Enduring buyer–supplier relationship and buyer performance: the mediating role of buyer–supplier dyadic embeddedness and supplier external embeddedness

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Abstract

Purpose – The purpose of this research is to investigate the causal mechanisms that explain the relationship between the long-term buyer–supplier relationship and buyer performance. Building on the growing body of research on social capital in supply chain management (SCM), the authors examine how a buyer achieves superior performance in forming the enduring partnership with a supplier through two different forms of supplier embeddedness: buyer–supplier dyadic embeddedness and supplier external embeddedness.

Design/methodology/approach – The bootstrapping method is utilized in data analysis to examine the mediating effects of the two different forms of supplier embeddedness simultaneously on the linkage between the duration of buyer–supplier relationships and buyer performance outcomes.

Findings – The authors find that the two forms of supplier embeddedness serve as distinct conduits for the buyer to translate the long-term buyer–supplier relationship into performance effectiveness. Notably, dyadic embeddedness only mediates the linkage between the duration of buyer–supplier relationships and buyer economic performance, while supplier external embeddedness solely mediates the linkage between the duration of buyer–supplier relationships and buyer innovation performance.

Originality/value – This study empirically demonstrates that different forms of supplier embeddedness may benefit a buyer differentially when directed at distinct performance goals. If a buyer can leverage both buyer–supplier dyadic embeddedness and supplier external embeddedness, the buyer will overcome value creation limitations of social capital from a single source, obtaining more comprehensive performance benefits sought by developing long-term buyer–supplier relationships.

Keywords Buyer–supplier relationship, Dyadic embeddedness, Supplier external embeddedness, Buyer economic performance, Buyer innovation performance

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1. Introduction

In the context of buyer–supplier relationship management, recent decades have witnessed a growing trend: leading buying firms, such as Proctor and Gamble, Dell, Hewlett–Packard, have forged long-term collaborative relationships with their strategic suppliers as a continuous source for value creation and competitive advantage (Cao and Zhang, 2011; Sjoerdsma and van Weele, 2015; Zhao *et al.*, 2019). This trend has motivated researchers to examine the causal mechanisms through which the enduring buyer–supplier partnership contributes to buyer performance (Huang and Huang, 2019; Aisyah *et al.*, 2019). In the evaluation, the application of social capital theory is gaining momentum, which views social capital as the goodwill embedded in social relations, and advocates that building social capital between buyers and suppliers allows them to gain access to and leverage resources residing in their relationships (Alghababsheh and Gallear, 2020). Highlighting social capital's association with trust, shared goal and reciprocity, prior studies have suggested that social capital is an effective intervening mechanism for the buyer to govern buyer–supplier relationships towards its performance goals (e.g. Lawson *et al.*, 2008; Johnson *et al.*, 2013; Kulangara *et al.*, 2016).

However, in examining buyer performance outcomes of enduring buyer–supplier partnerships, prior studies have focused more on the explanation power of social capital embedded in the buyer's dyadic relationship with its supplier (Krause *et al.*, 2007; Lawson *et al.*, 2008; Carey *et al.*, 2011; Kim *et al.*, 2015). Less attention has been given to the impact of a supplier's external network on buyer performance (Cousins and Spekman, 2003; Choi and Wu, 2009; Kim, 2014; Bellamy *et al.*, 2014). As recent research indicates, it is important to frame a supplier as being embedded in an extended network rather than being isolated in a dyad for studying the benefits of buyer–supplier relationship because dyadic interactions are rooted in the broader inter-organizational networks (Yan *et al.*, 2017). From a supplier's perspective, its extended external network is as important as, if not more important than, the internal dyadic relationship with a buyer for its daily business life and performance. In buyer–supplier settings, the social capital from the supplier's embeddedness in the extended external network has been mostly ignored (Kim and Choi, 2021).

We use the term "supplier external embeddedness" to describe the extent to which the supplier in a buyer–supplier dyad maintains quality relationships with diversified business partners external to the dyad. A supplier's external embeddedness can influence buyer performance in two main ways: First, a supplier's external ties may increase the breath and variety of the buyer's network resources (Choi and Kim, 2008). Second, some research has pointed out that the over-embeddedness in a buyer–supplier dyad may lead to risks associated with supplier rigidity, exploratory learning reduction, etc (e.g. Handoko *et al.*, 2018; Kim and Choi, 2021). These risks could be addressed when the buyer and supplier take advantage of the supplier's external ties to expand their horizons (Yan and Azadegan, 2017; Yan *et al.*, 2017). Therefore, when taking the social capital perspective to contemplate how a buyer achieves superior performance in forming the enduring partnership with a supplier, it is crucial to examine both forms of supplier embeddedness simultaneously: buyer–supplier dyadic embeddedness and supplier external embeddedness. However, studies that analyze the intervening effects of both forms of supplier embeddedness in buyer–supplier relationship are scarce.

In evaluating the impact of social capital on buyer performance, growing research has attempted to extend our understanding by providing a more comprehensive examination, covering two major types of buyer performance outcomes: economic gains (e.g. cost benefits) and innovation achievements (e.g. new product development) (Carey *et al.*, 2011; Villena *et al.*, 2011; Bellamy *et al.*, 2014; Mitrega *et al.*, 2017). As opposed to buyer–supplier dyadic embeddedness, it is not clear whether supplier external embeddedness has similar or different mediating effects on the linkages between enduring buyer–supplier collaboration and the two

types of buyer performance outcomes. The distinctions between the two dimensions of supplier embeddedness as possible mediators may provide a new perspective to explain why some studies focusing only on dyadic embeddedness do not find expected performance benefits from long-term buyer–supplier relationships (e.g. Krause *et al.*, 2007; Wagner, 2011; Gelderman *et al.*, 2016).

