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Building dynamic capabilities in product development: How do contextual antecedents matter?

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Summary This paper contributes to elucidate the nature, antecedents and outcomes of dynamic capabilities in product development. Building on the organizational context literature, the paper uses an input–process–output framework to argue that a context characterized by a combination of autonomy, performance management, support and trust facilitates dynamic capabilities for continuous product development. Further, dynamic capabilities shape product development competences. Empirical evidence is provided by performing survey research with data collected from 80 product development efforts developed in Spain. The paper includes conclusions, limitations and future research potentials for those with an interest in supporting dynamic capabilities.

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Introduction

In recent years, management scholars have emphasized the virtues of product development in driving organizational change and renewal (Verona & Ravasi, 2003). Introducing new products in the market has been indicated as one of the driving forces of innovation capabilities. It has also been maintained that the product development process allows organizations to perform the critical tasks of integrating dispersed knowledge of different nature, reconfiguring it in an innovative way, and thus generating effective new

knowledge (Henderson & Cockburn, 1994; Iansiti & Clark, 1994; Verona & Ravasi, 2003). For this reason, several studies have begun to investigate product development as an ideal frame for dynamic capabilities to emerge from (Danneels, 2002; Marsh & Stock, 2003, 2006).

Over the last few decades, literature suggests that dynamic capabilities are the ultimate source of competitive advantage (Teece, Pisano, & Shuen, 1997) and a necessary element for firms to survive in an environment with increased global competitiveness and highly dynamic markets (Eisenhardt & Martin, 2000). Dynamic capabilities provide effective perspective of the dynamic nature of capabilities, explaining how a firm's resources, capabilities and competences evolve over time in changing competitive landscapes (Eisenhardt & Martin, 2000; Teece et al., 1997; Wernerfelt, 1984). The focus of interest on dynamic capabilities has been diverse with different authors looking at the nature of dynamic capabilities, their antecedents, their outcomes and their

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associated processes. Although this increasing relevance, dynamic capabilities have been predominantly the subject of several theoretical debates (Teece et al., 1997; Zollo & Winter, 2002). Perhaps the largest source of discussion is the lack of agreement on a definition of dynamic capabilities. One of the most recent definitions describes dynamic capabilities as the processes to reconfigure a firm's resources and operational capabilities in the manner envisioned and deemed appropriate by its principal decision makers (Zahra, Sapienza, & Davidsson, 2006, p. 924). Examples of dynamic capabilities are strategic decision making and product development processes (Eisenhardt & Martin, 2000).

Recently research has begun to explore the development of dynamic capabilities in product development (Danneels, 2002; Marsh & Stock, 2003, 2006; Verona & Ravasi, 2003). Product development is one of the mechanisms by which firms create, integrate, recombine and shed resources and capabilities. It is inherently a knowledge-based activity that highlights learning and knowledge processes to the development, production and delivery of new products. Dynamic capabilities involve a transformation process and, consequently, product development can be adequately compared to a dynamic capability (Danneels, 2002; Iansiti & Clark, 1994; Leonard Barton, 1992). For example, as explained by Verona and Ravasi (2003), dynamic capabilities in Oticon A/S, a leading company in the hearing-aid industry, enabled the capacity to develop and launch a considerable number of high-quality products during the nineties. Additionally, the notion of dynamic capabilities has been applied in settings such as innovation (Danneels, 2002) and product and process development (Benner & Tushman, 2003). This is the reason why this article includes product development to provide a conceptual framework for investigating dynamic capabilities.

Literature on dynamic capabilities is still in progress (Eisenhardt & Martin, 2000; Teece et al., 1997; Zollo & Winter, 2002) and, specifically, there has been little effort to consolidate findings in a unifying picture (Easterby-Smith & Prieto, 2008; Sher & Lee, 2004; Verona & Ravasi, 2003). It is worth noting that empirical work is quite scarce and most of the studies are longitudinal and qualitative, based on single or multiple case studies. These studies have discovered a wide range of firm- or industry-specific processes pertinent to dynamic capabilities (Wang & Ahmed, 2007), but findings remain disconnected, so there is no clear understanding of what dynamic capabilities imply and how to develop them. Also, since quantitative studies are underdeveloped, it is still necessary to create and validate a multi-dimensional construct of dynamic capabilities. In addition to this, while most literature has focused on the competitive consequences of dynamic capabilities, some recent theoretical studies (Mulder & Romme, 2007; Wang & Ahmed, 2007; Zahra et al., 2006) have explained the importance of distinguishing between dynamic capabilities and their possible antec-

edents. These studies show the concern to be complex. However, the lack of empirical testing of these relations has not generated any unifying framework nor, again, a consensus in the "operationalisation" of dynamic capabilities. This then suggests the need to clarify the antecedents, the nature, and the outcomes of dynamic capabilities and, thus, the processes that foster continuous innovation.

Accordingly, the aim of this paper is to empirically investigate an input–process–outcome model framed to examine the antecedents (inputs) of dynamic capabilities, their nature (processes) and the resulting operational competences (output). The model describes dynamic capabilities for continuous product development as a set of knowledge processes (generation, integration and reconfiguration) and, adopting a context perspective, emphasizes the importance of a range of contextual antecedents as drivers of dynamic capabilities in product development. According to this, dynamic capabilities are achieved by building a carefully selected set of systems, processes and norms, including autonomy, performance management, support and trust, which arises from features of the organizational context, and allow the knowledge processes underlying dynamic capabilities to flourish. The model also suggests that dynamic capabilities affect product development competences, which occur by concurrently achieving process competence (e.g., efficient teamwork, fast time to market and low costs) (Kusunoki, Nonaka, & Nagata, 1998) and product competence (e.g., value to customers, product quality and innovativeness). Both competences have been linked to market success and profitability (Pavlou & El Sawy, 2004). These predicted relationships are depicted in Fig. 1.

The article makes three essential contributions to the literature. First, while dynamic capabilities are usually described as an abstract concept using qualitative case studies, the lack of measurement makes difficult to study how dynamic capabilities are amenable to managerial action. Therefore this research measures dynamic capabilities as a multi-dimensional construct that is built on knowledge processes associated with product development. Second, the study proposes a model of dynamic capabilities that incorporates their contextual antecedents and their consequences and, though it is studied in the frame of product development, it may be comprehensive for other units of analysis. Third, this article contributes to product development literature by examining specific influential contextual enablers that may help to develop competitive new products beyond existing success factors.

In the body of the paper, we develop these arguments in more detail. The next section presents a research background on dynamic capabilities in product development, and then addresses their antecedents and consequences. The third and fourth sections respectively describe the research methodology used to test the model, the analysis

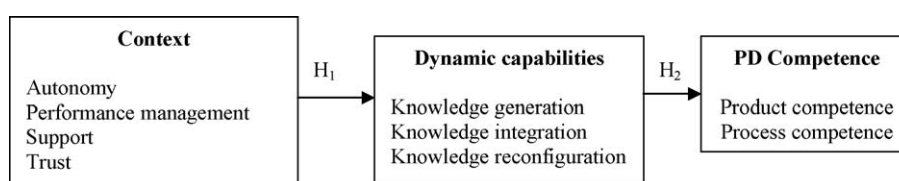


Figure 1 Predicted relations.

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