

# Cross-Functional collaboration, competitive intensity, knowledge integration mechanisms, and new product performance: A mediated moderation model



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## ABSTRACT

This study draws upon the structural contingency theory to develop a mediated moderation model in order to examine how knowledge integration mechanisms mediate the impact of competitive intensity on the cross-functional collaboration–new product performance relationship. A final sample of 182 Taiwanese manufacturing firms provides the data for the analyses. The results show that (1) competitive intensity weakens the effect of cross-functional collaboration on new product performance and (2) knowledge integration mechanisms mediate the negative effect of competitive intensity on the cross-functional collaboration–new product performance relationship. These results not only provide an explanation for the inconsistent findings documented in the marketing literature but also call on managers to take relevant actions to alleviate the negative influence of competitive intensity on the performance effects of cross-functional collaboration and knowledge integration mechanisms.

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## 1. Introduction

Along with the increasing competition in the product markets, managing new product development has become a significant focus area in industrial marketing management (Hutt & Speh, 2010). To develop new products successfully, firms must possess resources and skills necessary for executing new product initiatives (Song & Parry, 1997). However, resources and skills often get distributed among the different units within an organization (Teece, 2000). Thus, a firm must design processing mechanisms to integrate the resources and skills required for product innovation. Marketing literature has suggested that cross-functional collaboration is widely utilized in new product development to enhance the chance of new product success (Atanasova & Senn, 2011; Song & Parry, 1997). Cross-functional collaboration refers to the degree of cooperation, the extent of representation, and the contribution of marketing, R&D, and other functional units to the product development process (Li & Calantone, 1998; Ruekert & Walker, 1987). Given that the advantage of a new product is created through teamwork (Clark & Fujimoto, 1991; Wheelwright & Clark, 1992), the role of cross-functional collaboration on product innovation becomes more critical.

Existing literature on marketing contends that cross-functional collaboration is a valuable resource for successful product innovation (De Luca & Atuahene-Gima, 2007; Griffin & Hauser, 1996; Song &

Parry, 1997). Over the past two decades, research on the association between cross-functional collaboration and new product performance has increased, indicating the importance of the issue. A review of 25 articles utilized in a meta-analysis by Troy, Hirunyawipada, and Paswan (2008) reveals that existing findings on the performance effects of cross-functional collaboration are inconsistent. For example, while Leenders and Wierenga (2002) and Li and Calantone (1998) find that cross-functional collaboration has a positive performance effect, De Luca and Atuahene-Gima (2007), Im and Workman (2004), and Nakata, Im, Park, and Ha (2006) find that the effect of cross-functional collaboration on new product performance is insignificant. This disparity in findings indicates a need to examine the moderators of the relationship between cross-functional collaboration and new product performance.

In addition, while the positive impact of cross-functional activities on product innovation has often been emphasized (Griffin & Hauser, 1996; Song & Parry, 1997), problems with these activities, such as their time-consuming nature and the conflicts that they create, have also been well-documented (Parry & Song, 1993; Song & Xie, 2000; Varela, Fernández, Del Río, & Bande, 2005). Some product development literature suggests that in cross-functional teams, the amount of time required to reach a consensus before making a decision may offset the benefits of collaboration on new product development (Song, Thieme, & Xie, 1998; Song & Xie, 2000). Time is clearly an important factor influencing the performance effects of cross-functional collaboration. Given that quick responses become more critical to gain a competitive advantage in ultracompetitive business environments (Lindelöf & Löfsten, 2006; Volberda, 1996), the increasing competitive intensity of such environments may

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influence the success of cross-functional collaboration. Past research has also suggested that competitive intensity plays an important role in providing an adequate point of departure for the analyses of relationships between new product strategies and product innovation performance (Chan, He, Chan, & Wang, 2012; Dröge & Calantone, 1996). All these perspectives reinforce the need to investigate the influence of competitive intensity on the relationship between cross-functional collaboration and new product performance.

Furthermore, past research suggests that in order to cope with the impacts of environmental changes, organizations may develop structural mechanisms to process information within the context of organizational decision-making (Tushman & Nadler, 1978). This implies that the roles of such structural mechanisms reflect the impacts of environmental changes on the performance effects of strategic behaviors. According to the information-processing perspectives proposed by Galbraith (1973), firms typically adopt knowledge integration mechanisms (KIMs) to process the increasing amounts of information associated with cross-functional product innovation activities. KIMs comprise the formal processes and structures that ensure access to and integration of knowledge among different functional units within a firm (Griffin & Hauser, 1996; Olson, Walker, & Ruekert, 1995). Given that KIMs play a pivotal role in translating cross-functional collaboration into product innovation performance (De Luca & Atuahene-Gima, 2007), they may account for the performance effects of cross-functional collaboration under different levels of competitive intensity. However, previous research has paid little attention to the roles of KIMs in the cross-functional collaboration–performance linkage impacted by competitive intensity.