Therefore, to close the above-mentioned gaps in the current literature and better understand how the buyer's performance outcomes of forming a long-term partnership with a supplier are realized, we posit that we need to take a broader network perspective and investigate the intervening influence of both the buyer–supplier dyadic embeddedness and the supplier external embeddedness. Specifically, this study strives to answer one research question: *compared to the buyer–supplier dyadic embeddedness, how does the supplier external embeddedness influence the linkage between buyer–supplier relationship duration and buyer economic and innovation performance*?

Our study relied on SPSS AMOS to test the measurement model on collected survey data from 76 firms and utilized the bootstrapping method to simultaneously examine the mediating effects of the two different forms of supplier embeddedness on the linkage between the duration of buyer–supplier relationships and buyer performance outcomes. In doing so, we seek to illuminate the intermediate steps that link the duration of buyer–supplier relationship with buyer performance, answering how and why a buyer can benefit from the development of long-term partnership with a supplier. Drawing from social capital arguments on network closure and network brokerage (Burt, 2000; Gargiulo and Benassi, 2000), we delve into the distinct mediating effects of two different forms of supplier embeddedness. We hope our research investigation can alleviate recent concerns about the risks associated with the over-embeddedness in a buyer–supplier dyad, and contribute to the debate that buying firms should look beyond managing immediate suppliers towards utilizing suppliers' external networks as their competitive resource (Kim *et al.*, 2011; Yan *et al.*, 2017, 2020). We believe insights from our research examination will increase academic appreciation for different forms of supplier embeddedness, breaking new ground for future investigation on extended supply chain network where supply chain members are not constrained by dyadic ties.

2. Literature review and theoretical background

2.1 Past studies on the value of long-term buyer–supplier collaborative relationships

Research in supply chain management (SCM) has discussed the importance of classifying buyer–supplier collaborative relationships into long-term or short-term ties (Heide and John, 1990; Wagner and Johnson, 2004). Long-term relationships aim to facilitate sharing of fine-grained information and critical resources, and the transactions are bases on partners' mutual expectations of relationship continuity (Heide and Miner, 1992). In contrast, short-term relationships are more involved with noncritical resources, and the transactions are anchored in short-term economic considerations with readiness to switch partners if transaction conditions change (Uzzi, 1996). It has been theorized that long-term relationships can generate more desirable performance outcomes than short-term relationships (Uzzi, 1996; Dyer and Singh, 1998).

However, empirical studies examining the impact of buyer–supplier relationship duration on the buyer's performance give mixed results. For example, Blonska *et al.* (2013) showed that relationship duration had a linear positive relationship with buyer performance; while in the study by Krause *et al.* (2007), this linear relationship was not statistically significant. Kotabe *et al.* (2003) presented evidence that the longer the partnership is, the better the performance that supplier development practices could achieve. However, Wagner (2011) found that if the supplier development practices cannot adapt to the relationship evolution phases, the

buyer–supplier relationship, either too short or too long, would have a detrimental effect on buyer performance. The inconsistency in these findings suggests that long-term buyer–supplier partnership has a dynamic nature and points to a need for exploring the intermediate steps between buyer–supplier relationship duration and buyer performance.

Acknowledging that social capital is the "relational glue" underpinning effective supply chain relationships (McGrath and Sparks, 2005), the SCM literature has increasingly promoted social capital as the core concept casting lights on the factors and processes linking buyer–supplier relationships with buyer performance (Carey *et al.*, 2011; Alghababsheh and Gallear, 2020). It suggests that the discrepancy of performance outcomes boils down to social capital.

2.2 Social capital in the context of buyer–supplier relationships

The concept of social capital advocates that the goodwill embedded in relations is a valuable resource, providing individuals or organizations with "collectively-owned capital", which can facilitate collective actions (Bourdieu, 1986; Adler and Kwon, 2002; Inkpen and Tsang, 2005). Manifesting in trust, reciprocity, shared goals, overall pattern of connections between partners, etc., social capital provides a useful perspective to explain and predict many important behaviors and outcomes in the relationships (Nahapiet and Ghoshal, 1998; Adler and Kwon, 2002). Therefore, in the SCM literature over the past 20 years, an increasing number of studies have investigated how social capital creates value for firms participating in collaborative buyer–supplier relationships and suggest that social capital developed between the buyer and the supplier can underpin and contribute to effective buyer–supplier relationships, leading to a variety of benefits (Alghababsheh and Gallear, 2020).

So far, researchers have focused mainly on buyer–supplier relationship at the dyadic level. They have found that social capital, measured as a level of embeddedness within a buyer–supplier dyad, has a positive effect on buyer performance (e.g. Krause *et al.*, 2007; Carey *et al.*, 2011; Kim *et al.*, 2015). However, this positive effect could diminish, when embeddedness within the buyer–supplier dyad accumulates over time, causing supplier rigidity to increase and exploratory learning and innovation to reduce (e.g. Villena *et al.*, 2011; Cho *et al.*, 2017; Wang *et al.*, 2017; Handoko *et al.*, 2018). Some scholars call this phenomenon the "paradox of embeddedness" (e.g. Uzzi, 1997; Day *et al.*, 2013; Kim and Choi, 2021), while others refer to it as the "dark side" of social capital (e.g. Villena *et al.*, 2011).

