Inter-organizational communication as a relational competency: Antecedents and performance outcomes in collaborative buyer–supplier relationships

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Abstract
Inter-organizational communication has been documented as a critical factor in promoting strategic collaboration among firms. In this paper, we seek to extend the stream of research in supply chain management by systematically investigating the antecedents and performance outcomes of inter-organizational communication. Specifically, inter-organizational communication is proposed as a relational competency that may yield strategic advantages for supply chain partners. Using structural equation modeling, we empirically test a number of hypothesized relationships based on a sample of over 200 United States firms. Our results provide strong support for the notion of inter-organizational communication as a relational competency that enhances buyers’ and suppliers’ performance. Implications for future research and practice are offered.

Keywords: Inter-organizational communication; Relational competency; Buyer–supplier relationships and performance; Knowledge sharing; Information exchange

1. Introduction

That communication is the essence of organizational life has been well documented by communication and management scholars and practitioners (e.g., Fulk and Boyd, 1991; Reinsch, 2001; Yates and Orlikowski, 1992). Similarly, literature in relationship marketing has recognized how collaborative communication is critical to fostering and maintaining value-enhancing inter-organizational relationships (e.g., Anderson et al., 1994; Mohr and Nevin, 1990; Mohr et al., 1996; Schultz and Evans, 2002). Reflecting its centrality to business performance, one business executive asserted, “communication is as fundamental to business as carbon is to physical life” (Reinsch, 2001, p. 20).

Operations management researchers have also documented how inter-organizational communication enhances buyer–supplier performance (e.g., Carr and Pearson, 1999; Carter and Miller, 1989; Claycomb and Frankwick, 2004; Newman and Rhee, 1990; Prahinski and Benton, 2004; Cousins and Menguc, 2006). However, such work has remained disjointed, largely anecdotal, and without a strong theoretical underpinning.
In empirical studies, researchers have typically considered communication as a facet of a broader construct, such as supply management (e.g., Chen et al., 2004), or examined the extent to which the use of select communication strategies by buyer firms enhances supplier firm operational performance (e.g., Prahinski and Benton, 2004). What has not been systematically investigated is the extent to which communication between buyer and supplier firms mediates the links among key antecedents and outcome variables within a coherent theoretical framework. Such an investigation is needed in order to advance theory building and empirical testing in supply chain management.

With this goal in mind, we develop a conceptual model linking key antecedents and outcomes of inter-organizational communication within the context of collaborative buyer–supplier relationships. Drawing on the relational view of strategic management (Dyer and Singh, 1998), we conceptualize inter-organizational communication as a relational competency, which mediates the links between several antecedent and outcome variables for buyer and supplier firms. Using structural equation modeling, we provide a holistic test of the hypothesized relationships (Bagozzi et al., 1991), and document the extent to which the empirical evidence concerning the strategic role of inter-organizational communication is cumulative.

We believe the relational view of strategic management provides the relevant theoretical framework for the present investigation for at least three reasons. First, the relational view takes the inter-organizational level of analysis and addresses the extent to which relational capabilities form the basis of durable strategic advantages (Dyer and Singh, 1998; Kanter, 1994; Lado et al., 1997; Madhok and Tallman, 1998). This theoretical perspective extends the “resource-based view” (RBV), a firm-level theory of sustained competitive advantage (Barney, 1991; Wernerfelt, 1984). Taken together these perspectives provide a robust theoretical framework for explaining how strategic advantage is gained or lost based largely on endogenous strategic factors. Second, users of the relational view examine how relational competencies, enable firms to gain and sustain collaborative advantage (Kanter, 1994). In contrast, users of the RBV focus on explaining how firm-specific resources and capabilities characterized by value, rareness, imperfect imitability, and non-substitutability form the basis of sustained competitive advantage (e.g., Barney, 1991). Finally, the relational view places a premium on behavioral phenomena, such as inter-organizational communication as the drivers of firm performance. Thus, by viewing inter-organizational communication as a relational competency and empirically investigating its mediating role in the links between key antecedents and outcomes, we seek to gain a better understanding of the strategic importance of this construct within the context of buyer–supplier relationships.

In the following section, we briefly review literature in the relational view to provide a theoretical backdrop to our proposed model of the antecedents and outcomes of inter-organizational communication. Then, we develop the theoretical rationale of our proposed model, drawing on related research in strategic management, operations management, and marketing, among others. In Section 3, we explain our research methodology, including data collection procedure, construct operationalization and measurement, hypothesis testing and results. Section 4 presents discussion and implications of the study findings. In Section 5, we highlight some limitations of the study and offer suggestions for future research.

2. Theory and hypotheses

2.1. Relational competencies and supply chain management

Given the increasing importance of strategic collaboration among supply chain partners (Contractor and Lorange, 1988; Kanter, 1994), the issue of how relational competencies generate sustainable strategic advantage has attracted a great deal of scholarly attention (Dyer and Singh, 1998; Kale et al., 2000; Lorenzoni and Lipparrini, 1999). The development of relational competencies requires that firms adopt a collaborative managerial mindset for building strategic advantage (Ohmae, 1989). Leaders in such firms articulate a “strategic intent” by creating an imbalance between the firm’s strategic goals and their current stocks of resources and capabilities (Hamel and Prahalad, 1994). Such a strategic intent then drives firms to acquire, access, or develop additional resources through cooperation. Additionally, firms may form strategic partnerships to access or acquire unique and valuable resources that they lack, or leverage “social” resources, such as reputation, status, and legitimacy (Eisenhardt and Schoonhoven, 1996). Thus, firms that emphasize cooperation among supply chain partners may achieve greater economic benefits compared to those that espouse traditional, zero-sum-based notion of competition. For example, Toyota’s cooperation with its suppliers enhances its competitive position as well as
that of its suppliers in the global automobile industry (Dyer and Nobeoka, 2000). With a market capitalization greater than that of General Motors, Ford, and Chrysler combined, Toyota is also by far the world’s most profitable automaker (Liker, 2004).

2.2. Communication as a relational competence

As a relational competency, communication among supply chain members may foster inter-organizational learning that is crucially important to competitive success (Powell et al., 1996). Organizations often learn by collaborating with other organizations and especially by sharing tacit, critical information and knowledge (Grant, 1996; Kogut and Zander, 1992). Open, frequent communication is essential to the maintenance of these value-enhancing relationships (Christopher, 1992). Such communication can facilitate knowledge development (Kotabe et al., 2003; Takeishi, 2001) and foster greater understanding of complex competitive issues related to supply chain success (Grant, 1996; Kogut and Zander, 1992). Specifically, the frequent exchange of information on strategic and operational matters may foster greater confidence, build cooperation and trust, reduce dysfunctional conflict and, thus, generate relational rents (Anderson and Narus, 1990; Anderson and Weitz, 1992). Such inter-organizational communication also may lead to increased behavioral transparency and reduced information asymmetry (Heide and Miner, 1992), thereby lowering transaction costs and enhancing transaction value (Dyer, 1997; Zajac and Olsen, 1993). Therefore, as a relational competency, inter-organizational communication may generate “relational rents,” referring to benefits that accrue through relationship-specific assets (Dyer and Singh, 1998; Madhok and Tallman, 1998).