To fill the abovementioned gaps, this study pursues to investigate two issues: (1) how competitive intensity influences the effects of cross-functional collaboration on new product performance, and (2) whether the mediating roles of KIMs explain the moderating effect of competitive intensity in the cross-functional collaboration–performance relationship. We draw the perspectives from the structural contingency theory to develop a mediated moderation model for investigating these two issues. These investigations will advance the study of marketing in the context of product innovation management by examining the roles of competitive intensity and KIMs within the cross-functional collaboration–performance relationship.

The remainder of this manuscript is organized as follows. The following section briefly presents the conceptual framework to guide the literature review and to develop the research hypotheses. The next section describes the research methods, including the model, definition of variables, measurements, and data utilized in this study. After presenting and discussing the results, the final section summarizes the results, discusses their implications for theory and managerial practice, and provides some compelling directions for future research.

## 2. Conceptual framework and research hypotheses

### 2.1. Conceptual framework

We draw upon the two strands of structural contingency theory, fit-as-moderation and fit-as-mediation (Venkatraman, 1989) to develop the conceptual model. The view of fit-as-moderation suggests that the influence of an organization's strategic behaviors on performance depends on the environmental conditions (Atuahene-Gima & Murray, 2004; Prescott, 1986; Zeithaml, Varadarajan, & Zeithaml, 1988). According to this view, the conceptual framework illustrates that competitive intensity affects the relationship between cross-functional collaboration and new product performance. The fit-as-mediation view suggests that organizational design aims to enhance the information-processing capacity of its integration mechanisms in correspondence with the information-processing requirements of its strategic contingencies (Galbraith, 1973: 6). Thus, by increasing the

information processing demands of the firm, strategic interdependence or collaboration among functions dictates the type and degree of organizational integration mechanisms adopted to transfer knowledge within the organization (Kumar & Seth, 1998). Following this view, KIMs are designed to cope with the increasing information from cross-functional activities for improving new product performance. Past literature suggests that the strategic behavior–performance links should include the environmental context and organizational structure as a moderator and a mediator (Dröge & Calantone, 1996; Song & Montoya-Weiss, 2001). Following this perspective, we thus consider the two views and combine them to form the framework in Fig. 1.

Fig. 1 jointly involves the moderation of competitive intensity and the mediation of KIMs in linking cross-functional collaboration and new product performance. Given that firms have to provide the structure mechanisms for cross-functional collaboration to be implemented (De Luca & Atuahene-Gima, 2007), we assume that the impacts of competitive intensity on the performance effect of cross-functional collaboration reflect in the mediating role of KIMs. Fig. 1 postulates that the overall moderating effect of competitive intensity is decomposed into both a direct and an indirect moderating effect. According to Muller, Judd, and Yzerbyt (2005), KIMs mediate the moderating effect of competitive intensity while the overall moderation of competitive intensity is greater than that of the direct path. That is, the moderating effect of competitive intensity emerges in the indirect path between cross-functional collaboration and new product performance through KIMs. We present the framework to guide the development of research hypotheses. Specific hypotheses concerning these relationships are detailed in the rest of this section together with their underlying rationale.

### 2.2. Cross-functional collaboration

Cross-functional collaboration involves aligning the various goals of functional units by recognizing their interdependence and the need to cooperate for the benefit of the organization (Kahn & Mentzer, 1998; Olson, Walker, Ruekert, & Bonner, 2001). Interdepartmental collaboration improves horizontal communication links (Moenaert & Souder, 1990) and the handling of inter-functional dependency through direct information transfer between functions (Frishammar & Hörte, 2005; Olson et al., 1995). The involvement of functionally diverse people in product development activities offers opportunities for integrating diverse perspectives. Marketers' information on customers and their needs, preferences, and potential for using a product, as gained through market analysis, helps guide engineering design. It also contributes to better technical development and manufacturing process design and thus improves the chance of developing a successful product.

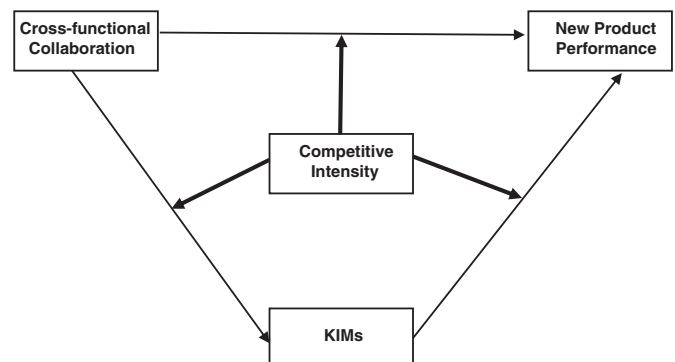


Fig. 1. Conceptual framework.

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