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The relationship between knowledge search strategies and absorptive capacity: A deeper look



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ABSTRACT

The present study analyzes how the breadth and depth of search strategies affect the dimensions of a firm's absorptive capacity: exploration, transformation and exploitation. Results of an analysis of a sample of 467 Spanish manufacturing firms reveal that openness of external knowledge search contributes to firms' exploratory, transformative and exploitative learning processes in different ways. In particular, a strong curvilinear effect of external knowledge search breadth on exploratory and exploitative learning was found. It is also important to establish deep relationships with external agents to achieve transformative and exploitative learning up to a certain point after which relationships become negative. Interestingly, for a firm to develop explorative learning, it is not important to establish deep relationships. And for a firm to develop transformative learning it is not important to establish broad relationships. Some suggestions for managers and future lines of research are provided.

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1. Introduction

The reason why some companies are able to take advantage of knowledge from external sources and others are not has captured the attention of both academics and practitioners. Cohen and Levinthal (1989) used the term absorptive capacity (AC) to describe a firm's ability to recognize the value of new external information, assimilate it and apply it to commercial ends. Since then many researchers from different fields have identified various elements as antecedents of this concept, amongst which inter-organizational antecedents have received the most academic attention (Lane et al., 2006; Volberda et al., 2010; Enkel and Heil, 2014; Ferreras-Méndez et al., 2015; Roberts, 2015).

Some researchers have argued that different ways of acquiring new knowledge may lead to different modes of organizational learning (Chiang and Hung, 2010) that can be split into different processes, namely, explorative, transformative and exploitative learning processes (Lane et al., 2006). Exploratory learning is the acquisition of external knowledge, and it refers to the notion of potential absorptive capacity (Zahra and George, 2002; Enkel and Heil, 2014). Transformative learning corresponds to the maintenance of knowledge over time (Garud and Nayyar, 1994) and links exploratory learning with exploitative learning. And finally, exploitative learning refers to the application of acquired

knowledge, and corresponds to the concept of realized absorptive capacity (Zahra and George, 2002; Patel et al., 2015). These learning processes are the mechanisms that originate and make possible the development of a dynamic capability inside the firm (Eisenhardt and Martin, 2000; Helfat et al., 2007).

Studies assessing the link between inter-organizational antecedents and AC dynamic capability have focused primarily on the characteristics of previous or related knowledge (Lane and Lubatkin, 1998; Lane et al., 2006; Wales et al., 2013). It has been highlighted that the nature and the kind of knowledge required by one of the collaborating firms may also affect knowledge transfer, particularly through the type of mechanism required for its transfer (Khamseh and Jolly, 2008). Therefore, other aspects such as the nature of the relationship, the search mechanisms, and the level of trust could influence the knowledge transfer and the development of AC (Khamseh and Jolly, 2008; Murovec and Prodan, 2009). How these relationships take place and how these strategies can affect the different stages of external knowledge absorption (Volberda et al., 2010) is a very interesting area of research. For instance, developing deep and broad relationships with external agents may generate noteworthy benefits for firms (Laursen and Salter, 2006; Chen et al., 2011; Cruz-González et al., 2015). The multidimensional approach of AC examines the effect that different external knowledge search strategies have on its dimensions (exploration, transformation and exploitation) and helps us to understand why some firms and not others are able to take advantage of knowledge from external sources. It may be the case that these relationships between external knowledge search

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strategies and the dimensions of AC do not always result in positive effects. One explanation for this phenomenon might be that collaborating with other organizations can lead to a leakage of key technologies and high costs for information search and knowledge integration (Chen et al., 2011). Another plausible explanation is that the managerial challenges posed by the three learning processes differ, so distinct components of prior knowledge may be critical in the three learning processes of absorptive capacity (Garud and Nayyar, 1994; Lane et al., 2006; March, 1991). Therefore, organizations may develop different strategies to facilitate the acquisition of the external knowledge necessary for their learning processes.

Following this logic this study contributes to extending the analysis of external knowledge search strategies. This research addresses, theoretically and empirically, how intensively accessing knowledge from a limited number of external channels (open search depth) and from a broad range of external sources (open search breadth) may be related to firms' exploratory, transformative and exploitative learning processes.

Previous studies suggest that searching widely and deeply has a curvilinear (inverted U-shape) relationship with performance (Laursen and Salter, 2006, 2014); however these studies did not consider what internal mechanisms might be involved in this relationship and may originate this type of effect. Because a firm's ability to apply the new external knowledge to its products and services depends on its level of absorptive capacity (Lane et al., 2006; Reza Saeedi et al., 2014), analyzing the effect of search strategies for this type of knowledge on the learning processes of absorptive capacity (exploration, transformation and exploitation) may provide further understanding of why some firms are able to take advantage of knowledge from external sources and others are not. To analyze this effect, the study draws on results from a survey completed in personal interviews with two different managers in 467 companies.

