

A Review of Absorptive Capacity

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INTRODUCTION

The globalization of markets, rapid technological change, shortening of product life cycles and the increasing aggressiveness of competitors have changed the competitive arena in business environments in many ways. These changes have prompted not only fast-moving, high-tech industries to react, but even industries that were assumed to be stable are now heating up.

In this context, the firm's capacity to acquire and absorb external knowledge represents a critical capacity to innovate (Cohen & Levinthal, 1990), and to develop and sustain competitive advantages (Camisón & Forés, 2010; Zahra & George, 2002). The problems that organizations face in attaining self-sufficiency in knowledge creation and the path-dependence nature of external knowledge absorption (Cohen & Levinthal, 1990) contradict research that posits high levels of one learning process (e.g. internal) would imply low levels of the other process (e.g., external) as firms compete for scarce resources (Gupta et al., 2006). In contrast, they support the perspective that organizational learning processes are not mutually exclusive, high levels of internal and external learning may coexist, and their conjoint development will enhance organizational success and innovation (Cassiman & Veugelers, 2006).

Absorptive capacity has become one of the most significant constructs in the last twenty years precisely because external knowledge resources are so important. Since the publication of Cohen and Levinthal's (1989) work on absorptive capacity, numerous theoretical and empirical studies have analysed firms' capacity to absorb knowledge.¹

Nonetheless, despite the huge growth in the absorptive capacity literature, certain important gaps still remain. Specifically, there is a certain ambiguity in the definition of the construct, its measurement and its antecedents (Lane, Koka, & Pathak, 2006). This controversy lies behind our objective to compile a "state of the art" of the absorptive capacity construct.

The article is structured in four parts. First we present a review of the literature on the construct and the definitions it offers in order to provide the foundations on which to construct and measure an integrating, multi-dimensional and theoretically grounded concept. Second, we examine the major external and internal antecedents of firm's absorptive capacity. Finally, we report the study conclusions and implications.

BACKGROUND

Definition of Absorptive Capacity

Cohen and Levinthal (1989) define absorptive capacity as the ability to learn from external knowledge through processes of knowledge identification, assimilation and exploitation. These authors state that absorptive capacity represents a major part of a firm's ability to create knowledge that is either new or different from previously existing knowledge. Based on previous studies such as Allen (1984), they hold that absorptive capacity is a by-product of an organization's R&D efforts. Since the publication of this study, R&D has been considered as a key factor in organizational learning.

In a later paper Cohen and Levinthal (1990) redefine the absorptive capacity construct as the

capacity of a firm to value, assimilate and apply, for commercial ends, knowledge from external sources. This new approach considers absorptive capacity as a by-product not only of R&D activities, but also of the diversity or breadth of the organization's knowledge base, its prior learning experience, a shared language, the existence of cross-functional interfaces, and the mental models and problem solving capacity of the organization's members. In a further paper in 1994, Cohen and Levinthal again modify their definition of the absorptive capacity construct, by stating that it not only enables new external knowledge to be acquired and exploited, but also helps to more accurately predict the nature and importance of future technological changes and hence, to exploit emerging opportunities and in this way obtain advantages by anticipating the market before industry competitors.

These three definitions of absorptive capacity, framed within the context of technological knowledge, have proved cardinal to the conceptualization of the construct, to such an extent that very few subsequent studies have revised or expanded Cohen and Levinthal's definition. The studies (e.g., Arbussa & Coenders, 2007; George, Zahra, Wheatley, & Khan, 2001; Liao, Welsch, & Stoica, 2003) that modify Cohen and Levinthal's definition alter its dimensionalization only slightly, by limiting the construct to two dimensions: the first, related to the evaluation, acquisition and assimilation of external knowledge, and the second related to its internal dissemination and application. The only critical contributions with a certain level of originality are those of Mowery and Oxley (1995), Kim (1998), Lane and Lubatkin (1998), Dyer and Singh (1998), Van den Bosch, Volberda, and De Boer (1999), Zahra and George (2002) and Lane, Koka, and Pathak (2006).

Lane and Lubatkin (1998) are the first scholars to reinterpret the construct introduced by Cohen and Levinthal (1989). These authors define a new construct that they termed relative absorptive capacity, in which the main difference from the construct used by Cohen and Levinthal lies in its context of analysis. Hence, while Cohen and Levinthal (1989, 1990) analyze firms' capacity to absorb knowledge from a sector, Lane and Lubatkin (1998) analyze the capacity of organizations to absorb from other organizations. These authors define relative absorptive capacity as the ability of a (student or receiver) firm to value, assimilate and apply knowledge derived from another (teacher or sender) firm. After demonstrating that R&D expenditure explains only

4% of variance in inter-organizational learning, Lane and Lubatkin conclude that an organization's ability to absorb knowledge from another organization is to a large extent determined by the relative characteristics of the two organizations, and in particular by the relation between their knowledge processing and application systems. In this way, these authors establish that the main antecedents of absorptive capacity are the similarity of the two firms' knowledge bases (but different specialized knowledge), organizational structures and compensation policies, dominant logics and familiarity with organizational problems.

The most far-reaching reconceptualization of the absorptive capacity construct since Cohen and Levinthal is that proposed by Zahra and George (2002). Zahra and George (2002) link the construct to a set of organizational routines and strategic processes through which firms acquire, assimilate, transform and apply knowledge with the aim of creating a dynamic organizational capacity. Zahra and George therefore start off from the idea that absorptive capacity is developed through systematic and persistent routinized efforts. This new perspective lends added importance to dynamic capabilities (Teece, Pisano, & Shuen, 1997).

According to Zahra and George (2002), the four capacities or processes their definition introduces represent the four dimensions of absorptive capacity which combine naturally and build upon one other to produce a dynamic organizational capability. Hence, Cohen and Levinthal's (1989) original three-dimensional model is now reformulated with four dimensions that, at the same time, are grouped into two components: potential absorptive capacity (PACAP) and realized absorptive capacity (RACAP). PACAP comprises the dimensions of knowledge acquisition –both the capacity to value knowledge as Cohen and Levinthal (1990) introduce and the capacity to acquire knowledge– and of assimilation. In turn, realized absorptive capacity consists of knowledge transformation and application. According to Zahra and George (2002) these two components perform separate but complementary roles. Firms cannot apply external knowledge without acquiring it. Similarly, certain organizations may develop abilities to acquire and assimilate external knowledge, but are not able to transform and apply it, in other words, to turn it into competitive advantage. Hence, both subsets of ACAP meet a necessary but insufficient condition to generate value for the firm. Zahra and George (2002) highlight the following as the main antecedents of

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