What is overlooked in existing studies is the fact that a buyer can also gain access to and utilize social capital in its supplier's external network. Some scholars have pointed out that the logic used to build up the theoretical linkages concerning the role of social capital in buyer–supplier collaborative relationships should be reconsidered if a supplier's external network is incorporated into an investigation (Borgatti and Li, 2009; Kim *et al.*, 2011; Carter *et al.*, 2015). Kim and Choi (2021) propose that to unpack the paradoxical outcomes in buyer–supplier settings, we need to understand that the supplier faces two separate business environments: the focal dyad and its extended ties. Next, we revisit the social capital theory in the context of buyer–supplier collaborative relationships and discuss the implications of including two supplier embeddedness dimensions in such a context.

2.3 Supplier embeddedness dimensions

Social capital theory furnishes a theoretical perspective for examining the advantages gained by firms through their investments in business relationships (Lin *et al.*, 2001). Social capital can be defined and applied to various levels of analysis, such as individuals, groups and organizations (Adler and Kwon, 2002). The most-often cited definition for social capital in the SCM literature is from Nahapiet and Ghoshal (1998), where social capital refers to "the sum of

the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet and Ghoshal, 1998, p. 243). This definition tells us that the social capital a buyer can obtain through its partnership with a supplier has two dimensions: dyadic embeddedness (i.e. that embedded within the dyadic buyer–supplier relationship) and supplier external embeddedness (i.e. that derived from the supplier's external network).

The benefits of social capital are determined by its underlying network structure (Burt, 2000), which comprises an integration of embedded ties (Granovetter, 1985; Uzzi, 1997). The buyer–supplier dyad and the supplier's external network exhibit distinct forms of embeddedness. As portrayed in Table 1, a dyadic buyer–supplier relationship constitutes two nodes and one link. As the buyer and supplier increase investment in this relationship, the relationship becomes embedded. In contrast, supplier external embeddedness involves multiple links. The variety of the supplier's external contacts (e.g. its own suppliers and other business contacts within or across regions and industries), and how well the supplier is linked with those contacts constitute supplier external embeddedness. If we consider only the buyer–supplier dyad, the buyer has a closed network with the supplier; if we also consider the supplier's external network, the buyer has access to a more diversified and open network through the supplier.

Based on social capital arguments on network closure and network brokerage (Burt, 2000; Gargiulo and Benassi, 2000), we argue that buyer–supplier dyadic embeddedness and supplier external embeddedness are distinct conduits, conveying social capital benefits in two different ways. The buyer–supplier dyadic embeddedness takes the form of network closure, creating social capital such as trust, effective norms and reliable channel of communication (Coleman, 1988, 1990). Supplier external embeddedness brings more opportunities for network brokerage, which provides the network actor with broad, early access to and entrepreneurial control over non-redundant information (Burt, 2000).

As indicated in Table 1, we posit that a more general model of social capital should be applied when investigating how the buyer builds social capital during its enduring buyer–supplier partnership to achieve performance gains. This general model includes two supplier embeddedness dimensions: buyer–supplier dyadic embeddedness and supplier external embeddedness.

Source of Literature	The Network Structure of Social Capital
Proposed by Cousins *et al*. (2006); Krause *et al*. (2007); Lawson *et al*. (2008); Villena *et al*. (2011); Whipple *et al*. (2015); Villena and Craighead (2017); etc.	**The buyer-supplier dyad** (Dyadic embeddedness) Buyer — Supplier
Posited in this research	**The buyer-supplier dyad** (Dyadic embeddedness) Buyer — Supplier **The supplier's external network** (Supplier external embeddedness) Supplier external ties within or across industries Supplier more

Note(s): The dash line indicates more contacts

Table 1.
Network structures of a buyer's social capital through buyer–supplier partnership

2.4 Buyer performance outcomes from long-term buyer–supplier relationships

The SCM literature acknowledges that various supply chain members contribute to the value creation process in a supply chain, including the focal firm, suppliers on different tiers and customers on different tiers (Ketchen and Guinipero, 2004). This value creation process requires individual firms to invest in mechanisms that foster integration, collaboration and coordination across supply chain members (Greer and Theuri, 2012; Wu and Chiu, 2018; Yu and Huo, 2018). It is through these mechanisms that a superior performance can be achieved in a variety of aspects. In this study, we focus on how the buyer develops social capital within the long-term partnership with the supplier as the intervening mechanism in order to leverage the supplier resources to improve buyer performance.

Considering that gains in performance are dependent on both the efficiency and the creativity of the buyer–supplier collaborative actions (Nahapiet and Ghoshal, 1998), we classify buyer performance into two broad types: economic performance and innovation performance. While the first type concentrates on the economic gains of a business such as decreases in cost, the second focuses on the benefits of innovation such as new product development. Most prior studies have framed the benefits of buyer–supplier partnership within a narrow range of economic performance gains. Given that buying firms strive to achieve a much wider range of performance goals within their buyer–supplier partnership, more recent studies suggest that a comprehensive evaluation of the buyer's performance gains from buyer–supplier partnership should consider not only economic gains but also innovation achievements (Carey *et al.*, 2011; Villena *et al.*, 2011; Bellamy *et al.*, 2014; Mitrega *et al.*, 2017). In addition, if distinct performance outcomes are aggregated into a singular construct, the relative impact of divergent mediators on firm performance may not be differentiated. Therefore, we include both buyer economic and innovation performances as two different performance outcomes into our research.

3. Hypothesis development

We developed the research model as displayed in Figure 1. The hypothesis development centers on the relationships that underline the research model.