2.3. Model and hypotheses

Fig. 1 provides the conceptual model linking three key antecedents (long-term relationship orientation, network governance, and information technology) and outcomes of inter-organizational communication within the context of collaborative buyer-supplier relationships. The model is grounded in the logic of the relational view of strategic management (Dyer and Singh, 1998), which also builds on Macneil’s (1980) relational exchange theory. Accordingly, having a long-term orientation is a key factor in forming, developing, and maintaining value-enhancing relational exchanges (e.g., Mohr et al., 1996; Ganesan, 1994). Exchange partners with this orientation are likely to rely on norms of fair dealing, such as solidarity, flexibility, mutuality and information exchange that have been documented to yield positive-sum benefits (Macneil, 1980; Kaufmann and Stern, 1988; Heide and John, 1992).

Additionally, researchers have documented the extent to which network governance is critical to managing inter-organizational exchange relationships (e.g., Borys and Jemison, 1989; Powell, 1990). Dyer and Singh (1998) specifically identified network governance as a key source of relational rents. Likewise, communication theorists have documented how network governance contributes to communication effectiveness within and between organizations (Fulk and Boyd, 1991). Thus, the use of network governance might foster collaborative communication among supply chain partners (Mohr et al., 1996), and facilitate

![Fig. 1. Proposed model of inter-organizational communication (Model 1).](image-url)
the exchange of knowledge and ideas for mutual gains (Dyer and Singh, 1998; Kale et al., 2000).

Finally, in contemporary supply chains, information technology plays a key role in reducing both internal and external coordination costs (Kim and Mahoney, 2006) and facilitating the development and exchange of strategically relevant information and knowledge among supply chain partners (Dyer and Singh, 1998; Fulk and Boyd, 1991). Additionally, information technology may be the source of sustainable competitive advantage insofar as it is embedded in organizational routines and processes for developing and deploying relational capabilities (Bharadwaj, 2000; Mata et al., 1995; Powell and Dent-Micallef, 1997). Thus, based on the logic of the relational view, information technology might promote greater communication and serve as a critical embedding mechanism, which may generate durable strategic advantages for the supply chain partners.

Furthermore, we propose that inter-organizational communication plays a mediating role in the links between the three antecedent variables and buyer and supplier firms’ performance. That is, the effects of these antecedent factors on supply chain performance are transmitted through inter-organizational communication (e.g., Mohr et al., 1996). We elaborate on the links among the antecedents and outcomes of inter-organizational communication next.

2.3.1. Long-term relationship orientation

A long-term relationship orientation may promote collaborative communication and enable supply chain partners to build stronger relational bonds (De Toni and Nassimbeni, 1999; Kotabe et al., 2003; Mohr et al., 1996; Powell et al., 1996). With such an orientation, supply chain partners are able to focus on knowledge development and exchange and increase investment in relational competencies (Madhok and Tallman, 1998). Insofar as these relational competencies are “socially created,” resulting from ongoing collaborative communication among exchange partners (Mohr et al., 1996), and not easily tradable in strategic factor markets (Dierickx and Cool, 1989), they may confer durable strategic advantages for the supply chain partners (Kale et al., 2000; Dyer and Singh, 1998). Thus, a long-term relationship orientation on the part of buyer and supplier firms provides the strategic context necessary for fostering collaborative communication. Such an orientation also enables the exchange parties to cultivate relational norms that promote cooperation for mutual gains (Morgan and Hunt, 1994; Heide and John, 1992; Macneil, 1980). Put differently, with a long-term orientation, “anticipated gains from mutual cooperation” are possible because “the future casts a [long] shadow back upon the present, affecting current behavior patterns” (Parkhe, 1993, p. 799).

When supply chain partners adopt a long-term orientation, they tend to rely on “understandings and conventions involving fair play and good faith” (Okun, 1980, p. 8), such that any agreements between them are enforceable largely through internal processes rather than through external arbitration or the courts (Dyer and Singh, 1998). Thus, such an orientation enables the communication and exchange of information and knowledge, lowers transaction costs and enhances transaction value through strategic collaboration. In contrast, a short-term oriented, adversarial buyer–supplier relationship focused on transaction cost economizing can inhibit the development of relational competencies, frustrate collaborative communication, and heighten opportunism, which ultimately dissipates relational rents (Ghoshal and Moran, 1996). This reasoning leads to the following hypothesis:

Hypothesis 1. Long-term relationship orientation is positively related to effective communication between the buyer firms and their suppliers.

Based on the above rationale that long-term relationship orientation can lead to effective communication and our discussion in Section 2.3.4 that communication is positively related to buyer and supplier performance, communication appears to mediate long-term relationship orientation and buyer and supplier performance. Since some studies (e.g., Jones et al., 1997; Vickery et al., 2003) have suggested that long-term relationship can result in improved firm performance, this study will also test for possible direct effect in the competing models in Section 3.8.

2.3.2. Network governance

Network governance refers to inter-firm coordination that is characterized by informal social systems in contrast to the use of hierarchical authority (Jones et al., 1997). These social systems, or “relational norms” include solidarity, mutuality, flexibility, information exchange, and role integrity (e.g., Heide and John, 1992; Kaufmann and Stern, 1988; Macneil, 1980). Communication, though conceptually distinct from relational norms, plays an important role in activating and translating these relational norms into value-enhancing relational assets (Mohr et al., 1996). Thus, network governance enables the exchange of information among supply chain partners, and facilitates the development and maintenance of value-enhancing
relational exchanges among supply chain partners (Dyer and Chu, 2003; Poppo and Zenger, 2002; Powell, 1990). Further, network governance facilitates inter-firm communication, which, in turn, may contribute to collaborative advantage by fostering knowledge development and exchange, and promoting the use of “richer” communication media, such as face-to-face interactions among supply chain partners (Jones et al., 1997; Powell, 1990; Zaheer and Bell, 2005). In the context of buyer–supplier relationships, little empirical work exists, documenting network governance as an antecedent of inter-organizational communication. Thus, we forward the following hypothesis for empirical testing:

**Hypothesis 2.** Network governance is positively related to effective communication between the buyer firms and their suppliers.

### 2.3.3. Information technology

Increasingly, information technology (IT) has become a vital element in contemporary supply chain systems, transforming the way exchange-related activities are performed (Palmer and Griffith, 1998). However, resource-based theorists have argued that supply chain partners that rely on “off-the-shelf” information technology are unlikely to achieve competitive advantage because such IT does not fulfill the criteria of value, rareness, imperfect imitability, and non-substitutability associated with rent-yielding resources and capabilities (Barney, 1991; Mata et al., 1995). Additionally, those who subscribe to the “strategic necessity” hypothesis believe that IT, at best, may be a source of competitive parity; that is, it is a necessary investment to avoid competitive disadvantage but, by itself, it does not provide a sufficient basis for generating sustained competitive advantage (Clemens and Row, 1991; Mata et al., 1995). Brynjolfson’s (1993) notion of IT productivity paradox – the fact that increases in IT investments at the firm level do not seem to produce commensurate productivity (i.e., efficiency) gains, even though such gains are evident at the macroeconomic level – is often invoked to support this view. Epitomizing this position, Carr (2003) asserted: “IT does not matter.”

