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Flexibility and quality in logistics and relationships

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ABSTRACT

This research focuses on supplier-buyer relationships in a distribution channel. It uses a contingency theory to claim that, under different environmental conditions, logistics flexibility and relationship flexibility for a focal firm (a manufacturer in this study) will have distinct effects on logistics service quality (when treated as a controllable mediator) and the firm's satisfaction in its relationship with its key downstream account. Using data from a survey of manufacturers in China, it uses structural equation modeling to test the main effects and moderated regression together with moderated path analysis to examine the contingent effects of environmental uncertainty. The results show that, as distinctive capabilities, both logistics flexibility and relationship flexibility have significant positive effects on the level of logistics service quality that the manufacturer offers, which, in turn, enhance how much it values and is satisfied with its relationship with its key account. However, the direct effect of logistics flexibility on relationship satisfaction is stronger under an uncertain environment, while the direct and total effect of relationship flexibility on relationship satisfaction is stronger under a stable environment.
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1. Introduction

Stable environments allow organizations to simply utilize well-learned or dominant responses to address environmental disturbances (Fredericks, 2005). However, globalization, rapidly changing information technology, and increasing diversification of consumer requirements cause many firms to face increasingly uncertain environments. In such instances, existing routines and procedures may be inappropriate in that a mismatch exists between organizational responses and external demands (Fredericks, 2005). Some years ago, a special issue in *Industrial Marketing Management* on "Rigidity versus Flexibility in Business Marketing" pointed to the need to create flexibility in business-to-business marketing settings (Matthyssens, Pauwels, & Vandenbempt, 2005). Studies published in that issue emphasized concepts such as intra-firm flexibility and inter-firm flexibility (Fredericks, 2005), service providers' flexibility (Ivens, 2005), purchasing/supply chain management flexibility (Giunipero, Denslow, & Eltantawy, 2005), and marketing-based flexibility (i.e. applied customer knowledge) (Claycomb, Drőge, & Germain, 2005). Furthermore, many ensuing studies also support the definitions and arguments of those studies (Hsieh, Chiu, & Hsu, 2008; Money, Hillenbrand, Day, & Magnan, 2010; Wang & Wei, 2007). Those emphasize the important role of flexible arrangements of firms embedded in relationships with their partners (Fernie, Sparks, & McKinnon, 2010). However, focusing not on relational norms but on resources invested in the relationship, Swafford, Ghosh, and Murthy (2006) define logistics flexibility as the capability to adapt the process of controlling the flow of physical and other resources to changing marketplace conditions, which is widely adopted in a channel context. Thus, this study argues that flexibility in B2B context has both resource-based and norm-based components, in effect, either pushing a logistical transformation to quick response and efficient customer response (McKinnon, 1994), or forcing many buyers and suppliers to make adaptations in their relationships and to modify the rules of exchange as circumstances change (Sezen & Yilmaz, 2007).

As a strategic capability that fits environment requirements, flexibility can be critical to organizational performance (Anand & Ward, 2004; Patel, 2011; Yu, Cadeaux, & Song, 2012). When flexibility is addressed as a tier of a system, its outcomes are often connected with financial or business performance such as return on investment (ROI), return on sales (ROS) and market share (Duclos, Vokurka, & Lummus, 2003; Sánchez & Pérez, 2005; Vickery, Calantone, & Dröge, 1999). In contrast, when defining flexibility as a capability or in terms of relational norms, researchers often focus on such direct or function-specific performance outcomes as product quality, delivery speed, delivery dependability, and new product introduction, all of which lead to customer satisfaction and ultimately influence competitive advantage (Young, Sapienza, & Baumer, 2003; Zhang, Vonderembse, & Lim, 2002). However, most of these studies treat flexibility as a universally effective strategy for enhancing performance and tend not to consider its relative strength as a capability under differing environmental conditions. Even though

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some empirical studies include environmental factors such as uncertainty, they often treat uncertainty only as an antecedent (see review by Fayezi, Zutshi, & O'Loughlin, 2014). Yet, Pagell and Krause (2004) show that the main effects model of uncertainty as a simple antecedent for flexibility does not fit well. Furthermore, Fantazy, Kumar, and Kumar (2009) found that some dimensions of flexibility can even have negative effects on firm performance. One reason for such results may be that relationships might vary across contexts.

Recent studies have just begun to test the moderating effect in accordance with a contingency theory. The present study aims to contribute to this stream of literature by examining several issues. Most of the existing studies test moderators of the effect on flexibility of its antecedents (Chang & Huang, 2012; Gligor, 2014; Kim, Suresh, & Kocabasoglu-Hillmer, 2013; Tamayo-Torres, Ruiz-Moreno, & Verdu, 2010) rather than moderators of the effect of flexibility on its performance outcomes. Thus, the present study considers how the effects of flexibility on performance vary across environmental circumstances. Even though some researchers do examine moderators of the effect of flexibility on performance, they focus on *structural* rather than *environmental* moderators (Li & Ogunmokun, 2008; Liao, Paul, & Rao, 2010; Patel, Terjesen, & Li, 2012). However, there are some researchers who do propose theoretical frameworks that explicate a comprehensive mechanism for how environmental factors can moderate the effect of flexibility on performance (Ketokivi & Schroeder, 2004; Vokurka & O'Leary-Kelly, 2000; Yu et al., 2012). Although some empirical studies have also tested such moderating effects (Hallavo, 2015; Li, 2010), they neither distinguish between different dimensions or types of flexibility nor do they examine its effects on more immediate and focused function-specific performance outcome. In light of contingency arguments developed from information processing theory and transaction cost theory, this study tries to determine the conditions under which two types of flexibility, specifically logistics flexibility and relationship flexibility, can enhance function-specific relationship performance.

