



Knowledge integration taxonomy in buyer–supplier relationships: Trade-offs between efficiency and innovation

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ABSTRACT

Based on the knowledge-based view of inter-firm collaboration, this study develops and proposes a parsimonious taxonomy of how buyers and suppliers develop knowledge integration in terms of two mechanisms: joint sense meaning and joint decision making. The first focuses on the interpretation and sense making of knowledge about strategic, relevant issues for the buyer–supplier relationship (BSR). The latter emphasizes joint problem solving related to their interlinked operative routine activities. Using survey data from 130 collaborative BSRs and cluster analysis, the results suggest that buyers that purposely develop a balanced knowledge integration with their suppliers—characterized by managing high levels of both joint sense meaning and joint decision making—show improved efficiency and innovation simultaneously even though they have to deal with the tension of managing the requirements of these two key, albeit competing outcomes. The results also suggest that buyers pursuing focused knowledge integration with their suppliers—characterized by managing high levels of either joint sense meaning or joint decision making—outperform in a specific outcome at the expense of the other. This study thus provides a comprehensive framework that allows organizations to evaluate the knowledge integration strategy that best supports their goals related to their collaborative buyer–supplier relationships.

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1. Introduction

Ever-changing market competition rules force firms to continuously improve. But what should a firm do to achieve this? Does a firm possess the knowledge and skills to achieve innovative and efficient products and/or processes? How can a firm organize its capabilities and leverage supply chain partners' knowledge in order to reach this goal? This research addresses these challenges by suggesting that different knowledge integration mechanisms between a buying firm and its supplier are essential for enhancing both efficiency and innovation. Consistent with previous studies (e.g., Frohlich and Westbrook, 2001; Vickery et al., 2003; Modi and Mabert, 2007; Wong et al., 2011), we note the positive impact of buyer–supplier integration on performance and extend this knowledge by offering an in-depth examination of which knowledge integration strategy the buyer and supplier should follow if they are to succeed in competitive markets.

Based on the knowledge-based view (KBV), we define knowledge integration as an important capability that enables both buyer and

supplier to access, share and exploit knowledge as well as to create new knowledge. Some supply chain management scholars (e.g., Zhao et al., 2008; Fabbe-Costes and Jahre, 2008; Myers and Cheung, 2008) have studied knowledge integration among buyers and suppliers. They have primarily analyzed the benefits of operative integration among buyers and suppliers—including material movements, ordering processes and forecasting development—in a narrow range of measures such as cost, lead time, flexibility and quality (for a review, see Sahin and Robinson, 2002; Terpend et al., 2008). However, competitive markets demand these firms to go beyond solely sharing operational information and achieving incremental improvements. They also require an element of interpretation or sense of sharing knowledge about critical, relevant issues (e.g., changes in customer need) that help buyers and suppliers better develop innovative strategies and products which accomplish market needs (Swink et al., 2007; Sanders 2008; Lawson et al., 2008). Thus, integration of both operative and strategic knowledge is necessary to compete in demanding markets.

Past studies have demonstrated that buyers sharing knowledge with their collaborative suppliers can benefit (e.g., Von Hippel, 1988; Hult et al., 2007; Esper et al., 2010; Azadegan, 2011). However, how buyers design their strategies in configuring their knowledge integration capabilities with their collaborative suppliers, so as to achieve operative and strategic benefits, remains a

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research gap (Sanders, 2008). We aim to fill this gap by examining how buyers pursue different strategies to share diverse, albeit complementary knowledge with their collaborative suppliers and by using a more comprehensive set of performance outcomes—efficiency and innovation. The latter would allow us to examine the trade-offs of these two performance outcomes, which remain a debate among academics (cf. Adler et al., 2009) and a major concern for managers (Chandrasekaran et al., 2012). Scholars have pointed out that future research needs to explore how firms (Abernathy, 1978; March, 1991) and inter-firm relationships (Im and Rai, 2008; Adler et al., 2009) should be designed to facilitate efficiency while promoting innovation. In industry, failure to manage efficiency and innovation has resulted in meaningful losses for organizations such as Motorola, Ericsson, and Samsung (Christensen and Raynor, 2003). Given its far-reaching and salient effects, we study how organizations configure their knowledge integration strategies to achieve a balance between efficiency and innovation.

From the buyer's perspective, this research develops and proposes a parsimonious taxonomy of how buyers and suppliers integrate diverse types of knowledge and how such configurations impact innovation and efficiency. We use a configuration approach because it provides a holistic analysis of the phenomenon under investigation (Miller, 1986; Flynn et al., 2010) and considers combinations of diverse knowledge flows and their relationships with performance as an interrelated bundle (Doty and Glick, 1994; Bozarth and McDermott, 1998).