In contrast, users of the relational view have documented how IT can generate sustainable competitive advantage by facilitating collaborative communication and fostering relational capabilities (e.g., Grover and Malhotra, 1997; Walton and Maruecheck, 1997). Accordingly, sustainability of advantage is possible when IT resources facilitate collaborative communication, leading to the development of complementary capabilities (e.g., Powell and Dent-Micalef, 1997). Firms such as Dell and Wal-Mart have made significant IT investments in their supply chain management systems and derived substantial benefits from these investments (Subramani, 2004). Furthermore, investments in IT may be associated with a flattening of organizational structure, which increases the flow of information across organizational functions or units (Kim and Mahoney, 2006). We should emphasize, however, that it is not the mere investment in IT, per se, which is the source of competitive advantage. Rather, the sustainability of strategic advantage depends on how information technology is used to foster collaborative communication between supply chain partners, and facilitate the development and use of complementary capabilities (Dyer and Singh, 1998; Kale et al., 2000). Therefore, we hypothesize that:

**Hypothesis 3.** Information technology is positively related to effective communication between the buyer firms and their suppliers.

### 2.3.4. Inter-organizational communication and buyer–supplier performance

Effective and efficient communication between supply chain partners reduces product and performance-related errors, thereby enhancing quality, time, and customer responsiveness (Chen and Paulraj, 2004; Dyer, 1996). When buyers and suppliers share important information relating to materials procurement and product design issues, they are more likely to (1) improve the quality of their products, (2) reduce customer response time, (3) reduce the costs of protecting against opportunistic behavior, and (4) increase cost savings through greater product design and operational efficiencies (Carr and Pearson, 1999; Turnbull et al., 1992). Dyer and Singh (1998) conclude that relational rents are possible when alliance partners combine or exchange idiosyncratic assets, knowledge, and resources/capabilities, and employ effective governance mechanisms that lower transaction costs or permit the realization of rents through the synergistic combination of knowledge and capabilities. Furthermore, empirical research shows that strategic alliances in which partners exchange timely, accurate, and relevant information, and share critical and “sensitive” information are more successful than alliances that do not exhibit those communication behaviors (Carter and Miller, 1989; Chen and Paulraj, 2004; Mohr and Spekman, 1994; Newman and Rhee, 1990). Thus, communication contributes to competitive advantage.
by enhancing operational efficiency, quality, flexibility, and customer responsiveness. Although studies have documented the benefits of information sharing for buyer firms (e.g., Clark and Fujimoto, 1991; Lamming, 1993), few studies have specifically focused on supplier firm performance (Carter and Miller, 1989; Kotabe et al., 2003). Thus, we investigate the effects of interorganizational communication on both buyer firms’ and supplier firms’ performance. We should note, however, that although communication may increase the created value within the partnership, individual firm’s performance ultimately depends on how much of the additional value is captured by each partner (e.g., Bowman and Ambrosini, 2000; Ghosh and John, 1999). With this caveat in mind, we submit the following hypotheses:

**Hypothesis 4.** Inter-organizational communication is positively related to buyer firms’ performance.

**Hypothesis 5.** Inter-organizational communication is positively related to supplier firms’ performance.

As stated previously, communication is proposed as a mediator of the links between the antecedents and outcomes of the buyer-supplier relationships. The relational view of strategic management supplies the rationale for this claim. Within this view, Dyer and Singh (1998) identified several relational variables, including inter-firm knowledge-sharing routines and complementary resources and capabilities as critical to fostering collaborative advantages. Insofar as communication enables the sharing of information and knowledge between exchange partners (e.g., Fulk and Boyd, 1991; Mohr et al., 1996), it may function as a critical mediating construct by transmitting the effects of the three antecedent variables (long-term relationship orientation, network governance, and information technology) on buyer and supplier performance. Additionally, open and frequent communication facilitates the development of relational capabilities (Kale et al., 2000), which may yield mutual benefits for the exchange partners. To the extent that communication is the “essence of organizational life” (e.g., Fulk and Boyd, 1991; Weick, 1987), and provides a medium that fosters a wide-range of value-enhancing organizational processes (e.g., Reinsch, 2001), investigating the mediating role of inter-organizational communication in the current study is warranted. Thus, we hypothesize that

**Hypothesis 6a.** Inter-organizational communication mediates the relationships between the antecedent variables (long-term relationship orientation, network governance, and information technology) and buyer performance.

**Hypothesis 6b.** Inter-organizational communication mediates the relationships between the antecedent variables (long-term relationship orientation, network governance, and information technology) and supplier performance.

### 3. Methodology

#### 3.1. Unit of analysis

To be sure, most of the constructs used in this study, such as communication are individual-level constructs. Organizations do not communicate; people do. However, in order to translate these behavioral constructs at the dyadic, inter-organizational level, which is the unit of analysis for this study, we presume that “individual views on [supply chain management] issues will be a function of their organizational roles” (Ring and Van de Ven, 1994, p. 95). And, individuals who occupy strategic positions in their organizations would be more knowledgeable about the strategic aspects of interorganizational exchange relationships. Thus, we tapped responses to the questionnaire from “key informants,” including vice presidents of purchasing, supply chain management, and materials management of US manufacturing firms. The use of key informants as sources of data is standard practice in strategic management research (e.g., Venkatraman and Ramamujam, 1986). In this study, we relied on key informants from the buyer side of the inter-organizational dyad to provide responses to the survey items. The approach of surveying the buying firms’ executives to study the buyer–supplier relationship has been widely adopted in the field of operations management (e.g., Carr and Pearson, 1999; Shin et al., 2000).

#### 3.2. Data collection

A cross-sectional mail survey was utilized for data collection. The target sample frame consisted of members of the Institute for Supply Management (ISM) drawn from U.S. firms covered under the two-digit SIC codes between 34 and 39. A 7-point Likert scale with end points of “strongly disagree” and “strongly agree” was used to measure the items. The buyer and supplier performance were measured using 7-point Likert scale with end points of “decreased significantly” and “increased significantly”. In an effort to increase the response rate, a modified version
of Dillman’s total design method was followed (Dillman, 1978). All mailings, including a cover letter, the survey, and a postage-paid return envelope were sent via first-class mail. Two weeks after the initial mailing, reminder postcards were sent to all potential respondents. For those who did not respond, a second wave of mailing of surveys, cover letters, and postage-paid return envelopes were mailed approximately 28 days after the initial mailing. Of the 1000 surveys mailed, 46 were returned due to address discrepancies. From the resulting sample size of 954, 232 responses were received, resulting in a response rate of 24.3%. A total of 11 were discarded due to incomplete information, resulting in an effective response rate of 23.2% (221/954). The final sample included 35 presidents/vice presidents (16%), 138 directors (62%), 33 purchasing managers (15%), and 15 others (7%). The respondents worked primarily for medium to large firms with nearly 36% working for firms employing more than 1000 employees. Nearly 60% of the firms had a gross income of greater than $100 million. With respect to the annual sales volume, the respondents were evenly distributed among the different groups. The respondents were also distributed evenly among the six SIC codes selected.

