



Customer interactivity and new product performance: Moderating effects of product newness and product embeddedness

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ABSTRACT

Understanding customer needs which drive significant product innovation is particularly challenging for new product development (NPD) organizations. Research has addressed how organizations benefit from interacting with customers, but more conceptualization is needed into the dimensions of the customer interaction process. In a business-to-business (B2B) setting, customer interactivity is conceptualized as a multi-dimensional construct consisting of bidirectional communications, participation, and joint problem solving during NPD projects. Drawing upon organizational information processing theory, customer interactivity is hypothesized to be positively related to customer information quality when developing highly innovative products, but not when developing modifications or extensions of existing products. Another condition affecting this relationship studied is the embeddedness of the new product in the customer's business environment. Customer interactivity is hypothesized to be positively related to information quality for highly embedded product, but not for low embedded product. Results from a sample of NPD organizations in several B2B industries support these hypotheses. The study contributes to the marketing literature and practice by identifying important dimensions of the customer interaction process which lead to more proactive organizations, and identifying two moderating conditions of the customer interactivity and NPD performance relationship.

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1. Introduction

A strong market orientation and customer knowledge competence are vital to the success of new products (Kohli & Jaworski, 1990; Li & Calantone, 1998). However, some researchers have argued that being market-oriented leads to less innovative, and more incremental, me-too products (Christensen & Bower, 1996; Berthon, Hulbert, & Pitt, 1999). The main argument is that organizations cannot generate innovative products by only responding to current customers who are myopic and unable to articulate more advanced needs. Since that criticism has been levied, Narver, Slater, and MacLachlan (2004) introduced the proactive market orientation concept which deals with attempts to understand the latent needs of customers—needs of which ordinary customers are unaware, or have difficulty articulating. Positive outcomes have been found for organizations who understand these needs (Olson, Slater, & Hult, 2005; Atuahene-Gima, Slater, & Olson, 2005). However, proactive market orientation offers a very general description of the customer interaction process, and is blended with other attributes of the organization. What is missing from the literature is a more refined conceptualization of the

dimensions of the customer interaction process, and an examination of how these dimensions influence new product development (NPD) performance. Understanding how customer interactivity differentially impacts performance when developing incremental and innovative products provides insight into how organizations should acquire incremental and difficult-to-articulate needs.

Another condition affecting the customers' ability to easily articulate their needs is the degree to which the product being developed is embedded into the customers' business environment. In Business-to-Business (B2B) markets, customers often use products which significantly influence their work processes, job responsibilities, job titles, and competitive strategies, among other aspects. Large mainframe computers have traditionally been highly embedded into information-intensive industries such as banking, insurance, and financial services. Other examples include medical equipment in hospitals, telecommunications equipment in telecom service companies, scientific equipment in laboratories and manufacturing equipment in manufacturing companies. The problem of articulating customer needs for such products is rooted in the depth, and breadth of needs including a range of technical, economic, user, service and management needs. If customer interactivity is more important for new product success under conditions of high embeddedness than for low embeddedness, it would suggest another condition in which hard-to-articulate needs are evident and customer interactivity is critical.

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Therefore, this study conceptualizes a customer interactivity construct. Its focus is on the intensity and richness of the interaction between the NPD project team and customers or potential customers during the NPD process. It suggests a learning perspective as opposed to viewing customers as being endowed with knowledge about the future such as lead users (von Hippel, 1986). While the NPD literature has shown strong support for a positive relationship between interacting with customers and new product performance (Moorman, 1995; Atuahene-Gima, 1996; Li & Calantone, 1998), this study raises the notion that a high degree of customer interactivity is not always warranted. Instead, it depends on the newness of the product being developed and the embeddedness of the product in the customers' environment.

The theoretical foundation and hypotheses are developed in the next section. This section is then followed by the study methodology section which is in turn followed by the findings and discussion sections.

2. Theoretical foundation and hypotheses

Much research has been conducted on the nature of NPD techniques for acquiring hard-to-articulate customer needs such as lead user analysis (von Hippel, 1986), and empathic or observational methods (Leonard & Rayport, 1997). This work suggests that rich communications between the NPD team and customers are necessary whether verbal or through observation. The organizational communications literature has specified dimensions of communication that indicate the richness of the communications channel (Krone, Jablin, & Putnam, 1987). Based on this research, Mohr and Nevin (1990) found that marketing channel communication, characterized by frequent bidirectional, informal (i.e. Face-to-face, participatory) and collaborative communications, results in an atmosphere of trust and high quality information exchange. These dimensions of communications offer similar potential in explaining effective communications in NPD where information can be difficult to articulate.