3.1 The linkage between the duration of buyer–supplier relationships and buyer performance outcomes

Scholars have argued that long-term buyer–supplier cooperative relationships increase efficiency and creativity of both parties' actions (e.g. Nahapiet and Ghoshal, 1998). The outcomes of efficiency are manifested in the improvement of buyer economic performance in terms of cost reduction, sales growth and the like (Uzzi, 1996; Krause *et al.*, 2007; Cruz and Liu,

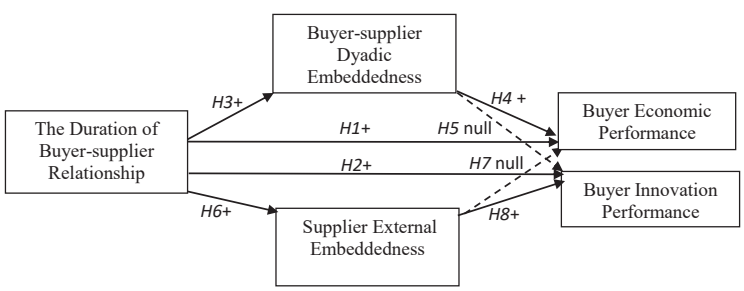

Figure 1.
Research model

2011; Verwaal, 2017). The benefits of creativity are revealed through the buyer's accomplishment of innovation objectives, such as responsiveness to a new market, shortening of product development time and frequency of new product launch (Lawson *et al.*, 2008; Carey *et al.*, 2011; Sjoerdsma and van Weele, 2015; Kulangara *et al.*, 2016). Therefore, we advance the following hypotheses:

H1. The duration of buyer–supplier relationship is positively related with buyer economic performance.

H2. The duration of buyer–supplier relationship is positively related buyer innovation performance.

3.2 Buyer–supplier dyadic embeddedness as a mediator

The SCM literature suggests that long-term buyer–supplier relationships boosts the formation of dyadic embeddedness, which is characterized by trust, shared goals, reciprocity, etc (Cousins *et al.*, 2006; Krause *et al.*, 2007; Lawson *et al.*, 2008; Carey *et al.*, 2011). Researchers have found that the duration of buyer–supplier relationship is positively associated with trust (Helper, 1991; Sako and Helper, 1998). Hoetker (2005) found that relationship-specific communication and coordination tend to increase with the length of the relationship between buyers and suppliers. Long-term exchange experience is said to be required to frame common understanding of collective goals and reciprocity, which facilitate collaboration and reduce the chance of conflicts (Inkpen and Tsang, 2005; Yam and Chan, 2015; Alinaghian *et al.*, 2020). We therefore hypothesize:

H3. The duration of buyer–supplier relationship is positively related with dyadic buyer–supplier embeddedness.

Social network researchers have pointed out that embeddedness establishes group or organization identification prompting embedded parties to make efforts to satisfy expectations (Uzzi, 1997). The embedded supplier typically has a substantial share of its resources devoted to achieving steady-state operations in the dyadic relationship (Oliver, 1990), to keeping good communication with the buyer, and aligning relational goals with the buyer. All of this keeps friction to a minimum when negotiating and enables smooth adjustment to variations in inter-firm operations (Johnston *et al.*, 2004; Cruz and Liu, 2011; Kim and Choi, 2015). Consequently, without the mediating mechanism of dyadic embeddedness, having long-term buyer–supplier relationships does not automatically result in better product quality, shorter lead time, quicker response, lower transaction costs, higher product transactions and hence higher buyer economic performance.

However, as dyadic embeddedness accumulates, it could be detrimental to the buyer–supplier dyadic relationships due to the following downsides: First, self-satisfaction and limited access to nonredundant information can be prompted by over-embedded dyadic relationships (Swink and Zsidisin, 2006; Sting *et al.*, 2019). Second, the buyer and supplier may become too similar in their thinking, thus decreasing their capacity to create challenging questions and explore innovative solutions (Uzzi, 1997; Villena *et al.*, 2011; Qian *et al.*, 2018). Kim and Choi (2021) provide evidence that routines emerging from increased dyadic embeddedness can create rigidities that discourage creativity and innovation performance. Therefore, we advance the following hypotheses:

H4. Dyadic buyer–supplier embeddedness mediates the linkage between the duration of buyer–supplier relationship and buyer economic performance.

H5. Dyadic buyer–supplier embeddedness does not mediate the linkage between the duration of buyer–supplier relationship and buyer innovation performance.

By presenting the non-significant mediating effect in H5, it may seem to be non-orthodox. However, the development of this hypothesis is in line with previous work, and the literature has recognized studies with hypotheses looking for non-significant results regarding the role of social capital in buyer–supplier relationship settings. For example, Kim *et al.* (2012) report empirical support for their hypothesis that social capital (trust) between the buyer and the supplier has no influence on knowledge exchange when knowledge complementarity is low.

3.3 Supplier external embeddedness as a mediator

The degree of supplier external embeddedness increases as the supplier develops more and good business ties across geographic and industrial boundaries. Burt (1992) shows that the network configuration with high diversity can be valuable because it provides access to varied sources of information.

A long-term buyer–supplier partnership helps the supplier expand its external network in two primary ways. First, the supplier's enduring collaborative relationship with a buyer creates a positive image for the supplier in terms of commitment and reliable performance, which attracts other parties to form relationships with the supplier. For example, a logistics service provider [1], founded in late 1980s, initially had an automobile manufacturer as its sole customer. After observing the logistics company's performance in its long-term business relationship with the automaker, two companies contacted the logistics company and became its new customers in 2003. In the following five years, the logistics company's enduring relationship with the automaker continued to attract new customers and its revenue from new customers increased to 35%.