Non-response bias was tested in two ways. First, the sample and the population means of demographic variables: namely, number of employees, and sales volume were compared to check for any significant difference. The t-tests yielded no statistically significant differences (at 99% confidence interval) between the sample and population. Additionally, the responses of early and late waves of returned surveys were compared to provide additional support of non-response bias (Armstrong and Overton, 1977; Lambert and Harrington, 1990). Along with the 10 demographic variables, 30 randomly selected variables were included in this analysis. The final sample was split into two, depending on the dates the responses were received. The early-wave group consisted of 123 responses while the late wave group consisted of 98 responses. t-Tests performed on these two groups yielded no statistically significant differences (at 99% confidence interval). These results suggest that non-response may not be a problem.

3.3. Measures

The variable, “Long-term Relationship Orientation” is operationalized by items tapping the extent to which the buying firm (a) expects its relationships with key suppliers to last a long time, (b) works closely with key suppliers to improve product quality, and (c) views the suppliers as an extension of the company (Krause and Ellram, 1997; Shin et al., 2000). “Network Governance” covers items that mirror (a) fewer management levels, (b) informal social systems, (c) permeable as well as flexible firm boundaries, and (d) non-power-based relationships (Jones et al., 1997; Stock et al., 2000). The indicators of “Information Technology” measure the adoption of (a) computer-to-computer electronic links, (b) technology enabled transaction processing, and (c) advanced systems for tracking and managing the business process (Carr and Pearson, 1999). “Inter-organizational Communication” is operationalized in terms of the extent to which the firm and its key suppliers (a) share critical, sensitive information related to operational and strategic issues, (b) exchange such information frequently, informally and/or in a timely manner, (c) maintain frequent face-to-face meetings, and (d) closely monitor and stay abreast of events or changes that may affect both parties (Krause and Ellram, 1997; Carr and Pearson, 1999; Carr and Smeltzer, 1999). Finally “Supplier Performance” and “Buyer Performance” are measured by indicators tapping the dimensions of (a) cost, (b) quality, (c) volume and scheduling flexibility, (d) speed and reliability of delivery, and (e) rapid responsiveness (Jayaram et al., 1999; Medori and Steeple, 2000).

Since firm size could significantly affect the scope of resource allocation (Ettlie, 1983), we have included number of employees (Graves and Langowitz, 1993) and annual sales volume (Cool and Schendel, 1987) to control for any effects of firm size on supplier and buyer performance. Because both of these variables were measured using categorical scales, they were included into the structural model as dummy variables. Number of employees was included in the model as a dummy variable with firms having less than or equal to 500 employees coded as 0 and firms having more than 500 employees coded as 1. Annual sales volume was included in the model as a dummy variable with firms having annual sales volume less than $100 million coded as 0 and firms having annual sales volume greater than or equal to $100 million coded as 1. Operation management researchers have used these (admittedly crude) measures to control for size differences between small and large firms, and industry effects in structural equation models (e.g., Cousins and Menguc, 2006; Fynes and Voss, 2001).

3.4. Common method variance

Since we collected the information on the variables of interest from a single respondent within a single firm,
common method bias may present a problem. The potential for common method bias was assessed in two ways (Podsakoff et al., 2003). First, the Harman’s (1967) single factor approach was used to test this potential problem. According to this test, if common method bias exists, (1) a single factor will emerge from a factor analysis of all survey items (Podsakoff and Organ, 1986), or (2) one general factor accounting for most of the common variance existing in the data will emerge (Doty and Glick, 1998). An un-rotated factor analysis using the eigen value-greater-than-one criterion revealed eight distinct factors that accounted for 67% of the variance. The first factor captured only 26% of the variance in the data. Since a single factor did not emerge and the first factor did not account for most of the variance, we concluded that common method variance might not be an issue. To reinforce this conclusion, we conducted a second test, following the procedure recommended by Widaman (1985). In this approach, two different latent variable models – a measurement model including just the traits (multiple factors), and a measurement model including a method factor in addition to the traits – were tested (Williams et al., 1989; Podsakoff et al., 2003; Ketokivi and Schroeder, 2004). Although the results from these analyses indicated that the method factor marginally improved model fit (normed fit index [NFI] by 0.02, non-normed fit index [NNFI] by 0.01, comparative fit index [CFI] by 0.01), it accounted for only 10% of the total variance, which is significantly less than the amount of method variance (25%) observed by Williams et al. (1989). Also, the path coefficients and their significance were not much different between the two models, suggesting that they were robust in spite of the inclusion of a methods factor. Based on the results of these analyses we could reasonably conclude that the results were not inflated due to the existence of common method variance in the data.

3.5. Instrument development

Prior to data collection, the content validity of the instrument was established by grounding it in existing literature. Pre-testing the measurement instrument before the collection of data further validated it. Researchers as well as purchasing executives affiliated with the Institute for Supply Management (ISM) were involved in this process. These experts were asked to review the questionnaire for structure, readability, ambiguity, and completeness (Dillman, 1978). The final survey instrument incorporated minor changes to remove a few ambiguities that were discovered during this validation process. As indicated earlier, multi-item scales were developed to measure the theoretical constructs. Before conducting factor analysis, the scales were tested for normality and outliers using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and the Bartlett test of sphericity. For the theoretical constructs in this study, the KMO score was 0.85 and the Bartlett test of sphericity was 4613.76 with a significance level of $p < 0.0001$. These numbers suggest the data could be reliably tested using factor analysis. Given that supplier and buyer performance (as shown in Appendix B) were operationalized using formative indicators (Diamantopoulos and Winklhofer, 2001; Jarvis et al., 2003) for which conventional techniques (such as LISREL) are not appropriate for assessing their reliability and validity, we did not include them in the instrument development process in line with Heide’s (2003) suggestion.

Construct validity and unidimensionality were established using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The results of these analyses are provided in Appendix A. As anticipated, most of the indicators loaded onto their underlying constructs during EFA using principal components method. The Eigen values for these factors were above the 1.0 cut-off point (Hair et al., 1998) while the percentage of variation was around 64%. The factor loadings were also above the cut-off point of 0.30 (Hair et al., 1998). CFA measurement model was used to further establish unidimensionality and construct validity. The values for the model fit indices (goodness of fit [GFI] = 0.90, adjusted goodness of fit [AGFI] = 0.86, NNFI = 0.95, CFI = 0.96, root mean square residual [RMSR] = 0.06, root mean square error of approximation [RMSEA] = 0.05, and normed $\chi^2$ [NC] = 1.62) show that the model fits the data well and hence establish unidimensionality. The standardized coefficients and $t$-values for the individual paths show that all the indicators are significantly related to their underlying theoretical constructs and, hence, exhibit convergent validity.

Discriminant validity was established using CFA. Measurement models were constructed for all possible pairs of the theoretical constructs. These models were tested on each selected pair by allowing for correlation between the two constructs, and fixing the correlation between the constructs at 1.0. A significant difference in $\chi^2$ values for the fixed and free solutions indicates the distinctiveness of the two constructs (Bagozzi et al., 1991). In addition, the confidence interval for each pair of constructs was set to be equal to plus or minus two standard errors of the respective correlation coefficient
If this confidence interval does not include the value of 1, the constructs exhibit discriminant validity. As can be seen in Table 1, all the differences between the fixed and free solutions (in $\chi^2$) are significant. Furthermore, the table shows that none of the confidence intervals include the value of 1.

