



The emergence of absorptive capacity through micro–macro level interactions



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ABSTRACT

A firm's absorptive capacity involves two dimensions: horizontal and vertical. The horizontal dimension refers to a dynamic interplay between internal and external environments of the firm, which is extensively covered in the absorptive capacity research. However, the literature ignores vertical dimension involving individual-organization interactions. Scant knowledge is available about the mechanisms through which absorptive capacity emerges as an organizational learning capability. This study reviews the seminal works of Cohen and Levinthal and finds that the stickiness of knowledge, the multiple antecedents of absorptive capacity and their interactions are explicitly addressed therein, but are insufficiently problematized in subsequent research. Drawing on the knowledge-based view of the firm and the micro-foundations lens of organizational capabilities, the present study re-conceptualizes absorptive capacity as a set of three sequentially linked learning processes where individual and organizational antecedents interact, and explains how value recognition, assimilation and application capabilities emerge as organizational (macro) level phenomena.

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1. Introduction

More than 25 years have passed since Cohen and Levinthal (1989, 1990, 1994) coined the term “absorptive capacity” and defined it as the “ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (1990, p. 128). Since then, a substantial number of conceptual and empirical studies have contributed to the understanding of how firms acquire and use new external knowledge for gaining and sustaining a competitive advantage (e.g. Lane, Koka, & Pathak, 2006; Lane & Lubatkin, 1998; Szulanski, 1996; Van Den Bosch, Volberda, & De Boer, 1999; Zahra & George, 2002). The rationale behind such high scholarly interest in absorptive capacity lies in high potential of this construct to link organizational knowledge, learning and performance (Ahuja & Katila, 2001; Cockburn & Henderson, 1998; Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011; Lane & Lubatkin, 1998; Lane, Salk, & Lyles, 2001; Tsai, 2001). Despite this, research on absorptive capacity has been conceptually and methodologically underdeveloped, with the core construct suffering from reification (Easterby-Smith, Graça, Antonacopoulou, & Ferdinand, 2008; Lane et al., 2006; Volberda, Foss, & Lyles, 2010). This reification has resulted in limited explanations of the actual mechanisms through which absorptive capacity emerges as an organizational learning capability (Tortoriello,

2015; Volberda et al., 2010). In particular, although Cohen and Levinthal (1990, p. 131–135) explicitly argued that an organization's absorptive capacity has both individual and organizational antecedents, only limited attention has been given to their dynamic interplay in knowledge identification, assimilation and commercial application processes. Current absorptive capacity frameworks tend to be based on either “macro” (top-down) or “micro” (bottom-up) level theorizing, and only few models combine multiple levels (e.g., Lane et al., 2006).

Omitting the multi-level antecedents and their interactions in the absorptive capacity research is problematic for at least three reasons. First, from a practical point of view, it is firm employees, who search, identify and select valuable knowledge, assimilate and exploit the new knowledge in products and services. However, they do so by playing specific organizational roles, in a particular strategic and organizational context. Firm managers are routinely concerned about how to achieve the best “fit” between individual absorptive capacities and the firm's external environment for new knowledge (Lewin, Massini, & Peeters, 2011; Van Den Bosch et al., 1999). Organizational form and governance mechanisms influence how employees interact with the external environment, how they communicate and integrate new knowledge within and across subunits, and what types of innovations they bring onto the market (Lane et al., 2001; Roberts, 2015; Van Den Bosch et al., 1999).

Second, from a theoretical perspective, overlooking the actions and interactions of multi-level antecedents does not only overlook the underlying logics of Cohen and Levinthal's (1990) theorizing, but also suggests that organizations follow a certain “algorithmic matching process” (Lane et al., 2006, p. 854) where investments of an amount X

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into absorptive capacity Y enable a firm to learn Z . However, what creates a firm's competitive advantage out of knowledge is the unique and valuable ways of combining and applying it (Grant, 1996). That uniqueness arises from diverse experiences and mental models of individuals and combinative capabilities of the firm (Kogut & Zander, 1992) that jointly determine the scanning of external environment, the integration and exploitation of new external knowledge in products, services and organizational processes (Gooderham, Minbaeva, & Pedersen, 2011; Jones, 2006). Third, neglecting a multi-level construct of absorptive capacity limits the understanding of how learning and innovation processes emerge and evolve over time in organizations. Even if absorptive capacity starts with an individual, some of its aspects are “distinctly organizational” (Cohen & Levinthal, 1990, p. 131), and tensions in individual-organization interaction may vary at different stages of the knowledge absorption process (Lane et al., 2006). A better understanding of these complex interactions may shed new light on how firms develop and use their absorptive capacities to generate innovations.

The goal of this study is to explain the emergence of a firm-level absorptive capacity from the actions and interactions of individual and organizational antecedents. Implied in this study is an assumption that individual and organizational processes of learning are fundamentally different and involve tension in interaction (Crossan, Lane, & White, 1999; Spender, 1996; Weick & Westley, 1996), and that a better understanding of absorptive capacity is obtainable by conceptualizing it as a multi-level phenomenon (Kozlowski & Klein, 2000). Through the adoption of micro-foundations lens on organizational capabilities (Abell, Felin, & Foss, 2008) and Coleman's (1990) “bathtub” model, the paper explicates linkages between individual and organizational (or group level) attributes at each stage of the absorptive capacity process. This study contributes to organizational learning and innovation research by explaining how a firm strategy, structure and processes, and individual absorptive capacities of its members shape the development of knowledge identification, assimilation and application capabilities.