Prior studies have also acknowledged that potential buyers/customers regard relationship duration of a supplier with its buyers as a critical partner selection criterion. In the integrated model of buyer–seller relationships developed by Wilson (1995), the supplier's reputation for committing to long-term relationship is an important measure when a buyer selects a new seller/supplier. Wagner *et al.* (2011) assert that a supplier's reputation of maintaining a long-term partnership with a buyer has a positive effect on its entry to future relationships with potential buyers. The study of Shane and Cable (2002) provides evidence that an entrepreneur's enduring relationships with its business partners have a great influence on investors' decisions to finance the entrepreneur's new ventures.

Second, social network researchers have pointed out that dyadic relationships do not occur in isolation, but rather form a network structure beyond the dyads (Gulati and Gargiulo, 1999; Kilduff and Brass, 2010). For example, at the interpersonal level, two good friends tend to expand their friendship network beyond dyad by helping each other get affiliated with friends of friends (Byrne, 1971). Applying this point to the setting of buyer–supplier relationships, we argue that through the long-term dyadic relationship with a buyer, the supplier will have a better chance to get to know and form more relationships with other parties in an extended network. Buyers also have intentions to help their long-term strategic suppliers form external ties because suppliers with diversified external ties have better performance and a greater chance of survival (Dyer and Nobeoka, 2000). The Toyota case in the study of Dyer and Nobeoka (2000) supports this assertion. Toyota formed a supply association, bringing all its suppliers together. Through regular meetings, workshops and joint actions sponsored through the association, each of Toyota's suppliers expands their network through forming deep relationships with other suppliers located in different regions, at different tiers and from different industries. The longer a supplier is affiliated with Toyota, the more business ties that supplier can accumulate beyond the dyad and in its external network. Therefore, we hypothesize:

H6. The duration of buyer–supplier relationship is positively related with supplier external embeddedness.

In contrast to buyer–supplier dyadic embeddedness, which is confined to a single relationship, supplier external embeddedness engages various ties. The network actor with diverse ties has greater exposure to new and different ideas ignited by outside connections to multiple networks (Kim *et al.*, 2006). Wu and Choi (2005) concluded from their case studies that a supplier with diverse ties is more likely to become an innovative solution provider and accomplish a larger share of supply responsibility for the buyer's innovation requirements. More recent studies show that buyers are utilizing the suppliers' external network as a resource for innovative ideas and competencies (Bellamy *et al.*, 2014; Yan and Azadegan, 2017; Wang and Hu, 2020). Without the various embedded ties in a supplier's external network, we should expect that long-term buyer–supplier relationship has relatively little effect on the buyer's innovation performance.

However, when a supplier increases the number of external ties, the supplier is more resourceful, powerful and autonomous. A high level of supplier external embeddedness can lead to the risk of supplier opportunism. Many scholars have noted the presence of opportunism in ongoing relations, especially when power is unequal (Wathne and Hiede, 2000; Villena and Craighead, 2017). As pointed out in Choi and Wu (2009), a more powerful supplier is less likely to devote all resources to one buyer. Instead, the supplier has incentives to recoup their investments in the buyer and behave opportunistically wherever possible (Kim and Choi, 2021). When the buyer sees that they do not hold much leverage over the supplier, they will attempt to restrain their reciprocity actions too (Kim and Henderson, 2015; Villena and Craighead, 2017). Consequently, the economic benefits that the buyer could attain from forming a long-term relationship with this supplier will be reduced. Thus, we consider the following hypotheses:

H7. Supplier external embeddedness does not mediate the linkage between the duration of buyer–supplier relationship and buyer economic performance.

H8. Supplier external embeddedness mediates the linkage between the duration of buyer–supplier relationship and buyer innovation performance.

4. Research methodology

4.1 Data collection and sample

The focus of this study is on the intervening effects of social capital that the buyer can obtain through two dimensions of supplier embeddedness. Therefore, we use the buyer–supplier relationship at the firm-to-firm level as the unit of analysis. We sampled from the membership list of a local chapter of the Association for Supply Chain Management (ASCM) in a large city in USA and focused only on manufacturing firms. There are two reasons for this sampling choice: First, the ASCM member list provides the contact information of the top executives responsible for SCM, who are the best informants for their firm's collaborative relationship with the strategic supplier and the supplier's external network. Second, prior studies have shown that the outcomes of social capital differ based on the firm type and location distance (Presutti *et al.*, 2016; Zhang *et al.*, 2017). By including only producers of durable, assembled products registered with the same local chapter of ASCM, we ensure environmental comparability across the survey firms in terms of firm type and location.

We randomly reached out to 170 top executives in charge of SCM via letter, mail and phone calls. We told those executives that two-rounds of survey would be involved to collect information about their firm's relationship with the strategic suppliers, the supplier's business network and the impact on their performance. In return for their participation, an executive summary of research findings would be provided.

We were able to receive 80 responses; of which, four responses were eliminated due to missing values. Therefore, our final sample includes 76 firms. We used three techniques to check non-response bias. First, assuming that late responding firms are like non-responders, we conducted *t*-tests on all the survey items between the early (first 25%) and late respondents (late 25%) (Williams *et al.*, 2013). No statistically significant differences were detected between the groups. Second, *t*-tests on firm size (number of employees) and industry type were performed. No statistically significant difference was found between the responding firms and non-responding firms. Third, paired sample *t*-tests were used to compare revenue of the sampled firms with the median values of their respective industry (Wagner and Kemmerling, 2010). The results did not indicate statistically significant differences. Collectively, these results do not suggest a serious concern about nonresponse bias.