2. Literature review and development of hypotheses

Empirical studies of customer satisfaction in the business-to-consumer market all support the theory that quality has a significant positive effect on overall customer satisfaction (Fornell, Johnson, Anderson, Cha, & Bryant, 1996). Arguably, in the context of business-to-business distribution channels, the higher the level of logistics service quality offered, which represents efficiency, accuracy and consistency in delivery (Mentzer, Flint, & Kent, 1999), the more positive will be the affective state resulting from the appraisal of all aspects of a distributor-manufacturer relationship, a construct that defines relationship satisfaction (Anderson & Narus, 1984; Webb & Hogan, 2002; Yu, Cadeaux, & Song, 2013). However, previous studies only propose a significant role for flexibility in enhancing service quality and customer satisfaction without distinguishing between direct and indirect effects (Young et al., 2003; Zhang et al., 2002). Thus, a question remains as to whether logistics service quality mediates the effect of flexibility on relationship satisfaction. The present study argues that both resource-based logistics flexibility and norm-based relationship flexibility are critical capabilities that underlie a firm's ability to offer logistics services with high quality in terms of availability, timeliness, and physical condition of stock and which can in turn lead to higher levels of satisfaction in a firm's relationship with its key downstream account.

However, the essence of the organizational contingency theory paradigm is that there is no universal set of strategies that are optimal for all businesses, and that, therefore, organizations need to design strategies for specific environment contexts. Most commonly, a contingency theory states that the effective level of some planning variable depends on the level of some environmental variables (Cadeaux, 1994). Miller (1979) suggests that "organizations are complex entities and the relationship between two variables may be influenced by many contextual conditions" (p. 296). Or, in other words, a contingency theory usually involves a theory of environmental moderation that is more explicit than a simple theory about how organization structures and strategies somehow "match" the environments in which they lie. Following this view, many empirical studies test not only the "match" between environmental uncertainty and flexibility (Fantazy et al., 2009; Merschmann & Thonemann, 2011; Vickery et al., 1999) but also how environmental factors moderate the effect of flexibility on performance (Hallavo, 2015; Li, 2010).

Some studies also argue that environmental uncertainty manifests itself in several dimensions and that a certain type of flexibility is a reaction to a specific dimension of uncertainty (Dreyer & Grønhaug, 2004; Tachizawa & Thomsen, 2007). Thus, it may be important to determine the conditions under which flexibility, or more particularly, each type of flexibility, can enhance a firm's performance. In a supply chain, demand uncertainty and competition uncertainty are the main dimensions of environmental uncertainty (Kumar, Stern, & Achrol, 1992). As an important contingency variable, environmental uncertainty in demand and competition may moderate the mediating effects of logistics service quality on the effects of logistics flexibility and relationship flexibility on relationship satisfaction. Following this view, Fig. 1 shows the theoretical model underlying this study. The following sections will illustrate the corresponding hypotheses for this model.

2.1. Flexibility, logistics service quality and satisfaction

Logistics flexibility is the ability of the organization to respond quickly to customer needs in delivery, support, and service (Zhang et al., 2002). To make such adjustments requires a sufficient quantity and quality of information as a resource. Information capability refers to an organization's ability to acquire, process, and transmit information to support decision-making (Grover & Malhotra, 2003). Logistics flexibility is related to information processing in such logistics activities as transportation planning and management, facility structure management (e.g. warehouse location), inventory management, material handling (e.g. packaging and loading), as well as reverse logistics, tracking, and delivery (Duclos et al., 2003; Williamson, Spitzer, & Bloomberg, 1990). The present study suggests that in order to adjust storage capacity, delivery capacity or schedules, transportation mode, inventory and other outbound logistics activities in response to direct and indirect customer demands, logistics flexibility involves processing material and information flow between the focal firm (e.g. manufacturer, the organizing hub of the supply chain network which integrates upstream and downstream resources) and its supply chain partners (Bowersox, 1972; Swafford et al., 2006).

In processing timely and sensitive data on demand, inventory, and shipping status (La Londe & Masters, 1994), the focal firm responds to those uncertainties that arise during delivery of physical products which directly affect the supply or distribution ability of the market and influence downstream distributors' operations. In this way, logistics flexibility minimizes operational costs, saves delivery time and enhances the consistency of delivery. Adjusting warehouse capacity in terms of size, locations, resources, technology, and automating or balancing inventory level can enhance the availability of products significantly; adjusting delivery capacity in transport routes and schedules or bundling shipments to achieve economies can allow shorter delivery time and allow goods to arrive in better condition (Rexhausen, Pibernik, & Kaiser, 2012). The implication is that a higher level of logistics flexibility allows a firm to offer its customers a higher level of logistics service quality. Since the effect of logistics service quality on relationship satisfaction has already been addressed, we hypothesize that:

H1a. The higher the level of logistics flexibility, the higher will be the level of logistics service quality offered by the focal firm, which in turn, ultimately enhances the level of relationship satisfaction.

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