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In union lies strength: Collaborative competence in new product development and its performance effects

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ABSTRACT

It is widely recognized that new product development (NPD) is a highly interdependent process, yet efforts to empirically model the interdependence and examine its effect on firm performance are scarce. Our study addresses this research gap. We model firms' abilities to collectively collaborate with suppliers, customers, and internal employee teams in NPD as *collaborative competence* and examine its impact on project and market performance. Using responses collected from 189 NPD managers, we find empirical evidence for collaborative competence and its differential impact on project and market performance. Specifically, we find that collaborative competence has a direct impact on project performance, but its impact on market performance is indirect, mediated through project performance. The results have significant managerial implications; achieving superior market performance from inter- and intra-organizational involvement is contingent on achieving superior project performance, and companies that fail to achieve desired project performance outcomes will also fail in achieving market performance goals.

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1. Introduction

New product development (NPD) is a key source of competitive advantage for individual firms (Verona, 1999). Successful NPD requires firms to develop routines and practices to collaborate with suppliers, customers, and internal cross-functional employee teams. While some firms are able to involve key suppliers in their NPD endeavors, others are more effective in collaborating with customers. Still others develop expertise in leveraging advantages garnered from involving their own employees in product development teams. Few firms, however, develop the competence to engage suppliers, customers, and internal employees simultaneously in their NPD projects. We believe that the ability to simultaneously collaborate with suppliers, customers, and cross-functional teams in NPD is a valuable – yet rare – firm level capability. We label it *collaborative competence* in this study.

The notion that focal firms need to integrate externally with their suppliers and customers and internally across different functions to achieve NPD success is not a new idea; it has a rich history in the organizational strategy (Bajaj et al., 2004; Grant, 1996; Bensaou and Venkatraman, 1995; Kogut and Zander, 1992) and supply chain literature (Frohlich and Westbrook, 2001; Hammel and Kopczak, 1993). Frohlich and Westbrook (2001) demonstrate empirically that firms with the widest arc of integration (i.e., firms that integrate both suppliers and customers into the activities of the focal firm) have the strongest association with performance improvement as compared to firms that integrate only suppliers or only customers. The practitioner literature also highlights the superior performance benefits of simultaneously involving multiple

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stakeholders in the NPD process (e.g., Carlile, 2004; Orlikowski, 2002). Despite the increased attention to collaboration in academic and practitioner literature, there is relatively little rigorous empirical research identifying the managerial actions and mechanisms that underlie collaborative competence.

In this study, we define collaborative competence as the ability to simultaneously involve key stakeholders in the NPD process and examine its effect on performance. We begin by developing a conceptual foundation for the underlying dimensional structure of collaborative competence by identifying three sets of collaborative practices related to suppliers, customers, and internal cross-functional employee teams. Following this, we empirically examine whether the three sets of collaborative practices indeed constitute collaborative competence in an NPD context. To quantify the performance benefits associated with collaborative competence, we operationalize performance as *project performance* and *market performance*. We investigate direct effects of collaborative competence on project and market performance and also test for the mediating role of project performance between collaborative competence and market performance. Complementarity theory and resource-based view (RBV) provide the theoretical grounding for our investigation.

We use project level data collected from 189 manufacturing plants in three industries and six countries to test our conceptual framework linking collaborative competence with project and market performance. Our results make three contributions to the literature. First, by empirically modeling the interdependencies among collaborative practices, we accurately replicate the highly interdependent nature of the product development process. Our second contribution lies in demonstrating that collaborative competence has a different impact on project and market performance measures; our results indicate that collaborative competence has a strong direct effect on project performance and an indirect effect on market performance, mediated by project performance. A third contribution of our research is related to the generalizability of empirical results obtained from using a multi-industry, multi-country sample. As a set, our results extend our understanding of the role of collaboration in NPD process and its specific links with performance.

The rest of the paper is organized in the following manner. In Sections 2 and 3, we review the existing NPD literature related to collaborative practices and present three research hypotheses. In Section 4, we describe the research design and measures. Section 5 outlines the empirical methods we use to evaluate the hypotheses and results followed by Section 6, in which we discuss our findings and their implications for research and practice. Finally, limitations and future research ideas are outlined in Section 7.

2. Collaboration in NPD

The literature on collaboration in NPD has a rich history with the information processing theory (IPT) (Galbraith, 1977; Tushman and Nadler, 1978; Daft and Lengel, 1986) serving as the primary theoretical lens through which collaboration between a firm and its internal and external partners in NPD has been studied. According to this perspective, an organizational design that is efficient in both acquiring and processing rich information is best suited for uncertain, equivocal tasks. Uncertainty arises from "the difference between the amount of information required to perform the task and the amount of information already possessed by the organization" (Galbraith, 1977). Equivocality, on the other hand, arises from the existence of multiple conflicting interpretations about organizational situations (Weick, 1979).

As NPD environments are typically characterized by high levels of both uncertainty and equivocality, an "integrated problem solving" approach that requires the early involvement of key stakeholders in the product development process and permits sharing of critical information upstream and downstream in the product development supply chain as necessary for executing NPD work (Wheelwright and Clark, 1992). Swink (2006, p. 1) states that an organization's ability to *collaborate* is key to its innovative success. It also suggests that collaborative NPD *integrates* many sources of design ideas and data. Building on Swink's conceptualization, we study collaboration in NPD across three interfaces: collaboration between the core design team and the suppliers, customers, and cross-functional teams.

To do so, we conducted an extensive review of organization theory, strategy, and operations management literatures and found that, while the term "collaboration" is widely used in the NPD context, it is frequently used interchangeably with integration and coordination and, to a lesser extent, with cooperation and communication (Gulati et al., 2005; Barki and Pinsoneeault, 2005; Frohlich and Westbrook, 2001; Van de Ven et al., 1976). Upon reviewing the long and rich evolutionary history associated with this body of literature, we came to the conclusion that it is very difficult, if not impossible, to resolve the differences among these different terms. Moreover, resolving these differences is not central to our research objectives. Rather, given that collaboration across each of the three interfaces has received widespread attention in existing literature, we summarize findings from key studies in Table 1.

With regard to supplier involvement, Clark and Fujimoto (1991), Eisenhardt and Tabrizi (1995), Smith and Reinertsen (1998), Gupta and Souder (1998), all find that involving suppliers in the NPD process is critical to accelerating the pace of product development. Suppliers are more likely to identify potential problems such as contradictory specifications or unrealistic designs, early in the design process. Involving suppliers in the NPD process also opens up outsourcing and external acquisition possibilities, thereby reducing the internal complexity of projects and providing extra personnel to shorten the critical path for NPD projects. Besides shortening development cycles, supplier involvement has been shown to have a positive effect on other measures of performance such as lower development costs (e.g., Kessler, 2000, McGinnis and Vallopra, 1999), improved design-for-manufacturability (e.g., Wasti and Liker, 1997, Swink, 1999) and enhanced product quality (e.g., McGinnis and Vallopra, 1999).