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The impacts of different R&D organizational structures on performance of firms: Perspective of absorptive capacity

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ABSTRACT

To speed up strategic alliance in R&D activities, different forms of R&D organization structures can be summarized into different roles including the input-oriented, the output-oriented, and the matrix organization structure. The most common mode of strategic alliance consists of horizontal and vertical integrations. However, the study adopting absorptive capacity to examine the impacts of different R&D organization structures on the performance of firms at different alliance modes has never been discussed. Therefore, the paper employs absorptive capacity to mediate the relationships between different R&D organization structures and the performance of firms. Since the theory of transaction cost economics is inadequate for addressing how well the technological knowledge develops in the organization. A conceptual model to analyze the tension between product strategies and their strategy implementation is proposed to challenge the vacancy. Practical investigation shows that a matrix R&D organizational structure mainly transfers knowledge to input-oriented R&D organizational structures in horizontal integration, and mainly integrates capabilities from output-oriented organizational structures in vertical integration. The result implies that stronger institutional environments lead to a stronger link between product strategies and their performance in vertical integration. Oppositely, the link is strengthened if more favorable attitudes and weaker management controls are present in horizontal integrations.

1. Introduction

Today's keener competition has forced companies to consider the integration of their R&D activities with external service providers in networks to develop new strategies, capacities and capabilities (Nieves & Osorio, 2013; Thimm, Lee, & Ma, 2006). Focused (allying or incumbent) firms frequently form strategic alliances – collaborative agreements involving exchange, sharing, or co-development of products, technologies or services – with smaller firms and new entrants (Zhang, Baden-Fuller, & Mangematin, 2007). The companies can make use of the focused expertise and concentrated resources, and take advantages of the diversified cutting-edge technologies by sharing risks and benefits with participants inside the networks. In order to speed up strategic alliance in R&D activities, different forms of R&D organization structures such as ethnocentric centralized, geocentric centralized, decentralized and cooperative, and polycentric decentralized can be found (Ozman, 2006; West, 2000) and summarized into three different roles, including (i) the input-oriented organization structure, (ii) the output-oriented organization structure, and (iii) the matrix organization structure (Kuvaas, 2008; Lundvall, 2004). In addition, there are two most common alliance modes including related-vertical and related-horizontal collaboration networks (Hill & Jones, 2007). However, the study to examine the impacts of different R&D organization structures on performance of firms at different alliance modes has never been discussed.

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The absorptive capacity, firm's capabilities to learn and absorb new knowledge, is seen as central to the performance of technology-based alliances (Elmawazini, Attallah, nwankwo, & Dissou, 2013; Ritala & Hurmelinna-Laukkanen, 2013; Zhang et al., 2007). For the purpose of filling the aforementioned vacancy, the paper proposes that characteristics of different R&D organization structures will determine the firm's absorptive capacity, which in turn can impact on the performance of technology-based firms. Therefore, as shown in Fig. 1, the relationships between R&D organization structures and the performance of firms should be mediated by absorptive capacity. The absorptive capacity is considered from two complementary theoretical perspectives. The first one is the institutional perspective of the firm (Phillips & Tracey, 2007; Zahra & George, 2002). Normative contexts can be ranged from strong top-down policies to mutually evolving regulations. Many studies assert that the greater the normative embedded organization, the more likely that the organization will be revolutionary and convergent rather than evolutionary and radical (Cohen & Levinthal, 1990; Zahra & Hayton, 2008). The context of constitutions has important implications for access and transfer of knowledge. Therefore, the paper proposes that if a technology-based firm, adopting a portfolio of institutions, restricts both distribution and access to knowledge sources, then these institutions would worsen the performance in the long run. The second perspective is the working attitude of employees. When "the working attitude of the employee" is included as a main parameter, it should be a distinction between subjective job satisfaction and objective criteria of "good working conditions" (Gallie, 2007; Robbins & DeCenzo, 2007). Here, the context of working attitude should have important implications for the absorption, transfer, and creation of knowledge. Then, it should indicate subjective job satisfaction rather than good working conditions, implying high motivation rather than high degrees of loyalty. Therefore, the paper proposes that if a member of technology-based firms, possessing stronger working attitudes, portends both distribution and access to knowledge sources, then these attitudes would improve final performance.

In addition, the decision to use their skills internally, acquire capabilities, or engage in cooperative strategies to develop their technology base is often addressed by theory of transaction cost economics (TCE) (Williamson, 1994, 1999). However, the use of TCE is appropriate in assessing the relative costs and benefits of organizational choice, but once that decision is made, it is inadequate for addressing how well the technological knowledge develops in the organization (Watts & Hamilton, 2011). Then, in order to find the most suitable R&D organization structures and their corresponding operations management at different alliance modes, the paper also proposes a conceptual model shown in Figs. 1 and 2 to analyze the tension between product strategies and their strategy implementation instead of conventional TCE method. After practical investigation, it shows that a matrix R&D organizational structure mainly transfers knowledge to input-oriented R&D organizational structures in horizontal integration, and mainly integrates capabilities from output-oriented organizational structures in vertical integration. The result also shows that stronger institutional environments lead to a stronger link between product strategies and their performance in vertical integration. On the other hand, the link is strengthened if more favorable attitudes and weaker management controls are present in horizontal integrations.

The rest of the paper is organized as follows. Literature review is presented in Section 2. A theoretic assumption and a conceptual methodology are proposed in Section 3. Data collection and analysis for developing new products by vertical and horizontal integrations are presented in Section 4. Some discussions and conclusions are addressed in the last sections.

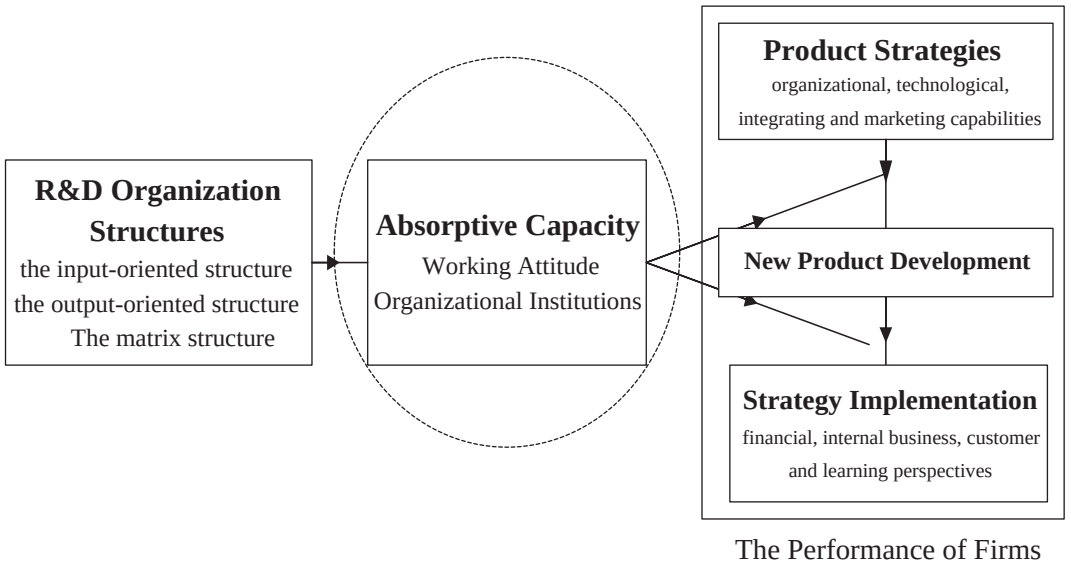

Fig. 1. The relationships between R&D organization structures and final performance.