



Supplier traits for better customer firm innovation performance

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ABSTRACT

Previous research on embedded ties with suppliers in an innovation context has ignored the need for customer firms to assess and select suppliers on the basis of market orientation strategies and relationship marketing attributes. To address this void, this study investigates the effects of suppliers' downstream customer orientation and supplier–customer homophily (i.e., similarity of the supplier and the customer) on the customers' innovation performance. Data pertaining to new product development projects with contributions from supplier firms was collected on both sides of the supplier–customer dyad. The analysis shows that downstream customer orientation and supplier–customer homophily have a significant impact on the customer firms' new product efficiency (i.e., project cost and project speed) and new product effectiveness (i.e., innovativeness), which in turn positively influence new product performance in terms of profitability, market share, and growth.

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1. Introduction

Firms in many industries are increasingly shifting to an 'open innovation' model and integrate company resources with the resources of external actors, with the aim of achieving and sustaining innovation. A large body of literature in the innovation, supply chain management, and business-to-business (B2B) marketing domain underscores the way in which customer and supplier firms should interact in order to achieve high innovation performance (Jap, 1999; Stump, Athaide, & Joshi, 2002; Ulrich & Ellison, 2005). Behaviors, actions and interactions of a customer and supplier in inter-organizational innovation depend to a large degree on the various traits of the actors: Do the characteristics of the customer and supplier complement each other? Do the customer and supplier employees communicate frequently and openly? Do they trust each other? Do both firms' corporate goals and cultures match?

A review of the literature shows that such supplier traits – apart from the technological expertise and product development capabilities of the supplier – have been largely neglected in prior research on new product development (NPD) with supplier contribution. Therefore, the objective of this research is to conceptualize additional supplier traits and to determine the impact of these supplier traits on the customer firm's innovation and new product performance. A better understanding of the influence of these supplier traits helps firms in selecting suitable suppliers to work with in NPD projects.

The next section provides a concise overview of the literature on supplier involvement in customer NPD. This is followed by the

development of the research model and hypotheses. Next, data collection procedures are described, followed by a description of the measurement model and the analysis of the structural relationships. The article concludes with a discussion of the study's findings and their implications to theory and practice.

2. Background

Recent research has highlighted the interactive character of generating high innovation performance, suggesting that successful innovators rely heavily on the interaction with external actors (Chesbrough, 2003; Fritsch & Lukas, 2001; Laursen & Salter, 2006), such as the focal firm's customers (Gruner & Homburg, 2000; Thomke & Von Hippel, 2002) as well as suppliers (Song & Di Benedetto, 2008; Wagner, 2003). The interaction with suppliers may range from screening the supply base for new technologies and innovations or simple consultation with suppliers on design ideas, to making suppliers fully responsible for the design of products that they will manufacture and deliver to the customer firm.

Examples illustrate and prior empirical research shows that suppliers can provide substantial benefits and enhance innovation performance along several dimensions. Customer firms can benefit from involving suppliers in NPD activities rather than working independently when it comes to NPD targets, such as product innovativeness, time-to-market, product quality, product cost, or development time and development cost. Furthermore, such a strategy can help firms conserve resources, share risks, gain new competencies, and move faster into new markets (Koufteros, Cheng, & Lai, 2007; Takeishi, 2001; Wagner, 2009).

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Despite the largely positive discussion of supplier involvement in customer NPD activities, there is empirical evidence that provides mixed support for the proposed positive effects. Several studies hint at the “rigidities, inflexibilities and coordination issues that can affect performance negatively” (Das, Narasimhan, & Talluri, 2006, p. 569) when suppliers are involved in customer NPD. Researchers repeatedly found no positive linear relationship between supplier–customer interaction in NPD and innovation performance, or even showed negative linear effects (Eisenhardt & Tabrizi, 1995; Hartley, Zirger, & Kamath, 1997; Littler, Leverick, & Wilson, 1998; Von Corswant & Tunäl, 2002).

Given the ‘openness’ of the innovation process towards the firms’ suppliers, the potential positive impact of suppliers’ contributions to a customer’s NPD efforts, and the potential negative effects, supplier involvement in customer NPD requires that the customer firm copes with the inherent project, technical, and inter-organizational challenges of such a strategy (Wagner & Hoegl, 2007). A few of these areas have already drawn some research attention.

On the *project* level, where human beings from two organizations interact, management scholars have highlighted that it is vital to reinforce the ‘soft facts’ and ‘human issues’ since individuals from the supplier and customer firms interact on highly complex and sensitive subjects when suppliers contribute to customers’ NPD. Gerwin and Ferris’s (2004) conceptual investigation of various project organizational options suggests that the preferred option of firms working either independently or with partners in NPD projects depends on the newness of the NPD alliance, the cooperativeness of the alliance in the past, and the distribution of skills among the partners. Gerwin’s (2004) theoretical model emphasizes the importance of reducing the coordination gap in joint NPD projects. Mismatches between the required and actual coordination of tasks negatively influence the performance of a NPD project. In their empirical study of NPD projects, Hoegl and Wagner (2005) point out that the quality of the collaborative working between the customer’s and the supplier’s project members, characterized by an open sharing of information, mutual support and accommodation, and high project commitment, is key to project success. The interactions of the project members shape the inter-organizational exchange which is critical in determining its outcomes.