We postulate that there are two main mechanisms for developing knowledge integration: joint sense meaning and joint decision making. The first focuses mainly on the interpretation and sense making of shared information about critical, strategic issues within the buyer–supplier relationship (BSR). The latter emphasizes joint decision making related to inter-firm operative routine activities. Based on these two mechanisms, we propose a taxonomy that suggests four types of strategies—operational, strategic, balanced and minimized integrations. When BSRs engage in *operational knowledge integration* (promoting high levels of joint decision making) or *strategic knowledge integration* (fostering high levels of joint sense meaning), one can outperform at the expense of the other. For instance, buyers pursuing *operational knowledge integration* exhibited higher levels of efficiency at the expense of innovation. BSRs that pursue *balanced knowledge integration* (equilibrium between joint sense meaning and joint decision making) can fully leverage synergies that result in improved efficiency and innovation; however, they might not perform simultaneously at the highest levels in both outcomes. BSRs seeking minimized knowledge integration (joint sense meaning and joint decision making are very low) exhibited low levels of efficiency and innovation.

The paper is organized as follows: We first review the literature on collaborative BSRs and knowledge integration and then develop hypotheses based on how the configurations of two knowledge integration dimensions impact efficiency and innovation. The methods section discusses how survey data from 130 BSRs were collected and analyzed using cluster analysis. The results suggest four types of BSRs and show the tradeoffs of pursuing a focused versus a balanced strategy of knowledge integration. Finally, we discuss theoretical and managerial implications and offer future research directions.

2. Theoretical framework

2.1. Collaborative buyer–supplier relationships (BSRs)

Organizations are increasingly aware of the value of developing collaborative BSRs (Krause et al., 2007; Sytch and Gulati, 2008; Cao and Zhang, 2010). Emphasis on knowledge-based capabilities,

as a means to create value, forces the buyer and supplier to go beyond the exchange of materials and information. Suppliers become important sources of knowledge, which complements a firm's own internal knowledge (Von Hippel, 1988; Dyer and Singh, 1998; Rebolledo and Nollet, 2011). For instance, suppliers usually have greater expertise and comprehensive knowledge regarding parts and components, which is critical to the development of a new product (Tsai, 2009). Likewise, suppliers are excellent sources of new ideas for achieving superior operative outcomes in terms of high quality, fast delivery and low cost (Dyer and Nobeoka, 2000; Frohlich and Westbrook, 2001; Vickery et al., 2003). Therefore, buyers that foster collaboration with their suppliers can leverage the additional knowledge gained from their BSRs, which allows them to benefit from not only superior operative outcomes but also inter-firm learning that results in innovation (Kogout and Zander, 1992).

Accordingly, buyers and suppliers involved in collaborative relationships are increasingly focused on knowledge integration and knowledge creation (Malhotra et al., 2005; Myers and Cheung, 2008). Im and Rai (2008) show how firms focusing on knowledge sharing with their long-term supply chain partners can benefit from exploiting existing competencies and exploring new opportunities. Similarly, Sanders (2008) suggests that buyers and suppliers involved in strategic and operational coordination can obtain operational and strategic benefits. These studies show how a firm's performance is positively affected by knowledge integration with its partner in terms of exploiting existing capabilities and exploring new opportunities. However, they analyze the direct relationship between individual dimensions of integration mechanisms (e.g., operative and strategic coordination) and performance rather than how *patterns* of integration mechanisms are related to different performance outcomes. We focus on the latter by examining how diverse knowledge integration configurations can help the buying firms to leverage the suppliers' knowledge so as to improve efficiency and innovation.

To study knowledge integration configurations, the concepts of knowledge exploitation and knowledge exploration are relevant. Knowledge exploitation refines established patterns with incremental benefits occurring over a more immediate time period with limited risks. Buyers and suppliers share knowledge mainly related to existing products and inter-firm processes (e.g., demand development). Their teamwork can reduce coordination costs, achieve quality improvements, improve production bottlenecks and enhance their abilities to perform routine tasks. Conversely, knowledge exploration involves actions that establish new patterns, and assumes higher risk levels with benefits occurring over a longer time. Under this situation, buyers and suppliers share knowledge related to issues outside the general routine (e.g., changes in customer needs) and are committed to fully exploring the synergistic potential of their resources in order to develop innovative products and strategies (March, 1991; Sanders, 2008; Im and Rai, 2008).

Knowledge integration between buyers and suppliers is therefore considered to be of strategic and operational importance (Zailani and Rajagopal, 2005; Swink et al., 2007; Sanders, 2008). The benefits of pursuing knowledge integration can go from decreased costs through reduced inventory and short lead times to enhanced innovation. Although most studies have shown the benefits of buyer–supplier integration within a narrow range of operational performance outcomes, buyers attempt to put forward a much wider range of performance goals within their BSRs (Krause et al., 2007; Sanders, 2008; Im and Rai, 2008). Our study thus considers two types of benefits—efficiency and innovation—to provide a comprehensive view of how configurations of knowledge integration can affect performance outcomes differently. In the next section, we examine the integration mechanisms that allow the buyer to build knowledge integration with its collaborative supplier.

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