Our sample firms represent a diverse set of over twenty different industries. The respondents were top executives in charge of SCM, with the title of president, chief supply chain officer, supply chain director or senior supply chain manager. All the respondents had at least five years working experiences in their firms and were highly knowledgeable about our survey items. Table 2 displays the profile of the sample firms.

4.2 Survey development and measures

The initial survey instrument was adapted from published scales or developed from the literature. To examine the survey instrument for face validity, we interviewed four supply chain executives from four Fortune-500 firms. Based on their feedback, we modified the initial instrument to enhance clarity. Appendix lists all items.

The duration of buyer–supplier relationship: this variable is measured by using a single question, which asked respondents "how long is the collaborative relationship between your company and this top strategic supplier (in years)?"

Buyer–supplier dyadic embeddedness: This variable was measured by three items adapted from the works of Krause *et al.* (2007) and Blonska *et al.* (2013). These items are mainly concerned with whether the dyadic ties are characterized by trust, goal congruence and reciprocity.

SIC (2 Digit)	Industry description	#	%	Number of employees	#	%
17	Construction – special trade contractors	3	3.9	<500	23	30.3
20	Food and kindred products	6	7.9	500–1,000	10	13.2
25	Furniture and fixtures	5	6.6	1,000–5,000	24	31.6
26	Paper and allied products	4	5.3	5,000–10,000	6	7.9
27	Printing, publishing and allied industries	3	3.9	10,000–100,000	9	11.8
28	Chemicals and allied products	9	11.8	>100,000	4	5.3
30	Rubber and miscellaneous plastic products	4	5.3			
32	Stone, clay, glass and concrete products	2	2.6	*Title profile*		
34	Fabricated metal products	2		Chief SC Officer	2	2.6
35	Industrial, commercial machinery and computer equipment	11	14.5	SC Vice President	22	28.9
37	Transportation equipment	8	10.5	President	10	13.2
36	Electronic equipment and components	11	14.5	SC Director	7	9.2
50	Construction and mining machinery and equipment	4	5.3	Senior SC Manager	35	46.1
56	Apparel and accessory	4	5.3			

Table 2.
Sample firm profile

Supplier external embeddedness: Drawing on the relevant literature (e.g. Andersson *et al.*, 2002; Moran, 2005; Choi and Kim, 2008), we developed three items to measure supplier external embeddedness. Respondents were asked to report their perceptions regarding whether the top strategic supplier has good business relationships in distinct geographic regions, within industries and across industries. The three items reflect the degree of external embeddedness in terms of tie quality and diversity.

Buyer economic performance: Building on the works of Greer and Theuri (2012), Narasimhan and Kim (2002) and Krause *et al.* (2007), we developed three items to examine a buyer's economic performance as the outcome of collaborative relationship. The three items are indicators of cost reduction, sales and profit growth.

Buyer innovation performance: This variable was measured by three items adapted from the works of Carey *et al.* (2011) and Villena *et al.* (2011). The respondents were asked to provide scores for the buyer's responsiveness to new market, frequency of new product/service introduction and new product development cycle time.

Controls: Firm size and environmental dynamism were used as control variables. The number of employees was used to operationalize firm size. Relative to smaller firms, large firms may allocate more resources for social capital development (Villena *et al.*, 2011). Environmental dynamism was measured using items developed by Miller and Friesen (1982). Yu *et al.* (2018) show that buyer performance is contingent on environmental dynamism, suggesting that firms might perform worse in highly dynamic economic environments.

To address common method bias concerns, we took a three-pronged approach. First, we grouped the independent and dependent variables in different sections of the questionnaire (Podsakoff *et al.*, 2003). Second, data on independent variables and dependent variables were collected at different time (Podsakoff *et al.*, 2003). Specifically, data on control and independent variables were collected in background questionnaire. After we received the background questionnaire, a follow-up survey was sent out for the dependent variables. Third, once we obtained the data, we assessed single respondent bias using Harman's single-factor test (Podsakoff and Organ, 1986), and the result indicated that single respondent bias was not an issue. Hence, the threat of common method bias can be considered insignificant for our survey study.

4.3 Measurement assessment

The general rule of thumb that has been proposed for determining sample size is 5–10 observations per parameter (Muthén and Muthén, 2002). In this study, we have five latent variables with a total of 15 parameters, and approximately five observations per parameter. It has been acknowledged that performing buyer–supplier relationship research is difficult due to the requirements of data collection (Shamsollahi *et al.*, 2021). The literature has recognized studies that use a small sample with around 80 observations for over 20 measurement parameters/items (e.g. Kim *et al.*, 2012; Horn *et al.*, 2014; Tseng and Chen, 2014). We employed SPSS AMOS for measurement assessment in this research. Following the guidelines by Anderson and Gerbing (1988), we assessed dimensionality, reliability, validity of our measures and overall measurement model fit. Table 3 displays the evaluation results.

Exploratory factor analysis was performed for dimensionality test. The results indicate that all items are loaded as theoretically expected. The eigenvalues generated for each construct also complied with a general rule of thumb to check the existence of construct unidimensionality: eigenvalues greater than 1.0 for the first dimension and eigenvalues of the second dimension less than 1.0 (Rencher, 1995, p. 464).