On the *technical* side it is vital that the product architecture, the type of design, and development interaction with suppliers match. With a modular product architecture, which implies a one-to-one mapping from functional elements to physical components and standardized interfaces among the components of a product (Ulrich, 1995), the upgrade and substitution of components can be done without difficulty. The design can easily be divided among different suppliers and between suppliers and the focal firm (Danilovic, 2006; Schrader & Göpfert, 1997; Von Hippel, 1990). Conversely, integral product architectures are much more complex and physical components are coupled, i.e., many functional elements are implemented by more than one physical component and several physical components implement more than one functional element (Ulrich, 1995). A change to one component may require a change to other physical components. When the development of components is divided between the focal firm and various suppliers, the innovation processes and projects must be linked (Schrader & Göpfert, 1997; Von Hippel, 1990). Several researchers have recommended that supplier–customer interaction strategies in NPD are contingent on the architecture of the product and the design and development interfaces with suppliers, ranging from ‘none’ and ‘white box’ to ‘gray box’ and ‘black box’ supplier integration (Koufteros et al., 2007), or from ‘traditional’ and ‘advanced’ to ‘black box’ and ‘integrated’ subcontracting (Sobrero & Roberts, 2001). The technical difficulty associated with NPD brings us to the challenges in the supplier–customer relationship.

At the *inter-organizational* level, scholars in the field of strategy, marketing and operations management have already paid some attention to the relationship between the customer and the supplier

who contributes to the customer’s NPD project (Jap, 1999; Primo & Amundson, 2002; Sobrero & Roberts, 2001; Stump et al., 2002). However, the questions of *when* and *how intensively* to involve the supplier in the customer’s NPD process, of *how* to interact with the supplier, and *with which* supplier to interact in NPD have been addressed to varying degrees.

Much of the previous research has focused on questions of when (i.e., how early in the overall innovation process from idea generation to product launch) and how much suppliers should be involved in the customer’s NPD. Monczka, Handfield, Scannell, Ragatz, and Frayer (2000) identify five phases in which supplier interaction in customer NPD could start. Consistent with the need to align multiple processes at the supplier–customer interface, much of the empirical research on the timing of supplier involvement advocates that early and intensive interaction with the supplier results in a faster NPD process (Bozdogan, Deyst, Hoult, & Lucas, 1998; Griffin & Hauser, 1992). Petersen, Handfield, and Ragatz (2005) add the stage of integration as a moderator into their model and also find that the relationship between project team effectiveness and design performance is influenced positively if decisions are made early in the NPD process.

An effective process of supplier assessment and selection is consistent with phase models of supplier–customer relationship development which concentrate on the early identification and evaluation of suitable partners (Dwyer, Schurr, & Oh, 1987; Ellram, 1991). For Petersen et al. (2005), the first critical element is to determine the effectiveness of the NPD project team. This encompasses a “detailed assessment of the suppliers being considered for involvement, leading to the selection of a supplier with capabilities well-matched to the buying company’s needs” (Petersen et al., 2005; p. 374). Suppliers may possess component knowledge and architectural knowledge (Henderson & Clark, 1990). These two types explain why some suppliers are able to take on certain R&D (research and development) responsibilities while others are not. Component knowledge involves the design and manufacture of one component (e.g., the fuel tank) for the buying firm’s product (e.g., an automobile), but not the product itself. All the supplier requires is R&D and design capabilities to develop the component. However, if a supplier possesses architectural knowledge, it has the ability to integrate and coordinate knowledge, capabilities, activities, or products from the customer firm and also from other suppliers.

A large body of literature in the relationship marketing domain in general and on inter-organizational innovation in particular underscores the way in which the customer and supplier firms should interact in order to achieve high innovation performance (Jap, 1999; Stump et al., 2002). For example, the role of relationship connectors (i.e., information exchange, operational linkages, legal bonds, cooperation, and relationship-specific adaptations by suppliers and customers) in achieving high customer satisfaction and supplier performance has been investigated (Cannon & Perreault, 1999). Communication frequency and intensity builds stronger supplier–customer relationships and has a positive impact on channel performance in terms of effectiveness and efficiency (Mohr & Nevin, 1990; Mohr & Sohi, 1995). Furthermore, commitment and trust (Doney & Cannon, 1997; Morgan & Hunt, 1994) and connectedness (Gemünden, Ritter, & Heydebreck, 1996; Johnson & Sohi, 2001) are also frequently cited antecedents of supplier–customer relationship outcomes.

Surprisingly, despite the criticality of selecting the suitable supplier to work with in NPD in the first place, it is – apart from the capabilities of the supplier – largely undetermined which supplier traits have a positive impact on the customer firm’s innovation and new product performance. The question of which supplier to select and involve in an innovation context has only recently received some research attention. Wynstra, Weggemann, and Van Weele (2003) point out plainly that the pre-selection and the selection of suppliers for involvement in NPD activities is a critical process in managing the supplier–customer relationship. However, the authors do not

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