



Knowledge absorptive capacity and innovation performance in high-tech companies: A multi-mediating analysis[☆]

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ARTICLE INFO

Keywords:

Knowledge acquisition
Knowledge assimilation
Knowledge transformation
Knowledge exploitation
Innovation performance

ABSTRACT

Building upon the knowledge-based view (KBV) and using data from 379 high-tech companies in China, we examine the underlying, mediating mechanisms in the relationship between knowledge absorptive capacity and firms' innovation performance. We find that there are positive relationships between four dimensions of knowledge absorptive capacity (i.e., knowledge acquisition, knowledge assimilation, knowledge transformation, and knowledge exploitation) and firms' innovation performance. Additionally, we discover that both firms' knowledge transformation capacity and knowledge exploitation capacity mediate the relationship between knowledge acquisition and firms' innovation performance, as well as between knowledge assimilation and firms' innovation performance. Our results shed light on knowledge absorptive capacity research and knowledge management theory by theoretically and empirically demonstrating how knowledge absorptive capacity affects firms' innovation outputs from a multi-mediating perspective.

1. Introduction

According to the knowledge-based view (KBV), the foundation of a firm's performance lies in its ability to generate, combine, recombine, and exploit knowledge (Grant, 1996). Thus, in the age of our knowledge economy, knowledge, understood as a strategic resource, is essential to a firm's ability to innovate and compete (Wang, 2013). A firm's knowledge is usually produced through either internal creation or external acquisition. Accordingly, a firm's knowledge absorptive capacity is important for value creation within the firm.

Absorptive capacity, defined as “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990, p.128), has become a well-known notion in the multiple disciplines of management research (Huang, Lin, Wu, & Yu, 2015). Here, the role of absorptive capacity has been recognized in knowledge management research (Chang, Gong, & Peng, 2012). Many previous studies have indicated that absorptive capacity contributes either directly or indirectly to a firm's innovation and financial performance (e.g., Chen, Lin, & Chang, 2009; Fosfuri & Tribó, 2008; Tseng, Chang Pai, & Hung, 2011).

Although there has been increasing growth in the literature focusing on absorptive capacity, significant gaps remain. First, although several

scholars have decomposed the process of knowledge absorptive capacity (e.g., Camisón & Forés, 2010; Flatten, Engelen, Zahra, & Brettel, 2011), the dimension division of the construct and the role of the individual dimension are ambiguous, both in theory and in practice; few studies have focused on the relationships between the multiple dimensions of knowledge absorptive capacity and firms' innovation performance. Second, although several scholars have indicated that each dimension of absorptive capacity performs separate but complementary roles (Zahra & George, 2002), little research has examined a systematic theory and completed an empirical verification of the potential internal mechanisms among the multiple dimensions of knowledge absorptive capacity. These gaps limit in-depth theory development and managerial practice regarding the concept of knowledge absorptive capacity.

Thus, based on the above research gaps, we examine the relationships between multiple dimensions of knowledge absorptive capacity and firms' innovation performance and explore the underlying, mediating mechanisms in these relationships. Our findings contribute to absorptive capacity research by decomposing the knowledge absorptive capacity into four dimensions, which allows us to distinguish the different sources of absorptive capacity. Additionally, our findings shed light on knowledge management theory by theoretically and empirically demonstrating how knowledge absorptive capacity affects firms'

[☆] The authors thank two anonymous referees for their helpful and valuable suggestions. The authors also thank Dr. Alicia Mas-Tur, Universitat de Valencia for her careful reading and suggestions. And the authors also gratefully acknowledge financial support from the National Natural Science Foundation of China (71472118, 71772118).

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innovation from a multi-mediating perspective.

The remainder of this paper is organized as follows. Section 2 discusses the development of our theoretical hypotheses. Section 3 describes the variable measurements and data source. Section 4 provides our empirical findings. Finally, in Section 5, we present our theoretical contributions, in addition to the managerial implications and limitations of this study.

2. Theory and hypotheses

Previous research has examined the concept of knowledge absorptive capacity in the context of different fields of study, including organization theory, strategic management, and economics (Lewin, Massini, & Peeters, 2011). Furthermore, several studies have focused on the impact of knowledge absorptive capacity on organizational learning, knowledge sharing, capability building, innovation, and firm performance (e.g., Bouncken, Pesch, & Reuschl, 2016; Flatten et al., 2011; Gutiérrez, Bustinza, & Molina, 2012; Tseng et al., 2011).

A firm's absorptive capacity is important to their innovation activities (Leal-Rodríguez, Ariza-Montes, Roldán, & Leal-Millán, 2014). Moreover, absorptive capacity plays a leading role in determining the magnitude and range of knowledge flows (Hurmelinna-Laukkanen, Olander, Blomqvist, & Panfili, 2012). Therefore, knowledge absorptive capacity, as a capability that continuously acquires, digests, and utilizes external knowledge, has become an important process necessary for a firm to identify market opportunities and use new knowledge to realize innovation.