As an alternative test, we compared the squared correlation between two latent constructs to their average variance extracted (AVE) estimates (Fornell and Larcker, 1981). According to this test, discriminant validity exists if the items share more common variance with their respective construct than any variance the construct shares with the other constructs. Therefore, the squared correlation between each pair of constructs should be less than the AVE for each individual construct. Comparing the correlation coefficients given in Table 2 with the AVE values given in Appendix A, we can conclude that none of the squared correlations is higher than the AVE for each individual construct. In fact, the highest squared correlation of 0.38 between inter-organizational communication and long-term relationship orientation (with a correlation of 0.62) was much lower than the AVE for the two constructs (0.66). These results collectively provide strong evidence of discriminant validity among the theoretical constructs.

Reliability was assessed using internal consistency method via Cronbach’s alpha (Cronbach, 1951; Nunnaly, 1978). Typically, reliability coefficients of 0.70 or higher are considered adequate (Cronbach, 1951; Nunnaly, 1978). All constructs had a Cronbach’s alpha greater than 0.70 (see Appendix A). This result establishes the reliability of all the theoretical constructs. Alternatively, following Bagozzi and Yi (1988), we computed composite reliability (CR) scores to assess construct reliability. According to these authors, a CR greater than 0.70 would imply that the variance captured by the factor is significantly more than the variance indicated by the error components. As reported in Appendix A, all factors have CRs greater than 0.70. In addition, the AVE values for all constructs exceed 0.50. Taken together, the results from the instrument development process show that the theoretical constructs exhibit good psychometric properties.

### 3.6. Hypothesis testing

The hypothesized structural equations model (Fig. 1) was tested using LISREL (Joreskog and Sorbom, 1999), with variance–covariance matrices for the latent variables and residuals used as input. Given the satisfactory measurement results, we used summated scores to measure the model’s latent constructs. The use of summated scores reduces the model’s complexity, identification problems, and the variable-to-sample ratio (Calantone et al., 1996). In the hypothesized

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<th>Factors</th>
<th>LR</th>
<th>NG</th>
<th>IT</th>
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<td>Long-term relationship orientation</td>
<td>208.39</td>
<td>–</td>
<td>0.53–0.73</td>
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<tr>
<td>Network governance</td>
<td></td>
<td>366.83</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Information technology</td>
<td>466.21</td>
<td>0.12–0.40</td>
<td>0.05–0.37</td>
<td></td>
</tr>
<tr>
<td>Inter-organizational communication</td>
<td>220.45</td>
<td>246.36</td>
<td>530.34</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>0.58–0.78</td>
<td>0.41–0.65</td>
<td>0.32–0.56</td>
<td></td>
</tr>
</tbody>
</table>

First row: $\chi^2$ differences between the fixed and free solution (significant at the 0.001 level [for 1 d.f.]). Second row: confidence interval $\phi \pm \sigma_c$ (none of them include 1.00).

<table>
<thead>
<tr>
<th>Factors</th>
<th>Mean</th>
<th>S.D.</th>
<th>LR</th>
<th>NG</th>
<th>IT</th>
<th>CO</th>
<th>SP</th>
<th>BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term relationship orientation</td>
<td>5.690</td>
<td>0.934</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network governance</td>
<td>5.061</td>
<td>1.078</td>
<td>0.53</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Information technology</td>
<td>4.368</td>
<td>1.443</td>
<td>0.23</td>
<td>0.18</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-organizational communication</td>
<td>5.100</td>
<td>1.039</td>
<td>0.62</td>
<td>0.45</td>
<td>0.40</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier performance</td>
<td>4.904</td>
<td>0.754</td>
<td>0.26</td>
<td>0.14</td>
<td>0.20</td>
<td>0.28</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Buyer performance</td>
<td>4.715</td>
<td>0.707</td>
<td>0.22</td>
<td>0.21</td>
<td>0.21</td>
<td>0.28</td>
<td>0.58</td>
<td>1.00</td>
</tr>
</tbody>
</table>
structural model, the measurement coefficients were constrained to one and the corresponding error coefficients were constrained to zero. The model parameters were estimated using the method of maximum likelihood (Joreskog and Sorbom, 1999). The values for the model fit indices (GFI = 0.98, AGFI = 0.90, NFI = 0.97, NNFI = 0.93, CFI = 0.98, RMRS = 0.05, RMSEA = 0.08, and NC = 2.45) show that the model fits the data very well. 

Table 3

<table>
<thead>
<tr>
<th>Exogenous variables</th>
<th>Endogenous variables</th>
<th>Supplier performance</th>
<th>Buyer performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inter-organizational communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td>Total</td>
<td>Indirect</td>
</tr>
<tr>
<td>Long-term relationships orientation (LR)</td>
<td>0.00</td>
<td>0.53** (0.48)</td>
<td>0.10** (0.13)</td>
</tr>
<tr>
<td>Network governance (NG)</td>
<td>0.00</td>
<td>0.14** (0.15)</td>
<td>0.03* (0.04)</td>
</tr>
<tr>
<td>Information technology (IT)</td>
<td>0.00</td>
<td>0.19** (0.26)</td>
<td>0.04** (0.07)</td>
</tr>
</tbody>
</table>

Note: **t-Values significant at p ≤ 0.01; *t-Values significant at p ≤ 0.05.

To test for the mediating effect of inter-organizational communication in our model (Hypotheses 6a and 6b), we used structural equation modeling (SEM) approach, following the suggestion of James et al. (2006). This approach is preferable to the commonly used Baron and Kenny (1986) method in that it: (a) allows for the testing of full as well as partial mediation (James et al., 2006); (b) reduces the chances of type I error (Schneider et al., 2005), and (c) exhibits greater statistical power (MacKinnon et al., 2002). Furthermore, as a confirmatory approach, SEM permits the simultaneous and holistic testing of the hypothesized relationships while accounting for all other effects of the variables.

As hypothesized, the paths from the antecedents to inter-organizational communication were positive and statistically significant, as were the paths from inter-organizational communication to supplier performance and buyer performance. This result empirically documents that inter-organizational communication may function as a mediator in the links between the antecedent variables and buyer and supplier performance. Further, we compared the proposed model (Model 1) with a partial mediation model (Model 3 which is explained in Section 3.8) to closely examine the extent to which inter-organizational communication partially or fully mediates these hypothesized relationships (Donavan et al., 2004; Schneider et al., 2005). The result for the partial mediation model is presented in Table 4. Though the overall fit of the partial mediation model (Model 3) was not satisfactory, as indicated by
the NNFI and RMSEA values, which are not within the recommended ranges, we compared the two models based on the significance of the paths between the antecedents and the performance variables. As shown in Table 4, although the paths between inter-organizational communication and performance outcomes reduced in significance from Model 1 to Model 3, they were still found to be significant at the $p < 0.10$ level.

The direct link between long-term relationship orientation and supplier performance was found to be marginally significant ($b = .14; t = 1.67; p < .10$), indicating that the effect of long-term relationship orientation on supplier performance is partially mediated by inter-organizational communication. In contrast, the effect of long-term relationship orientation on buyer performance was found to be non-significant ($b = .03; t = 0.40; n.s.$), indicating that this relationship is fully mediated by inter-organizational communication. The direct link between network governance and (1) supplier performance ($b = -.03; t = -0.43; n.s.$), and (2) buyer performance ($b = .08; t = 1.00; n.s.$) were both found to be non-significant. This result shows that inter-organizational communication fully mediates the relationships between network governance and buyer and supplier performance. Finally, the path linking information technology and supplier performance was found to be non-significant ($b = .10; t = 1.37; n.s.$), while the path leading to buyer performance was found to be marginally significant ($b = .14; t = 1.88; p < .10$). This result shows that while inter-organizational communication fully mediates the relationship between information technology and supplier performance, it only partially mediates the relationship between information technology and buyer performance.

