



# The effect of supply chain integration, modular production, and cultural distance on new product development: A dynamic capabilities approach <sup>☆</sup>

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## ABSTRACT

Little research has examined how international firms' operations strategies affect dynamic capability creation or how cultural distance affects operations management. This study addresses these gaps by bridging the work on dynamic capabilities, two operations management techniques (product modularization and supplier integration) and cultural distance. Using a sample of 111 Brazilian automobile suppliers, the study finds that new product development is marginally increased by product modularization but decreased by supplier integration. Cultural distance negatively moderated these relationships. This research extends the dynamic capabilities literature and indicates that operations management strategy is an important part of the dynamic capability formation process.

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## 1. Introduction

The last 20 years has seen the growth of dynamic capabilities theory as increasingly important in the management literature. This theoretical perspective focuses on a firm's ability to respond to internal and external dynamism and Schumpeterian "creative destruction" through the creation of new sources of competitive advantage (Augier and Teece, 2007; Eisenhardt and Martin, 2000). Rooted in the resource-based view of the firm, this strategic perspective posits that long-term, sustainable competitive advantage comes from the successful creation, extension, and/or protection of valuable, rare, inimitable, and non-substitutable resources (Teece, 2007). This ability to successfully navigate change is called a dynamic capability. Dynamic capabilities are posited to be particularly important for global firms that operate in the more volatile and dynamic international business environment (Griffith and Harvey, 2001; Luo, 2003; Teece, 2007).

Firms can possess many different kinds of dynamic capabilities. These include the ability to successfully complete mergers and acquisitions, the ability to manage knowledge, the creation of alliances, and the ability to develop new products (Eisenhardt and Martin, 2000). In the current work, we focus on the latter of these: new product development. New product development has been referred to in the literature as a prototypical dynamic capability (Winter, 2003) and is generally agreed upon as one of the essential dynamic capabilities a firm can possess (e.g., Eisenhardt and Martin, 2000; King and Tucci, 2002; Verona and Ravasi, 2003). Past research from the dynamic capabilities perspective has investigated new product development (e.g., Verona and Ravasi, 2003).

While many firms have a stated focus on new product development, this focus alone may not be sufficient for the generation of dynamic capabilities. As noted in Dosi et al. (2000), "dynamic capabilities cannot be built simply by spending on R & D or making

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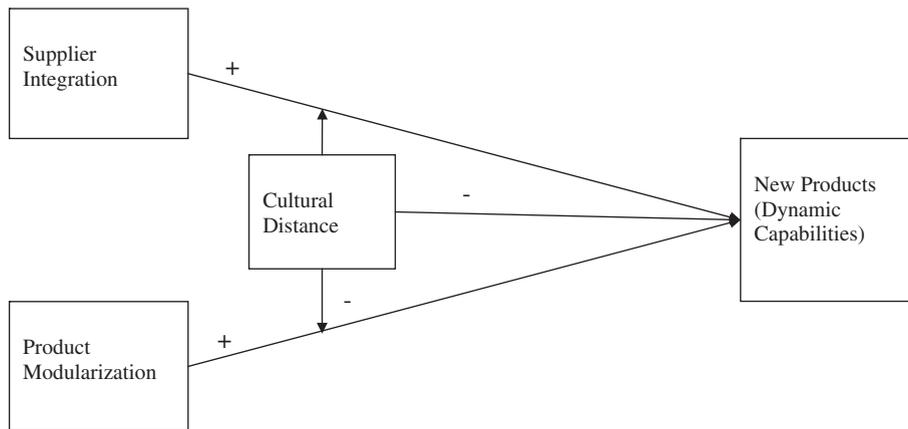


Fig. 1. The effect of supplier integration, modular production, and cultural distance on dynamic capability creation.

analogous investments. On the contrary – and to an increasing extent as the competitive pace quickens – coordination between R & D and other functions, and often with suppliers or alliance partners, is of the essence” (p. 6). This study focuses on the effect of the coordination of firm functions, namely upstream and downstream supply chain links, on new product development. Global firms are part of a complex supply chain that requires coordinating the flow of goods, services and information efficiently (Mentzer, 2001). In addition, “due to demanding customers and competitive pressures, businesses today are restructuring themselves to operate on a global basis to take advantage of the international product, factor, and capital markets” (Manuj and Mentzer, 2008, pp. 133). Therefore, suppliers can be important allies in managing supply chain complexity. With these increasingly intricate global supply chains achieving superior performance through new product introductions can be challenging, but firms that collaborate with their suppliers on long term strategic issues may develop competitive capabilities.

While many international firms search for external suppliers to collaborate in the development of new products (Ganesan et al., 2005; Wind and Mahajan, 1997), interestingly, little research has examined the relationship between international firms’ increasingly important operations management strategies and the creation of dynamic capabilities. This is in spite of the theoretical importance of firm structure for this process. (Augier and Teece, 2007), the importance of external integration in Teece et al. (1997) early writing on the topic, and the prominence given to supplier innovation in Teece’s (2007) recent model of the foundations of dynamic capabilities. This study begins to fill this research gap by focusing on two such operations management strategies – supplier integration and product modularization<sup>3</sup>.

As this paper investigates the relationship between operations management and dynamic capability creation in an international context, an important moderating variable is cultural distance. Cultural distance refers to the national-level value and behavioral differences between business actors, and it is posited that these differences increase the difficulties associated with international business activities (Johanson and Vahlne, 1977; Zhang et al., 2003). As has been independently observed by Griffith and Myers (2005), the impact of cultural distance in the context of supply chain management has been almost completely unexplored (see, however, Elango, 2005; Griffith and Myers, 2005 for examples of cultural distance being applied to supply chain management).

This study explored the creation of this dynamic capability in a global context, namely the Brazilian automobile industry. Our focus on Brazil, one of the largest emerging markets in the world, serves to deepen the literature’s understanding of the under-researched South American market, responding in part to a call for more research on this region (Hoskisson et al., 2000). Additionally, the Brazilian automobile industry has recently had a large number of new entrants (Zilbovicius et al., 2002) resulting in Brazil having the largest range of automobile brands being produced in a single country. Therefore, the Brazilian automobile industry offers the relevant environment for an investigation of the international business implications of the relationship between dynamic capabilities, operations management strategies, and cultural distance (Aulakh et al., 2000; Kotabe et al., 2007).

The paper is organized as follows. In the following section, we provide a theoretical model of dynamic capability creation, briefly outlined in Fig. 1, which is derived from our literature review. In this model, we link the supplier integration and product modularization literatures to the generation of dynamic capabilities, and, based on this discussion, we derive hypotheses. Count regression methods are then used to test these hypotheses with a sample of Brazilian automobile suppliers.

This study makes two contributions to the existing literature. First, by applying an operations management perspective, this paper contributes to the dynamic capability discussion by underscoring the importance of international firms’ operational

<sup>3</sup> Product modularization is a firm strategy for organizing complex products and processes (Baldwin and Clark, 2000). It is defined as the process of assembling final products from a number of predetermined and interchangeable components making up the independent modules (Hoogeweegen et al., 1999; O’Grady, 1999; Worren, 2001). We define supplier integration as it refers to the coordination of operations at the inter-firm level, and the implementing of close coordination between a manufacturer and its upstream and downstream supply links.

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