In the literature, for constructs that are generally broad in nature, the threshold value recommended for Cronbach's alpha and composite reliability is 0.6 (e.g. Nunnally, 1978;

Construct	Eigenvalue	Cronbach's alpha	Composite reliability	Standardized factor loading
Environment dynamism	1.71	0.61	0.61	0.52–0.67
Buyer–supplier dyadic embeddedness	2.01	0.65	0.69	0.58–0.74
Supplier external embeddedness	1.92	0.72	0.81	0.67–0.92
Buyer economic performance	2.29	0.75	0.79	0.43–0.87
Buyer innovation performance	1.84	0.68	0.76	0.65–0.82
Recommended minimum values[a]		>0.6	>0.6	

Model fit indices	RMSEA	NNFI (TLI)	CFI	χ^2 p value
	0.000	0.970	0.980	0.690
Recommended minimum values[a]	<0.05	>0.9	>0.9	

Source(s): [a] Nunnally (1978), Schumacker and Lomax (1996), Byrne (1998)

Table 3. Evaluation for dimensionality, reliability, validity and measurement model fit

Byrne, 1998; Narasimhan and Jayaram, 1998). As shown in Table 3, the Cronbach's alpha and composite reliability scores for the constructs in this study exceed the threshold values, indicating that these constructs have acceptable reliability.

As indicated in Table 3, the standardized factor loadings of all individual items from the measurement model are significant ($p < 0.01$). Therefore, the existence of convergent validity is supported. To examine discriminant validity, a series of pairwise chi-square tests between the latent variables were performed (Byrne, 1998, p. 199). The discriminant validity for the scales in this study is established because all the chi-square test results are significant ($p < 0.001$).

We assessed model fit using various fit indices including the root mean square error of approximation (RMSEA), non-normed fit index (NNFI) (Bentler and Bonett, 1980) and the comparative fit index (CFI) (Bentler, 1990). The recommended maximum value for RMSEA is 0.05 (Byrne, 1998; Hu and Bentler, 1999). NNFI and CFI values greater than 0.90 indicate acceptable fit (Byrne, 1998). As displayed in Table 3, RMSEA, NNFI and CFI values fulfill the recommended threshold values. In addition, the chi-square test results are insignificant, which indicate that no difference exists between the observed and the estimated covariance matrices (Schumacker and Lomax, 1996). Taken together, the results suggest that the measurement model achieves a good model-to-data fit.

4.4 Data analysis technique

We ran a series of regressions estimating the relationships among the predictors, mediators and buyer performance outcomes. To test the two mediators simultaneously in one model, we employed the bootstrapping method recommended by Preacher and Hayes (2008) to incorporate Model 6 of Process macro into our statistical analysis and bootstrapped 5,000 samples from our initial dataset. Bootstrapping is a nonparametric statistical method in which the dataset is resampled for many times. Indirect effects for these samples are calculated to generate a sampling distribution. Then, these indirect effects are tested for significance using confidence intervals (CIs). Mediation is inferred in the model if tests for indirect effects are significant (i.e. CI does not contain zero). According to Dastgeer *et al.* (2020), compared to the other two major methods of mediation analysis (i.e. the Baron and

Kenny method and the Sobel test), bootstrapping presents high statistical power, better control of Type-I error and produces better results when data lack the property of normal distribution.

5. Results

Table 4 presents the descriptive statistics and correlations. The average duration of the buyer–supplier relationship is approximately 14 years. We standardized all variables to reduce the effects of potential multicollinearity (Cohen *et al.*, 2003).

As reported in Table 5, the regression analysis results show that the duration of buyer–supplier relationship was positively related with buyer economic performance ($\beta = 0.248$, SE = 0.123 and $p < 0.05$) and buyer innovation performance ($\beta = 0.269$, SE = 0.117 and $p < 0.05$). Therefore, H1 and H2 are supported. The results suggest that the buyer can improve its economic and innovation performance through the development of a long-term collaborative relationship with its strategic supplier. The findings align with the prior research that promotes long-term buyer–supplier collaboration (e.g. Krause *et al.*, 2007; Narayanan *et al.*, 2015).

We also find that the duration of buyer–supplier relationship was positively related with buyer–supplier dyadic embeddedness ($\beta = 0.260$, SE = 0.123 and $p < 0.05$) and supplier external embeddedness ($\beta = 0.248$, SE = 0.121 and $p < 0.05$). Thus, H3 and H6 are supported. The findings give support to the idea that an enduring partnership cannot only enable the buyer to build up social capital with the supplier within the dyad but also contribute to the development of the supplier's external network. This is in line with research suggesting that buyers help their long-term strategic suppliers develop diversified external ties to increase their chance of survival and performance (Dyer and Nobeoka, 2000). In addition, the reputation obtained from an on-going buyer–supplier relationship enables a supplier to attract more external business partners (Wagner, 2011).

When the two mediators (dyadic embeddedness and supplier external embeddedness) were put into the model, relationship duration was not positively related with buyer economic performance ($\beta = 0.152$, SE = 0.121 and $p > 0.1$) and buyer innovation performance ($\beta = 0.154$, SE = 0.118 and $p > 0.1$). We also find that dyadic embeddedness significantly influenced buyer economic performance ($\beta = 0.408$, SE = 0.111 and $p < 0.01$) but not buyer

	Mean	SD	1	2	3	4	5	6
Firm size (number of employees) (1)	17712.07	54475.95	1					
Environmental dynamism (2)	3.51	1.13	0.13	1				
The duration of buyer–supplier relationship (3)	14.63	11.42	0.37***	−0.05	1			
Buyer–supplier dyadic embeddedness (4)	5.29	1.17	0.01	−0.07	0.24**	1		
Supplier external embeddedness (5)	4.55	1.33	0.07	0.24**	0.25**	0.21*	1	
Buyer economic performance (6)	4.51	1.37	0.01	−0.12	0.23**	0.44***	0.07	1
Buyer innovation performance (7)	4.56	1.02	0.31***	0.12	0.34***	0.21*	0.38***	0.19*