### 3.8. Competing models

Following recommended practice in structural equations methodology (Bollen and Long, 1992; Kelloway, 1998), we compared our proposed model with alternative or rival models in order to ascertain which model fits the data the best. As discussed
previously, in our proposed model, inter-organizational communication is posited to fully mediate the links among the three antecedent variables and buyer–supplier performance. Alternatively, a “direct effects” only model might be posited in which communication along with the three antecedent variables are directly linked to the performance outcomes (Model 2). The logic for this model is based on the view that communication and the other three antecedents constitute a set of supply management capabilities, which are directly associated with buyer–supplier performance (e.g., Chen et al., 2004). Furthermore, communication might serve as a “partial” rather than “full” mediator of the relationships between the antecedent and outcome variables. As discussed previously, both the RBV and relational view of strategic management suggest that the three antecedents may themselves be the sources of “relational rents;” that is, they might have “direct” effects (in addition to any “indirect” effects) on the outcome variables of interest (e.g., Dyer and Singh, 1998; Kale et al., 2000). Accordingly, in addition to the paths in the proposed model, this partial mediation model also adds direct paths from each antecedent to the performance constructs (Model 3). Finally, it could be argued that inter-organizational communication might function as the antecedent of the three variables above, which are then linked to the outcome variables. Thus, long-term relationship orientation, network governance, and information technology are treated as intervening variables coming between inter-organizational communication and buyer and supplier performance (Model 4). The logic for this model is analogous to that in Chen et al. (2004) who posited strategic purchasing to drive several supply management capabilities (including long-term orientation and communication), leading to performance outcomes.

Similar to the approach taken by Morgan and Hunt (1994), the proposed model is compared to three competing models along the following criteria: (1) overall model fit as measured by NNFI, CFI, and RMSEA; (2) percentage of models’ hypothesized parameters that are statistically significant; (3) the explained variance in the outcome variables, as measured by their squared multiple correlations (SMCs); (4) parsimony, as measured by the parsimonious normed fit index (PNFI) and RMSEA. Additionally, the proposed and alternative models were further compared using the Akaike’s Information Criterion (AIC) and the Consistent Akaike’s Information Criterion (CAIC). Though there are no specific cutoffs for AIC and CAIC, a smaller value for each of these indices represents a better fit (Akaike, 1987; Bozdogan, 1987). Moreover, the use of information criteria such as AIC and CAIC is valuable when comparing structural equation models that differ with respect to restrictiveness (Rust et al., 1995; Tabachnick and Fidell, 2001).

As shown in Table 4, the model fit statistics generally suggest that the proposed model fits the data relatively well. Specifically, the fit indices including CFI, NNFI, and RMSEA are well within acceptable ranges. In addition to these model fit indices, AIC and CAIC clearly indicate that the proposed model is better than the other three competing models. Moreover, the explanatory power of the outcome variables (supplier performance and buyer performance) in the proposed model was comparable to the other models. All five hypothesized relationships were significant at the $p < 0.01$ level, providing support for the efficacy of the proposed model.

The direct model (Model 2) performed significantly worse than the proposed model. As evident from Table 4, all fit indices (CFI, NNFI, and RMSEA) for this model are significantly lower than the proposed model. Only one out of eight paths are supported at the $p < 0.05$ level. Moreover, the explanatory power of the outcome variables is not significantly different from the proposed model. The PNFI of the proposed model (0.28) exceeds that of the Model 2 (0.03). Although there are no guidelines for determining a significant difference in PNFI values, the PNFI for the proposed model increased significantly. So, in addition to the model fit indices, the proposed model also accomplished a great deal of improvement in parsimony. Additionally, the AIC (139.01) and CAIC (292.94) for the non-nested direct model are much higher than the proposed model, indicating that the proposed model is significantly better than the direct model. These results collectively provide strong evidence for the superiority of the proposed model over the direct model.

Model 3 treats inter-organizational communication as a partial mediator of the relationships between the antecedents and the performance outcomes. Our proposed model is actually a restricted version of Model 3. Though this model fared much better than the direct model (Model 2), it was found to be inferior to the proposed model. As shown in Table 4, all fit indices (CFI, NNFI, and RMSEA) are lower than the proposed model. Except for CFI, the other fit indices in fact are not within the recommended ranges. Among the 11 paths in this partial mediation model, only four paths are supported at the $p < 0.05$ level. Moreover, the PNFI of the proposed model (0.28) is much higher than that of Model 3 (0.07). In addition, the AIC (78.45) and CAIC
(227.98) for Model 3 are higher than those for the proposed model, indicating that the proposed model is better than the partial mediation model. Though the explained variance in the outcome variables is marginally higher, the results collectively provide strong evidence for the superiority of the proposed model.

Furthermore, since the proposed model (Model 1) is nested within the partial mediation (Model 3) model, we also compared the \( \chi^2 \) values of the two models (Rust et al., 1995). The \( \chi^2 \) difference test requires a comparison of the \( \chi^2 \) values and associated degrees of freedom of two models. Finding a significant difference in the \( \chi^2 \) values would be interpreted as support for the less restricted of the two models (Model 3), while a non-significant difference would suggest that the proposed model fits the data statistically as well as the partial mediation model. The \( \chi^2 \) difference obtained in comparing the partial and full mediation model was not statistically significant (\( \Delta \chi^2 = 8.89, \text{d.f.} = 6, p > 0.10 \)), confirming that the proposed model fits the data at least as well as the less restricted partial mediation model. These results collectively support the notion that inter-organizational communication is a full mediator of most of the relationships between the antecedents and the performance outcomes.

Finally, Model 4, which posits inter-organizational communication to be an antecedent rather than a mediator variable, was compared with the proposed model. The fit indices for this rival model are much lower than the proposed model. Except for CFI, the other fit indices are not within their satisfactory ranges. Of the nine paths in this rival model, only five paths are supported at the \( p < 0.05 \) level. Although the rival model has achieved an improvement in parsimony when compared to the proposed model, the AIC (120.18) and CAIC (230.13) values are much higher than the proposed model, indicating that the proposed model is better than the rival model. Therefore, comparison of the model fit indices and information criteria like AIC and CAIC collectively provide strong support for the proposed model, thereby supporting our claim that inter-organizational communication functions as a mediator rather than an antecedent within the nomological structure of the proposed model. These analyses also clearly document that the proposed model is the best-fitting model compared to the three competing models.

4. Discussion and implications

We have documented how inter-organizational communication constitutes a relational competency that generates sustainable strategic advantage for supply chain partners. As a relational competency, communication takes on the quality of a “quasi-public good” in that it tends to increase in value when used and shared and, thus, fosters “positive-sum” benefits for the supply chain partners. By empirically documenting the antecedents and outcomes of inter-organizational communication within the context of dyadic, buyer–supplier relationships, this study has sought to increase the explanatory power and predictive scope of emerging models of supply chain management. Our findings in support of the hypotheses linking the antecedent variables with communication (Hypotheses 1–3) provide compelling evidence concerning the strategic importance of long-term relationship orientation, network governance, and information technology, respectively, in fostering collaborative communication within buyer–supplier relationships.