The structure of this paper is as follows. In Section 2, the literature is reviewed and three research hypotheses are proposed. Section 3 describes the methodology used in the empirical study and the characteristics of the sample data. Section 4 reports the results, and finally the conclusions and implications are discussed in Section 5.

2. Literature review and hypotheses development

2.1. The concept of absorptive capacity

Although Kedia and Bhagat (1988) first coined the term 'absorptive capacity', Cohen and Levinthal's (1989) contribution is generally regarded as the founding paper on the subject. This term has been analyzed at different levels: individual (Cohen and Levinthal, 1990; Minbaeva et al., 2003), business unit (Jansen et al., 2005; Szulanski, 1996), and organizational (Cohen and Levinthal, 1990). However, very few empirical studies have captured the rich theoretical arguments and the multidimensionality of the absorptive capacity construct (Murovec and Prodan, 2009). Some of the studies that modify Cohen and Levinthal's original definition alter the dimensionalization only slightly by limiting the construct to two dimensions: the first associated with the recognition, acquisition and assimilation of external knowledge, and the second, with its internal dissemination, reactivation and application.

One of the most important conceptualizations of AC since Cohen and Levinthal is that of Zahra and George (2002). This new conceptualization emphasizes the systems, processes, routines and structure of the organization that allow firms to identify, assimilate, transform and exploit external knowledge. These authors argue that absorptive capacity is a dynamic capability that has two

general states: potential AC, which refers to the ability to value and acquire external knowledge; and realized AC, which reflects the capacity to leverage the knowledge that has been absorbed. Both subsets of AC have separate but complementary roles and fulfill a necessary but insufficient condition to improve firm performance. By defining absorptive capacity as a dynamic capability, Zahra and George emphasized the strategic nature of absorptive capacity.

Although Zahra and George's (2002) reconceptualization raises important issues about the components, antecedents, contingencies and outcomes of the construct, these authors do not sufficiently build on key insights from Cohen and Levinthal's (1989) original conceptualization. Furthermore, they only partly integrate into their model the substantial body of research on learning and innovation accumulated since the early seminal papers (Sun and Anderson, 2010).

Lane et al. (2006) reconceptualization is one of the first works to attempt to integrate the insights generated in previous studies into Cohen and Levinthal's (1989) original definition, and to link AC and organizational learning theoretically. These authors argue that AC represents a dynamic capability and the benefits of this capability depend on the underlying learning processes representing the mechanisms that allow an organization to purposefully create, extend or modify its resource base (Eisenhardt and Martin, 2000; Helfat et al., 2007). Therefore, following this process-based view Lane et al. defined AC as a firm's ability to utilize externally held knowledge through three sequential processes: (1) recognizing and understanding potentially valuable new knowledge outside the firm through exploratory learning, (2) combining existing knowledge with externally-acquired knowledge through transformative learning, and (3) using the assimilated knowledge to create new knowledge and commercial outputs through exploitative learning (Lane et al., 2006; 856).

Following Lane et al. (2006) definition, the precursors of the three learning processes differ. Exploration is stimulated by the desire to discover something new (Rotharmel and Deeds, 2004; 203) whereas transformation is prompted by the existence of exploratory learning that can usefully be transformed for an exploitative purpose. Finally, the precursor of exploitation is the existence of an exploitable set of resources, assets, or capabilities under the firm's control (Rotharmel and Deeds, 2004; 203). Following this argument, transformation and exploitation depend upon prior exploration. Throughout the early stages of the new product development process a firm is prospecting for new wealth-creating opportunities (Rotharmel and Deeds, 2004; 203). During this creative stage, the company undertakes an exploratory search involving invention, basic research, risk taking, and building new capabilities with the aim of developing capabilities or new knowledge which it can subsequently exploit to create value (Cohen and Levinthal, 1989). Then, when the potentially valuable knowledge has been acquired through exploration, the firm transforms it into new skills and valuable knowledge, and finally it can be exploited. Thus, Lane et al. (2006) exploration–transformation–exploitation model implies a sequence for organizations to use these processes.

Later, Todorova and Durisin (2007) suggested that assimilation and transformation are parallel rather than sequential capabilities. They added feedback loop to the model and suggested that an identification capability comes before acquisition capability.

Volberda et al. (2010) study not only the process but also the antecedents, outcomes, moderators, and mediators of AC. Using bibliometric cartography they show that most attention has focused on the tangible outcomes of AC, but researchers have neglected the study of antecedents of AC such as the individual level and organizational design, and the interactions of individuals and organizations. These authors call for more research into the concept to show the micro and macro antecedents, and including

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