Case Study on the Organizational Structure Design Based on Technological Innovation Platform of Core Enterprises within the Distributed Innovation Networks

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The Asian Conference on the Social Sciences 2017
Official Conference Proceedings

Abstract
Research from a variety of perspectives has argued that technological innovation no longer takes place within a single organization, but rather is across multiple institutions or firms within a distributed network. This paper only discusses one kind of the distributed innovation networks that the ones have a core enterprise as the innovation platform provider. This study focuses on the organizational structure and its mechanism for the core companies to ensure and accelerate technological innovation within the distributed network. The methodology adopted in this study is case study. A diversified transnational firm is chosen to be the objective of this study, which is a high-tech in Asia and a core enterprise of a distributed innovation network across the world. This paper considers the nature, organs and their effects of the organizational structure for the innovation platform of the core enterprise. From this, we contrast and analyze the sources, motivation and connection of external innovation, and thereby provide a framework for the organizational structure design of the core enterprises of the distributed innovation networks.

Keywords: organizational structure, technological innovation, core enterprise, distributed network

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Introduction

There is an extensive literature around the theme of distributed innovation. Within a distributed innovation network, a variety of business agglomerations with different objectives, technological background, culture and approaches (Markusen, 1996; Iammarino and McCann, 2006). The researchers within the domain of distributed innovation challenge the vertically integrated model and its argument of innovation created and commercialized within a single company (Bogers, West, 2012).

Distributed innovation is the extension and deepening of technological innovation theory (Liu Guoxin, et al., 2010). The idea of distributed innovation embodies the cross hierarchy of enterprise innovation mechanism (Coombs & Metcalfe, 2002). The internal and external members, distributed in different geographical locations, cooperate with each other and implement the innovations on concept, task or program. Therefore the enterprises can integrate internal and external knowledge more efficient and effective, so to improve the innovation performance (Bowden, 2005). Distributed Innovation emphases on the acquisition and integration of different knowledge geographically distributed. The core enterprise itself or with their network partners works on innovative activities, based on shared resources in different areas of the innovation on the basis of a common network platform. These innovative activities are implemented in different regions simultaneously, and have collaborative and resource sharing features. The organizational structure of the core enterprise should promote the distributed innovative activities both within and outside the organization (Liu Guoxin, 2010). Therefore, what kind of organizational structure that the core enterprise needs to design to integrate the innovation achievement of the whole network and to promote the innovation performance of the network should be discussed, which is also the focus of this study.

Methodology

The methodology adopted in this study is multiple case studies. A diversified firm has been chosen to be the objective of this research, which is SS Electro-Mechanics. The major level of analysis has been at the business level, since at this level the innovative activities of this firm have been taken and the comparative materials would be available. The technological innovation processes of the business of MLCC, LED and ISM of this firm have been chosen to be the cases for study. The reasons on the research objective and cases choosing are as follows.

(I)The phenomenon of innovation could generally be found in the technological development processes of the most developing countries or areas, past or present, such as America, Japan after World War II, South Korea, Singapore, Taiwan and so on. Actually not all the technological innovation strategies have been successful. Some failed. SS Electro-Mechanics is one of the successful firms under technological innovation strategy in South Korea. Choosing it to be the research objective could more effectively ensure the validity and reliability of this study.

(II) The technological development processes of SS Electro-Mechanics including these three businesses have typically demonstrated the path of distributed innovation. This firm has built up a worldwide innovation network, and as the core of this

network, it has an efficient and effective organizational structure to implement and coordinate the distributed innovation.

Conclusion

The organizational structure of an enterprise is in line with its strategy. As the core enterprise of a distributed innovation network, its strategy must make the innovation activities forward-looking and have a global vision. Therefore its organizational structure should be designed under these strategic demands. The MLCC, LED and ISM business of SS Electro-Mechanics shares a great similarity in organizational structure, since they belong to the same company. Therefore, the following analysis will be more from the company level to analyze its common organizational structure.

Incremental innovation and radical innovation

The incremental improvements made by distributed innovators to each other's technology – often in the context of a radical innovation that is being refined to become useful (Nuvolari, 2004; Bogers, West, 2012). The organizational structure of the core enterprise should help the common innovation platform to build the direct collaboration in cumulative innovation and also the radical innovation of the network partners.

The technological organizational structure of SS Electro-Mechanics

The study shows that the technical organizational structure of SS Electro-Mechanic solves the organizational structure dilemma of incremental innovation and radical innovation. The Central Research Institute of SS Electro-Mechanic undertakes the most tasks of radical innovation, and the Technical Section and Technology Institute of each business unit undertakes the task of incremental innovation. In this organizational model, enterprises can better take into account both incremental innovation and radical innovation. And all these departments have direct connection with the corresponding departments of their network partners. They share both incremental innovation and radical innovation achievements and undertake some joint R&D programs. This multi-level organizational structure of technological innovation has a significant role in promoting the technological performance of enterprises. SS Electro-Mechanics set up a Technological Headquarter to manage and coordinate the whole organizational structure.

Department	Content	orientation	Current research area
Technical Section and of each business unit	Ensure the quality of production and improvement of production process	Improvement of existing process to ensure the technical capabilities of current products	Technical improvement and upgrade of corresponding products
Technology Institute of each business unit	Optimize the company's production lines and processes, develop unique core processes / equipment, and	Provide strong guarantee on the field production capacity to ensure the company's strong production capacity	Develop activities on process/line design to reduce manufacturing costs and increase production efficiency; develop differentiated

	establish a unique production system		core production processes
Central Research Institute	Develop advanced technology and new products for high tech electronic components	The driving force for the future development of enterprises, and ensure the enterprises gain a favorable position in the future competition	Take Materials Science, Optics and Photoelectricity as the core technologies, and develop the advanced technology and new products of high-tech components.

Table1 Content and orientation of technical organizational structure of SS Electro-Mechanics

Finally, technological organizational structure of SS Electro-Mechanics is a good solution to the problem of current technological improvement and the long-term technological reserves in the development of the technological capabilities of the enterprise, and integrating the inside and outside part of the distributed innovation achievements. The Technology Institute of each business unit undertakes the current technological improvement to ensure the current competitive advantage; the Central Research Institute of the enterprise integrates the technology of all the business units and makes the technical reserves, and laid a good foundation for the enterprise to win in the future competition. At the same time, the cross- organizational links between the inner technical organizations and corresponding departments of the other network partners also ensure the implementation of distributed innovation.

Acknowledgements

This study has been funded by China Postdoctoral Science Foundation (2014M561182).

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