Operations management researchers have documented how a long-term relationship orientation results in improved coordination of tasks or activities between buyer and supplier firms (De Toni and Nassimbeni, 1999). Such an orientation enables exchange partners to develop greater confidence in one another, display cooperative and trusting behaviors, and increase investments in relationship-specific assets in order to accomplish mutual goals. In line with this work, the finding in support of hypothesis Hypothesis 1 suggests that having a long-term relationship orientation can increase collaborative communication between supply chain partners which is necessary for disseminating and sharing strategically important information and knowledge for mutual gains. By facilitating such relational exchanges, supply chain partners who adopt a long-term orientation are able to synergistically combine their resources and capabilities in order to develop a stronger basis for strategic advantage (e.g., Shan et al., 1994; Madhok, 2002). It is important to emphasize, however, that a long-term orientation does not refer to calendar time. It is possible for a buyer firm to engage in transaction-based, spot-market contracting with a supplier for a long period of time, without realizing the benefits of collaborative communication (Mohr et al., 1996). Rather, long-term orientation reflects the strategic mindset needed for a supply chain partner to cultivate the norms of solidarity, mutuality, flexibility and information sharing, which are the hallmarks of relational contracting (e.g., Macneil, 1980; Heide and John, 1992).
communication, leading to sustainable competitive advantage for supply chain partners. Strategy researchers have investigated the direct effects of network governance on inter-firm performance (e.g., Poppo and Zenger, 2002; Uzzi, 1997; Zaheer and Venkatraman, 1995). Network governance may also contribute to firm performance through fostering relational behaviors and capabilities, such as inter-organizational communication. Our finding in support of Hypothesis 2 suggests that network governance may foster the collaborative communication necessary for the development and exchange of rent-yielding relational assets among supply chain partners (e.g., Lorenzoni and Lipparini, 1999; Dyer and Singh, 1998). This finding is also in line with research on Japanese Keiretsu (i.e., clusters of interdependent buyer–supplier firms), which documents how such networks generate greater benefits for member firms (relative to non-members) by, among other things, facilitating communication, fostering trust and reciprocity, and enhancing overall productivity (e.g., Gerlach, 1992; Lincoln et al., 1992; Dyer, 2000).

The result of our empirical investigation also supports the claim about the strategic importance of IT in fostering and facilitating rent-yielding relational capabilities (Mata et al., 1995; Powell and Dent-Micalef, 1997; Zhang and Lado, 2001). The finding of a significant link between IT and inter-organizational communication (Hypothesis 3) indicates that IT can contribute to collaborative advantage through leveraging relational competencies. Additionally, the significant effect of IT on inter-organizational communication suggests that, contrary to Carr (2003), IT does matter insofar as it facilitates the use of collaborative communication between supply chain partners. More than just “cables and wires,” contemporary ITs, which can integrate data, voice and image, are capable of simulating the attributes of the “rich media” (Daft and Lengel, 1986) necessary for the development, exchange, and use of strategically valuable (tacit) knowledge between supply chain partners.

The finding of significant, positive linkage between inter-organizational communication and performance for both buyer and supplier firms (Hypotheses 6a and 6b) is contrary to a recent study by Prahinski and Benton (2004). These researchers did not find support for their proposition that the use of collaborative communication by buyer firms enhanced the perceived performance of supplier firms. It is possible that this lack of empirical support was more an artifact of their survey sample (consisting of firms in the North American automobile industry) than an empirical disconfirmation of the substantive linkage between inter-organizational communication and supplier performance, per se. This industry has been characterized by a long history of adversarial relationships between management and labor unions, as well as the use of spot market contracts between automobile companies (buyers) and supplier firms (Mudambi and Helper, 1998). Thus, supplier firms might view any efforts on the part of buyer firms (i.e., auto manufacturers) to employ collaborative forms of communication merely as manipulative tactics to extract short-term benefits from the suppliers, rather than as genuine attempts to cultivate long-term, win–win relationships. In contrast, our empirical finding is more in line with research by Mohr and Nevin (1990), Mohr and Spekman (1994), and Mohr et al. (1996), which documents that the use of collaborative communication strategies may deepen cooperation and trust, and engender greater performance benefits for the exchange partners.

Finally, this study documents that inter-organizational communication may function as a mediator of the links between the key antecedents – long-term relationship orientation, network governance, and information technology – and outcome variables within the context of dyadic buyer–supplier relationships. The proposed full mediation model was found to be superior to other competing models. Furthermore, the documented mediation effects might support the claim of communication theorists and practitioners that “communication is as fundamental to business as carbon is to physical life” (Reinsch, 2001, p. 20) insofar as it enables buyer and supplier firms to accrue relational rents.

The mediating role of communication, however, seems to vary for buyer and supplier firms, and for the different antecedent variables. For buyer firms, communication appears to function as a partial mediator of the relationship between information technology and performance. This suggests that in addition to having significant direct effect, investments in information technology might contribute to buying firm’s performance through fostering effective communication between buyer and supplier firms. The significant indirect effect of IT on performance suggests that by facilitating communication, IT may engender competitive advantage by easing the flow and exchange of knowledge and other idiosyncratic, relationship-specific assets (Madhok and Tallman, 1998). Communication was also found to partially mediate the relationship between long-term relationship orientation and supplier performance. On the other hand,
communication seems to fully mediate the relationships between (a) long-term relationship orientation and buyer performance, (b) network governance and supplier performance, (c) network governance and buyer performance, and (d) information technology and supplier performance. In conclusion, this investigation documents that inter-organizational communication plays a complex mediating role in the links between the antecedent and outcome variables, and its effect varies for buyer and supplier firms. Thus, managers and researchers need to appreciate the nuances involved in building strategic advantage through collaborative communication.

5. Conclusion and directions for future research

In this study, we have sought to advance theory and research in supply chain management by developing a parsimonious model of antecedents and outcomes of inter-organizational communication. The empirical findings in support of the hypothesized relationships corroborate our main theoretical assertion that inter-organizational communication can be viewed as a relational competency that yields strategic advantage for the collaborating firms. From a practical viewpoint, this study shows that building collaborative communication skills or competencies can have direct, positive effects on the bottom lines of the supply chain partners.

Additionally, interorganizational communication functions as an important mediating construct that has different effects on outcomes for supplier and buyer firms. For supplier firms, this finding suggests that merely adopting a long-term relationship orientation is necessary but not sufficient for achieving strategic advantage. Furthermore, managers of supplier firms would need to hone skills for effective communication in order to fully reap the benefits of long-term relationships with buyer firms. For the buyer firms, establishing a network form of governance may not be sufficient for achieving strategic advantage; such a governance form may only engender strategic advantage through providing an inter-organizational context that is conducive to collaborative communication. Thus, a nuanced understanding of the roles of these factors in shaping an inter-organizational exchange context that is conducive to collaborative communication is key to effectively managing buyer–supplier relationships for mutual benefits.