The structure of this paper is as follows. First, the study reviews seminal works of Cohen and Levinthal (1989, 1990, 1994) and places particular emphasis on conceptualizations of knowledge, the role of individuals and their interactions in the creation of firm's absorptive capacity. Second, a critical review of the subsequent absorptive capacity research is provided, where micro-level issues are addressed. Third, drawing on a multi-level paradigm in organizational research and the micro-foundations view of organizational capabilities, this paper provides a new conceptualization of absorptive capacity and offers seven propositions for empirical examination.

2. A Critical Review Of Absorptive Capacity Literature

2.1. Micro-Foundations of Absorptive Capacity in Cohen and Levinthal's Research

A review of the foundational articles by Cohen and Levinthal (1989, 1990, 1994) shows that the authors problematize the nature of organizational knowledge, address the multi-levelness of absorptive capacity construct and present it explicitly as a learning process. Although the micro-foundations view of absorptive capacity does not constitute the core of Cohen and Levinthal's work, their underlying assumptions about knowledge and learning in organizations confirm its high research potential.

First, Cohen and Levinthal (1989, 1990) explicitly argue that firm's absorptive capacity is a function of cognitive abilities and the intensity of effort of its individual members. Learning is cumulative, and the ability to recognize value, assimilate and exploit new external knowledge depends on individuals' prior related knowledge and the diversity of experience. Researchers maintain that firm employees do not equally experience or interpret new external knowledge. Quite the contrary, individuals possess diverse cognitive structures, and their absorptive capacities also depend on the degree to which they can process

knowledge throughout the firm. More specifically, individuals need to build awareness about “who knows what, who can help with what problem, and who can exploit it” (Cohen & Levinthal, 1990, 133), which implies that organizational knowledge is distributed in nature (Tsoukas, 1996). The role of an organization is to develop decision-making structures and networks of intra-firm relationships through which individual absorptive capacities can be leveraged and deployed (Tortoriello, 2015). Cohen and Levinthal (1990) also emphasize that individuals' prior related knowledge encompasses various domains that complement each other (such as research and development (R&D), product design, manufacturing and marketing knowledge). Complementary knowledge enables individuals to make new associations and linkages, and they make those linkages within a particular strategic context and through interactions with organizational structure, culture and knowledge management routines. Furthermore, Cohen and Levinthal (1989, 1990, 1994) address problems associated with the tacit nature of knowledge (Grant, 1996; Kogut & Zander, 1992). The authors maintain that knowledge about how innovation processes take place are firm specific and, therefore, cannot be bought and quickly integrated into another firm (Cohen & Levinthal, 1990).

Second, Cohen and Levinthal (1990, p. 131) consider firm's absorptive capacity as a multi-level construct – as a function of mental models and learning behaviors of its individual members and involving “distinctly organizational” aspects. In their view, individuals assess the value of new external knowledge, relate new knowledge to what they already know and creatively use it in new products, services and organizational processes. However, a firm's absorptive capacity is not resident in any single individual, nor is it an aggregate of individual absorptive capacities. Rather, it depends on the “links across a mosaic of individual capabilities” (Cohen & Levinthal, 1990, p. 133). The “linking” processes are embedded in combinative capabilities of the firm (Kogut & Zander, 1992). Coordination, systems and socialization capabilities enable firms and their business units to synthesize and apply the newly acquired knowledge (Jansen, Van Den Bosch, & Volberda, 2005; Roberts, 2015). As Lane et al. (2006) observed later, these organizational antecedents determine how efficiently and effectively individuals acquire and use new external knowledge to commercial ends.

Third, although Cohen and Levinthal (1989, 1990, 1994) use R&D spending as a proxy for absorptive capacity, they explicitly define it as a set of sequentially linked, complementary learning processes. The authors maintain that through R&D activities a firm develops a particular breadth and depth of its knowledge base and the speed of learning (Cohen & Levinthal, 1989). Over time, the firm develops communication structures and decision-making processes that facilitate (or inhibit) the knowledge sharing among firm employees (Cohen & Levinthal, 1990). The outcome of knowledge sharing and assimilation processes is a renewed “collective scheme” across organizational units (Lane et al., 2006), which leads to combinations of newly acquired technological and market knowledge (Lenox & King, 2004). Through these knowledge linkages, a firm becomes adept at forecasting new market trends, identifying new applications and incorporating newly acquired knowledge into its operations (Cohen & Levinthal, 1990, 1994).

2.2. Micro-Foundations of Absorptive Capacity in Subsequent Research

In contrast to the foundational works by Cohen and Levinthal (1989, 1990, 1994), in subsequent research absorptive capacity is typically viewed as a firm—or a business unit-level construct (with several notable exceptions, e.g. Chang, Gong, & Peng, 2012; Easterby-Smith et al., 2008; Jones, 2006; Matusik & Healey, 2005; Reinholt, Pedersen, & Foss, 2011). A lack of attention to the role of individuals has led to the perceptions of absorptive capacity as a certain “algorithmic matching process” (Lane et al., 2006, p. 854): developments of X amount of absorptive capacity in Y enable a firm to learn Z (Ahuja & Katila, 2001; Mowery, Oxley, & Silverman, 1996; Stock, Greis, & Fischer, 2001; Tsai, 2001). Several recent studies have witnessed that organizational

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