2.1. Customer interactivity

The conceptualization of customer interactivity employed here draws upon the organizational communications literature, and includes three dimensions: bidirectionality, participation, and joint problem solving (Krone et al., 1987; Mohr & Nevin, 1990). Customer interactivity is defined as the degree to which interactions between potential customers and project team members are bidirectional, participative and involve joint problem solving. It captures the intensity of the customer interaction through face-to-face, and collaborative information exchange. At the high end of the spectrum, a project team meets frequently with members of the project team to get at the heart of issues and solve problems. At the low end of the spectrum, a project team uses more formal and detached means of communications such as written survey feedback and formal documents. Each dimension of customer interactivity is described in turn.

The bidirectionality dimension characterizes the flow of information between parties as either one-way or bidirectional (Mohr & Nevin, 1990). This study uses the bidirectionality dimension to examine the degree to which the flow of information between a new product development organization and its customers is bidirectional. Interactions that are primarily one-way from the customer to the NPD organization are more likely to represent simple responses concerning customer needs or preferences. Two-way interaction represents an interactive exchange where plans and issues are communicated and analyzed, and feedback is provided. For instance, the use of lead users in developing product concepts, or the use of focus groups in evaluating a product concept, tends to result in two-way interaction.

Organizational communications researchers have examined the modality of communications (Krone et al., 1987; Mohr & Nevin, 1990). It has been conceptualized as the degree to which the method

transmits rich information (i.e. variety of cues, feedback, and personalization) (Daft & Lengel, 1984). It seems reasonable to argue that direct participation by customers in new product development activities represents a rich mode of communications. Participation is defined as the degree to which customers actively and directly participate in NPD activities. It includes customer participation in face-to-face interactions, group discussions, and meetings. For instance, a NPD project that includes customers on the team that generates new product ideas would be considered to have a higher degree of participation than a project which acquires customer needs from written survey responses.

Lastly, organizational researchers consider the content of the interaction to be important. The content of interest in this study is the degree of joint problem solving between customers and NPD team related to the product and its use. For instance, the interaction between a NPD team and customers might contain significant probing into issues on the use and consequences of the new product in the customer's organization. The customer may devise solutions that the project team had not thought about. They may build off of each other's knowledge in developing innovative solutions in a truly collaborative fashion. At the other extreme, customers may provide direct statements of what they want with little additional probing into problems or alternative solutions.

The view offered in this study is a learning perspective as opposed to viewing customers as lead users who have knowledge about the future ahead of the general marketplace. There it becomes a problem of selecting the right lead users. This study raises the notion that users and product team can learn from each other even under conditions where the needs may be difficult to articulate. An NPD organization chooses the intensity of customer interaction during a project. The three attributes of bidirectionality, participation and joint problem solving offer further description of the process so NPD managers can develop an effective strategy for customer interaction in the NPD process. The framework used in the study is described next followed by the hypotheses.

2.2. Framework

The theoretical framework is shown in Fig. 1. The perspective taken is that customer interactivity influences new product performance through the quality of the customer information used in the project. Customer information quality is defined as the degree to which the customer information used in the project was perceived to be accurate, relevant, consistent, and provided clear signals and important details (Maltz & Kohli, 1996). The relationship between customer interactivity and information quality is moderated by product newness and product embeddedness. Product newness is defined as the degree to which the product being developed was new to the company and new to the market (Olson, Walker, & Ruekert, 1995). Product embeddedness is the degree to which the product impacts how customers perform important functions, influences a significant customer process, requires customer effort in learning the product, creates customer dependencies on the product, and influences customers' policies and procedures.

Customer information quality is in turn proposed to influence new product performance. New product performance is defined as the degree to which the resulting new product's quality, technical performance, features, and ability to meet customer needs was ahead, was on par, or behind the competition at the time of product introduction.

2.3. Hypotheses

2.3.1. Direct effects of customer interactivity on customer information quality

There has been numerous research studies on specific NPD techniques involving customer participation, such as lead user analysis (von Hippel, 1986), quality functional deployment (Hauser

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