At this juncture, we should acknowledge some limitations of our study that would provide opportunities for further research. Although our model of communication has the advantage of parsimony, it might also sacrifice breadth and richness of explanation. Thus, in the future, researchers should include other factors such as geographic dispersion (Jones et al., 1997), and cultural compatibility (Teece et al., 1994) that could influence communication among supply chain partners. Also, the role of trust and commitment in directly facilitating inter-organizational communication and enhancing transaction value should be explicitly assessed. Furthermore, in testing the hypothesized relationships using covariance-based SEM we assumed, in line with prior research in operations management (e.g., Chen et al., 2004; Prahinski and Benton, 2004), that all the measures used to tap the selected variables were “reflective” rather than “formative.” In the future, researchers might consider testing the hypothesized relationships using other SEM approaches, such as partial least squares (PLS) that are better suited for investigating formative constructs (Diamantopoulos and Winklhofer, 2001).

Another limitation of this research relates to the sample population. Having drawn from a list of ISM members, the results of this research are generalizable only to the firms included in the ISM database. Although this study sample covered a wide range of firms in the ISM database in terms of industry membership and demographic variables, we suggest that future research include a mixed population of respondents from multiple sources, including service firms, as well as domestic and international companies in order to increase the scope of generalizability of the results. Finally, this study focused on the dyadic relationship as the unit of analysis, and assumed the buying firm’s perspective. Since the supplier also plays a significant role in affecting the quality of the dyad, there is a need to examine the exchange relationship from the supplier’s perspective as well. Therefore, we urge future researchers to adopt the “strategic network” (Gulati et al., 2000) as a unit of analysis and investigate the antecedents and outcomes of communication from multiple viewpoints. Despite these limitations, we believe that this study makes a compelling case for viewing inter-organizational communication as a critically important relational competency that can be leveraged for mutual gains within collaborative buyer–supplier relationships.

Acknowledgement

We would like to thank the Institute for Supply Management (ISM) for its administrative and financial support of this research.
### Appendix A

<table>
<thead>
<tr>
<th>Indicator (Cronbach’s alpha, eigen value, composite reliability, average variance extracted)</th>
<th>Principal component factor loading</th>
<th>Measurement model Std. coefficient</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term relationship orientation ((\alpha = 0.85; \text{eigen value} = 2.65; \text{CR} = 0.88; \text{AVE} = 0.66))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We expect our relationship with key suppliers to last a long time</td>
<td>0.85</td>
<td>0.67</td>
<td>–</td>
</tr>
<tr>
<td>We work with key suppliers to improve their quality in the long run</td>
<td>0.62</td>
<td>0.73</td>
<td>9.26</td>
</tr>
<tr>
<td>The suppliers see our relationship as a long-term alliance</td>
<td>0.79</td>
<td>0.81</td>
<td>12.01</td>
</tr>
<tr>
<td>We view our suppliers as an extension of our company</td>
<td>0.69</td>
<td>0.85</td>
<td>10.19</td>
</tr>
<tr>
<td>We give a fair profit share to key suppliers*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The relationship we have with key suppliers is essentially evergreen**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network governance ((\alpha = 0.81; \text{eigen value} = 2.84; \text{CR} = 0.88; \text{AVE} = 0.65))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have a permeable organizational boundary that facilitates better communication and/or relationship with our key suppliers</td>
<td>0.72</td>
<td>0.74</td>
<td>–</td>
</tr>
<tr>
<td>Our relation with the suppliers is based on interdependence rather than power</td>
<td>0.81</td>
<td>0.73</td>
<td>9.32</td>
</tr>
<tr>
<td>Our organizational structure can be characterized as a flexible value-adding network</td>
<td>0.70</td>
<td>0.73</td>
<td>9.48</td>
</tr>
<tr>
<td>Our organizational/supply structure does not involve power-based relationships</td>
<td>0.83</td>
<td>0.67</td>
<td>8.50</td>
</tr>
<tr>
<td>The decision making process in our organization is decentralized*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have few management levels in our relationship with suppliers**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information technology ((\alpha = 0.84; \text{eigen value} = 3.45; \text{CR} = 0.95; \text{AVE} = 0.75))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are direct computer-to-computer links with key suppliers</td>
<td>0.77</td>
<td>0.69</td>
<td>–</td>
</tr>
<tr>
<td>Inter-organizational coordination is achieved using electronic links</td>
<td>0.75</td>
<td>0.75</td>
<td>9.48</td>
</tr>
<tr>
<td>We use information technology enabled transaction processing</td>
<td>0.80</td>
<td>0.80</td>
<td>10.00</td>
</tr>
<tr>
<td>We have electronic mailing capabilities with our key suppliers</td>
<td>0.60</td>
<td>0.55</td>
<td>7.27</td>
</tr>
<tr>
<td>We use electronic transfer of purchase orders, invoices and/or funds</td>
<td>0.67</td>
<td>0.50</td>
<td>7.41</td>
</tr>
<tr>
<td>We use advanced information systems to track and/or expedite shipments</td>
<td>0.77</td>
<td>0.70</td>
<td>9.04</td>
</tr>
<tr>
<td>Inter-organizational communication ((\alpha = 0.86; \text{eigen value} = 3.90; \text{CR} = 0.92; \text{AVE} = 0.66))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We share sensitive information (financial, production, design, research, and/or competition)</td>
<td>0.70</td>
<td>0.57</td>
<td>–</td>
</tr>
<tr>
<td>Suppliers are provided with any information that might help them</td>
<td>0.67</td>
<td>0.66</td>
<td>8.67</td>
</tr>
<tr>
<td>Exchange of information takes place frequently, informally and/or in a timely manner</td>
<td>0.80</td>
<td>0.85</td>
<td>8.99</td>
</tr>
<tr>
<td>We keep each other informed about events or changes that may affect the other party</td>
<td>0.77</td>
<td>0.88</td>
<td>9.14</td>
</tr>
<tr>
<td>We have frequent face-to-face planning/communication</td>
<td>0.77</td>
<td>0.74</td>
<td>8.26</td>
</tr>
<tr>
<td>We exchange performance feedback</td>
<td>0.62</td>
<td>0.61</td>
<td>7.30</td>
</tr>
</tbody>
</table>

Model fit indices: normed \(\chi^2 = 1.62 (\leq 2.0); \text{goodness of fit index} = 0.90 (\geq 0.90); \text{adjusted goodness of fit index} = 0.86 (\geq 0.80); \text{non-normed fit index} = 0.95 (\geq 0.90); \text{comparative fit index} = 0.96 (\geq 0.90); \text{root mean square residual} = 0.06 (\leq 0.10); \text{root mean square error of approximation} = 0.05 (\leq 0.10). \text{Note: *Items dropped after EFA; **Items dropped after CFA; }^1\text{All t-values are significant at } p < 0.05 \text{ level.}

### Appendix B

**Performance measure**

- **Supplier performance**
  - Quality
  - Cost
  - Volume flexibility
  - Scheduling flexibility
  - On-time delivery
  - Delivery reliability/consistency
  - Prompt response

- **Buyer performance**
  - Product conformance to specifications
  - Production costs
  - Volume flexibility
  - Delivery speed
  - Delivery reliability/dependability
  - Rapid confirmation of customer orders
  - Rapid handling of customer complaints
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