises; university plays a role in strengthening the promotion of technological innovation, and university can also marketize scientific research; universi-

ty-enterprise cooperation has good complementarity, so it has attracted wide attention from all walks of life. Based on this environment, according to the relevant academic research, in this paper mainly from the network point of view, space point of view and social perspective on the university-enterprise cooperation, innovation performance factors are reviewed.

2. Literature Review

2.1. Cooperative Network Structure Perspective

From the perspective of cooperative network structure, many scholars put forward their own views from different angles on the network factors of university-enterprise cooperation innovation performance. Enterprises had different information in different network positions, [Mazzola, Perrone, & Kamuriwo, 2015](#) pointed out that the concentration of network was beneficial to product innovation through the empirical analysis of biopharmaceutical industry cooperative network, and enterprises can receive and obtain a large amount of information and resources when they were in the more central and dominant position in the network structure. If an enterprise was located in the structural holes position of the bridge in the whole network structure, it had little impact on the development of new products. But, some scholars also come up with different opinions. [Guan et al., 2016](#) studied the impact of the structural characteristics of cooperation network on innovation performance from the national level. The network characteristics include degree centrality, closeness centrality, betweenness centrality, structural holes and clustering coefficient, which regard innovation performance as two aspects (process efficiency and result performance). The process efficiency was calculated by Malmquist-DEA, and the result performance was the number of co-published papers and patent applications. The analysis of papers and patent cooperation data showed that the centrality index and structural holes of the network had a positive effect on the performance of cooperative innovation. And he hypothesized about clustering coefficient fails to be verified because its model did not pass the test. [Iravani et al., 2007](#) showed the effect of small world on the innovation performance of cooperative networks, and showed that small world networks were effective and simple solutions to complex random problems, while cooperative innovation problems were often complex, which was conducive to cooperative innovation. [Mazzola, Perrone, & Kamuriwo, 2015](#) pointed out that the concentration of the network is good to product innovation, because it can accept and obtain a lot of information and resources. [Peng & Wang, 2013](#) studied the citation network of journals and the University-Enterprise Cooperation innovation network, and found that if the organization is in the “bridge” position of the whole network structure, it has a positive impact on innovation performance.

2.2. Geospatial Perspective

About the geospatial perspective, some researches pointed out that geographical

distance had a negative impact on cooperative R&D activities, they believed that geographical distance hinders the exchange and diffusion of knowledge between partners, [Maietta, 2015](#) studied the driving factors of university-enterprise cooperation innovation, how the university's participation in R&D cooperation affected the enterprise's product innovation, concerning with the knowledge background of the enterprise (such as regional education and technology transfer). The survey represented that the knowledge spillover of university in the same area was very important, the geographical proximity between university and enterprises had a positive impact on cooperative innovation, and companies within 150 km from universities had a higher possibility of product innovation than those farther away. [Schiffauerova & Beaudry, 2012](#) analyzed the bio-industry cluster, which is mainly a close relationship of geographical location, which has a positive impact on the joint research and development capabilities of biotechnology. However, some scholars hold different views on geographical factors. [Morescalchi et al., 2015](#) have conducted an in-depth analysis of the temporal and spatial variation of this geographical constraint, and obtained the data from the European Patent Office (EPO). Based on the data of cooperation from 1988 to 2009, this paper explored the effects of physical distance and national boundaries on R&D personnel network, patent citation network, R&D personnel flow network and laboratory network by establishing a zero-inflation negative binomial model, and found that geographical factors were not always constraints on cooperative innovation activities. [Geldes et al., 2015](#) discussed different distance scales measure cooperation between organizations and found that geographical factors are not of great relevance and have no obvious impact on agricultural cluster cooperation.

2.3. Social Factors Perspective

From the of social factors perspective, first of all, with regard to the cooperative relationship and trust between partners, [Hemmert et al., 2014](#) indicated the formation path of trust mechanism through 618 survey data of university-enterprise cooperation in the United States, Japan and Korea, including the strength of cooperative relationship, partner reputation, contract guarantee and winning behavior. And the empirical results of each country were different. From the practical management point of view, it was suggested that the cooperation network between university and enterprises should be strengthened, and contract safeguard measures should be provided to effectively reflect the interests of partners, so as to strengthen the formation of trust in university-enterprise cooperation. [Sherwood & Covin, 2008](#) argued that technological knowledge was not only accumulated through the internal learning process, but also should be more turned to external sources to obtain innovative technological knowledge needed by enterprises. This study explored how various factors affect the successful transfer of university implicit and explicit knowledge to cooperative enterprises, mainly through the analysis of 104 industry managers' questionnaires. It was found that

the trust of partners indicates the successful acquisition of tacit knowledge, instead of explicit knowledge. Both forms of knowledge were predicted by the familiarity of partners and the communication between technical experts, that is, the depth and intensity of interaction between knowledge interfaces between cooperative organizations contribute to the acquisition of knowledge, which enabled knowledge seekers to find the right people to obtain desired information directly when they need it.

Secondly, from the perspective of human input in cooperative R&D, most of the current literatures on university-enterprise cooperation assumed that it was beneficial. [Giuliani & Arza, 2009](#) questioned this assumption and explored various driving forces for the formation of “valuable university-enterprise cooperation”. At the same time, they considered whether the connection between university and enterprises had greater potential to spread knowledge to other companies in the region. The data samples were collected from the questionnaire survey on wine technology in Chile and Italy. By using the least squares regression model, the study found that the enterprise own knowledge base (such as human resources, R&D investment, etc.) was the key factor to form “valuable university-enterprise cooperation”, and the university’s scientific research strength was also one of the main factors, so we should selectively promote the cooperative innovation between universities and enterprises. [Pontana et al., 2006](#) explored the propensity of innovative SMEs to undertake R&D projects with public research organizations (whether in collaboration or not) and the extent of such collaboration (number of R&D projects). Using econometric methods to investigate and analyze seven EU countries, it was found that the tendency of signing cooperation agreements between enterprises and university depends on the “absolute scale” of enterprises, and that large enterprises with certain innovation strength and talent reserve were more willing to cooperate with university. And how open the business was to the external environment, which measured by its willingness to search, filter, and signal. It also significantly affected the development of university-enterprise R&D cooperation projects.

Thirdly, some scholars had put forward the overall conceptual model of university-enterprise cooperative innovation, [Barnes et al., 2002](#) have proposed a conceptual framework of university-enterprise cooperative innovation through the case analysis of several specific cooperative innovation projects, including cooperation experience, project management, cultural differences, teachers and graduate students, and each category was detailed and specific. The scholar believed that project management had a significant impact on university-enterprise cooperation.

3. Conclusion

Finishing found that from various angles by using different empirical data, the results of same factors are not consistent by scholars. So in the study of specific issues, we should hypothesize firstly and then establish models, for empirical

analysis to get reliable conclusions.

The inadequacies of this paper only take into account the relevant academic researches, and did not conduct in-depth exploration from the perspective of the industry. The three aspects summed up may not be comprehensive. The main contribution of this paper is to lay the foundation for future research; follow-up research direction can be further launched for these three factors on the impact of universities-enterprise cooperation performance, analyze how each factor specifically affects innovation performance, and apply the conclusions to practice.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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