Many scholars have explored the dimensions of knowledge absorptive capacity. For example, Cohen and Levinthal (1989) conceptualized absorptive capacity as a three-dimensional model composed of the ability to learn from external knowledge through the processes of knowledge identification, assimilation, and exploitation. This work has been widely cited in the knowledge management field. However, there have been conflicting views of how to best decompose the dimensions of absorptive capacity. Kim (1998) has extended Cohen and Levinthal's concept and has showed that knowledge absorptive capacity should include knowledge acquisition, assimilation, transformation, and development processes. In addition, Zahra and George (2002) have defined knowledge absorptive capacity as a set of knowledge-based capabilities embedded within a firm's routines and strategic processes, including the acquisition, assimilation, transformation, and exploitation of knowledge (i.e., four-dimensional model). The four-dimensional model uses the condition of complementarity to describe the relationships among the four dimensions (Zahra & George, 2002). Moreover, according to configuration theory, organizations that are multidimensional in nature represent complex, unified concepts of multiple, interdependent, and mutually reinforcing organizational components (Ozkan-Canbolat & Beraha, 2016). Given that the four-dimensional model of Zahra and George (2002) is more comprehensive and that it combines naturally and mutually (i.e., four dimensions perform complementary roles) to produce dynamic organizational capability, in the current study, we decompose knowledge absorptive capacity into four dimensions: knowledge acquisition, knowledge assimilation, knowledge transformation, and knowledge exploitation. The conceptual model of our work is shown in Fig. 1.

2.1. Knowledge acquisition

Knowledge acquisition capacity is related to a firm's ability to identify and acquire externally generated knowledge important to its operations (Zahra & George, 2002). The knowledge acquisition process can be summarized as the process whereby firms acquire relevant knowledge resources while in the process of interacting with their internal and external environments (Buckley, Glaister, Klijn, & Tan, 2009; Sherwood & Covin, 2008). Knowledge acquisition is the initial stage in the process of knowledge absorption.

In a dynamic environment, knowledge acquisition capacity enables firms to identify the external environment more quickly (Lei, Hitt, & Bettis, 1996) and helps them expand the breadth and depth of available knowledge, which can enhance their technical abilities (Yli-Renko, Autio, & Sapienza²⁰⁰¹). Furthermore, knowledge acquired from the outside can augment a firm's capacity for making novel links (Jansen, Van Den Bosch, & Volberda, 2005). Many previous studies have connected knowledge acquisition to firm innovation (e.g., Chen & Huang, 2009; Sullivan & Marvel, 2011; Zhou & Li, 2012). Overall, we understand that the external sourcing of knowledge is an essential method for firms to improve their innovation performance (Berchicci, 2013; Carayannopoulos & Auster, 2010). Therefore, we propose the following:

H1. Knowledge acquisition capacity is positively correlated with firms' innovation performance.

2.2. Knowledge assimilation

Knowledge assimilation capacity refers to a firm's routines and processes that allow the firm to analyze, interpret, and understand information obtained from external sources (Zahra & George, 2002). The ability to assimilate external knowledge can speed up the rate of solving problems and shorten the development cycle of new products. In addition, assimilating external knowledge can avoid repetitive work, update a firm's knowledge reserves (Atuahene-Gima, 2003), and enhance a firm's innovativeness and competitiveness (Hoarau, 2014). Thus, a firm with a stronger assimilation capacity is more powerful in terms of innovation performance (Inkpen, 2000). On the other hand, if a firm does not have a strong ability to assimilate new knowledge, it will waste intellectual resources (Huber, 2001). Therefore, we propose the following:

H2. Knowledge assimilation capacity is positively correlated with firms' innovation performance.

2.3. Knowledge transformation

Knowledge transformation, as a transformation process of both tacit and explicit knowledge, is an important component of knowledge absorption. Here, knowledge transformation denotes a firm's ability to develop and refine the routines that facilitate combining existing knowledge and newly acquired and assimilated knowledge (Zahra & George, 2002). The transfer of knowledge occurs in a social context, and the resources and opportunities for transferring that knowledge often reside in social relationships (Chang et al., 2012).

Effective knowledge transformation will accelerate the absorption of new knowledge and realize efficient integration and innovation, likely yielding better business performance (Yli-Renko et al., 2001). When there are differences between new knowledge and existing knowledge, a firm cannot simply copy or immediately understand the external knowledge; therefore, a firm's knowledge transformation capacity becomes even more necessary. Firms can reconstruct their cognitive structure from a new perspective through knowledge transformation (Todorova & Durisin, 2007), thus enhancing their innovation performance. Therefore, we propose the following:

H3. Knowledge transformation capacity is positively correlated with firms' innovation performance.

2.4. Knowledge exploitation

Knowledge exploitation capacity is related to the ability of firms to incorporate and utilize the acquired, assimilated, and transformed knowledge into their operations and routines to solve real-world problems, allowing them to create new operations, competencies, and routines, and ultimately, to translate that knowledge into profit

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