



The role of intermediaries on technological risk management and business development performance in Korea

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ABSTRACT

This paper examines the strategic use of intermediaries by companies to better meet their technology needs from the resource-based theory and network theory perspectives. The results of this study are based on a sample of Korean IT companies and indicate the particular importance of cooperation with government support organizations and public R&D institutions in building relational assets. Intermediaries played a crucial role in enabling and facilitating joint development projects and promoting technology transfer among the companies in general.

The results of this study suggest that intermediaries, as they are linked to other organizations within networks and are centrally situated within those networks where information and resource flow, can coordinate and control the exchange of information and resources within networks and enjoy timely and privileged access to such information, giving them the means to expand their strategic social capital.

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1. Introduction

R&D cooperation is essential for companies to meet the increasingly complex technological requirements of today's marketplace and to cope with the fast-evolving industrial environment. Companies draw technological capabilities from both internal and external technology sources. Tapping various external technology sources is often necessary for companies to build the capabilities they need to remain competitive. External technology sources include universities, public research institutions, outside companies (competitor and non-competitor), and customers. According to a cross-sectional study by the OECD, the expanding R&D cooperation among the OECD member states of the European Union has increased the importance of interaction with external organizations for achieving company growth [1]. Cooperation involving technology transfer, as an external partnership for R&D and joint technology development, provides new market opportunities and, just as importantly, access to technological knowledge that cannot be obtained by internal means alone. It is a mode of intercompany cooperation based on exchange. Technology transfer and cooperation are different from general commercial transactions, because the companies cooperatively share intangible assets (i.e., technologies) for mutual benefit. It is more important in terms of the technological risk management in the initial stage of business development and that is the background of the participation by intermediaries in this partnership of the technology transfer.

The term "intermediaries," in the context of R&D, refers to groups such as industry associations and academic societies with research manpower that are capable of leading technological innovations and that can play a central role between governments and industries, as well as among companies, universities and research institutions. In Korea, intermediaries are still in the early

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stages of development. For this reason, their role is still not clearly understood, and the level of their participation remains quite low. Although there are many research groups and associations in Korea that match the profile of an intermediary, the level of their activities as intermediaries has been quite modest; their role in driving innovations, at least up to now, has been negligible. This, therefore, calls for more active networking efforts to build a systemic cooperation system that can better tap the intermediary potential of these organizations, as well as an effort to stimulate their activities as intermediaries.

This paper examines the role of intermediaries on the R&D performance of companies and explores the ways in which their technological capabilities can be linked to technology development from the network theory perspective, which also incorporates the perspectives of the resource-based theory and the transaction cost theory. An important objective of this study is to provide appropriate business strategies for collaborative technology development that consider relational factors among cooperating companies.

2. Literature Review

Companies cannot rely solely on their internal resources to obtain all of the technologies necessary for their production needs. Resources being limited, it is hardly realistic for a company to possess all of the technologies the company needs; thus, it is necessary in most cases to tap external technology sources. However, the external outsourcing of the technology may bring unexpected risks from the uncertainty. The path-breaking work of Tversky and Kahneman [2] demonstrated that rational individuals employ heuristics, such as accessibility and representativeness of the uncertainty, to make judgments and that they use simplified strategies to make choices based on these systematic approaches [3,4]. Also, under the reasonable circumstances such as in our case of R&D project, the adjustment to decrease the uncertain risks is so crucial in the development with social networks [5]. That means a decision under external technology acquisition should be based on the three kinds of heuristics: accessibility, representativeness, and appropriate adjustment [2,5,6]. These three paradigms could be a good starting point for our model.

Unfortunately, the innovation potential of a company, if derived solely from its internal technology sources, will be extremely limited in the new era of network economies [7]. Hence, to complement their internal capabilities, companies turn to external sources for creating and gaining access to new technologies [8]. According to Pavitt [9], internal capabilities provide 60% of technologies a company needs for innovation. Meanwhile, Von Hippel [10] proposed that companies draw technologies for innovation mainly from external parties that have the ability to provide them with important benefits. Tyson stressed that external sources are becoming a key determinant for enhancing technology development for companies. External technology sources such as governments, organizations promoting research (i.e., universities and research institutes), and companies possessing complementary technologies can serve as crucial links, resulting in reduced transaction costs: between technology and demand sources, suppliers, or competitors; between complementary technologies; and between promoters and technologies. With respect to technology acquisition in the US, 60% of basic research has been performed through technological links with research-based organizations, such as universities, R&D organizations, public R&D institutions, and private R&D companies [11]. Also, I replaced “promotion organization” with “research-based organizations.” In the sentence above, I have also used “organizations promoting research.” I did this because the original text sounded awkward. If “promoting organization” is a technical term, please replace. Gulati [12] claimed that networks that link research and academic organizations are able to reduce contract costs arising from information asymmetry and that trust between the members of these networks helps to minimize costs arising from opportunistic behavior, resulting in the reduction of overall transaction costs.

This type of network relationship is an asset that could make outsourcing transactions more efficient and less costly and also reduce funding burden and risks arising from capital-intensive investments [13]. The use of intermediaries can be effective in technology transactions where the parties are investing in assets specifically related to the transactions or in cases where the transactions involve an exchange of information or technology transfer. This type of network confers situational power with regard to the process of developing links with other organizations [14].

The transaction cost theory stipulates that the longer the relationship of transactions lasts, the stronger the mutual dependence and the trust between transaction partners, which would lead to reductions in transaction cost [15]. The development of a mutually beneficial relationship, which leads to the growth of transaction-specific assets, drives down the cost of transaction for the parties involved, resulting in positive consequences on company competitiveness [16]. Companies enter into a cooperative relationship with other companies mainly to reduce uncertainties and to secure a stable supply of needed resources; relationships with external companies are a great way for companies to gain access to required resources or capabilities and to expand their capital base [17].

3. Model and methodology

This study examines technological capacity resources from the perspective of the resource-based theory and relational assets (i.e., external technology sources) from a network perspective [18]. The importance of intercompany networking can hardly be exaggerated; such networking could effectively boost a company's production capacity by facilitating access to indispensable resources through capital cooperation, technology transfer, and human exchange [19]. The concept and categories of assets underpinning the resource-based theory are largely shaped by Williamson [13] who classified the basic types, Walker [20] who defined the specific characteristics of physical assets, and Anderson [21] who characterized the unique attributes of human assets. Technological capabilities refer to capabilities that allow for an effective use of existing technological competence for imitating,

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