Note(s): ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 4.
Correlation table

Table 5.
Bootstrapping results for regression analysis and indirect effect estimation for mediation analysis

	Buyer economic performance		Buyer innovation performance		Buyer–supplier dyadic embeddedness		Supplier external embeddedness		Buyer economic performance		Buyer innovation performance	
	b	SE	*b*	SE	*b*	SE	*b*	SE	*b*	SE	*b*	SE
Control variable												
Firm size (number of employees)	−0.064	0.124	0.197*	0.117	−0.075	0.124	−0.064	0.118	−0.036	0.115	0.228**	0.112
Environmental dynamism	−0.097	0.115	0.102	0.109	−0.043	0.115	0.267**	0.110	−0.071	0.111	0.030	0.109
Predictor variables												
Buyer–supplier relationship duration	0.248**	0.123	0.269**	0.117	0.260**	0.123	0.248**	0.121	0.152	0.121	0.154	0.118
Mediators												
Buyer–supplier dyadic embeddedness							0.167	0.112	0.408***	0.111	0.109	0.108
Supplier external embeddedness									−0.035	0.116	0.297**	0.113
R^2	0.068		0.164		0.063		0.157		0.219		0.260	
F	1.739		4.700***		1.616		3.316**		3.923***		4.929***	

	Indirect effect (95% CI)			
	b	SE	LCL	UCL
Buyer–supplier relationship duration-dyadic embeddedness-Buyer economic performance	0.106	0.050	0.029	0.211
Buyer–supplier relationship duration- Supplier external embeddedness-Buyer economic performance	−0.009	0.038	−0.098	0.062
Buyer–supplier relationship duration-dyadic embeddedness-Buyer innovation performance	0.028	0.037	−0.029	0.119
Buyer–supplier relationship duration-Supplier external embeddedness-Buyer innovation performance	0.074	0.051	0.001	0.208

Note(s): *b* is the unstandardized regression coefficient; ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$; LCI: lower confidence interval; UCL: upper confidence interval

innovation performance (β = 109, SE = 0.108, $p > 0.1$). The impact of supplier external embeddedness on buyer economic performance was not statistically significant ($\beta = -0.035$, SE = 0.116, $p > 0.1$) while on buyer innovation performance was statistically significant ($\beta = 0.297$, SE = 0.113, $p < 0.01$).

Table 5 also displays the 95% bias-corrected CIs for the indirect effects. We find that the CIs for the indirect effect of buyer–supplier relationship duration and buyer economic performance via buyer–supplier dyadic embeddedness [0.029, 0.211] was significant, via supplier external embeddedness [−0.098, 0.062] was not significant. Thus, H4 and H5 were supported, indicating that buyer–supplier dyadic embeddedness mediates the linkage between the duration of buyer–supplier relationship and buyer economic performance, but does not mediate the linkage between the relationship duration and buyer innovation performance. The results suggest that buyer–supplier embeddedness mainly serves as the conduit for the buyer to translate the long-term buyer–supplier relationship benefits into economic gains. The finding that the dyadic embeddedness has no influence on buyer innovation performance enforces the argument that a "high" level of social capital accumulated in the buyer–supplier dyad could have the risk of inhibiting exploratory learning, reducing the flow of information and new innovative ideas (Handoko *et al.*, 2018; Wang *et al.*, 2017; Qian *et al.*, 2018).

Table 5 also shows that CIs for the indirect effect of buyer–supplier relationship duration and buyer innovation performance via buyer–supplier dyadic embeddedness [−0.029, 0.119] was not significant and via supplier external embeddedness [0.001, 0.208] was significant. Therefore, the results supported H7 and H8, showing that supplier external embedded mediates the linkage between the duration of buyer–supplier relationship and buyer innovation performance, but does not mediate the linkage between the relationship duration and buyer economic performance. The results support the concept that the buyer can rely on the social capital embedded in the supplier's external network to improve its innovation performance. Therefore, the supplier's external network is worthy of the buyer's attention, resources and investment (Nahapiet and Ghoshal, 1998; Kim *et al.*, 2011; Kim, 2014). The findings confirm that the dimensionality of social capital in the context of buyer–supplier relationships should be extended to include the external network of the supplier.

6. Discussion

Our findings have several important reveals. First, the mixed findings in the literature suggest the need to probe into the intermediate steps between the length of buyer–supplier relationships and buyer performance. Therefore, scholars have called for empirical insights into the mediating mechanisms that explain how the management of business relationships and networks impact performance (e.g. Forkmann *et al.*, 2018). This study answers this call by filling in gaps of current knowledge about the mediating roles of two dimensions of supplier embeddedness. We find that forming a long-term partnership with a supplier shows a buyer's dedication in its supplier relationship management, and it is through the cultivation of the two forms of supplier embeddedness that the buyer obtains benefits from the long-term partnership in the form of improved economic and innovation performance.

Second, unlike many of the prior studies that seek to explain the performance consequences by constraining the relationship into the dyadic boundary, we examine not only the mediating effects of the supplier's embeddedness in the dyad but also in its external network. Our results suggest that, in a buyer's long-term relationship with a supplier, a buyer can reap the benefits of social capital not only from its direct tie with the supplier but also from the supplier's external ties.

Third, we find that the two forms of supplier embeddedness have unique mediating influence. The benefits of investigating the extended supply network in buyer–supplier

relationship study have been postulated by several researchers (Choi and Kim, 2008; Borgatti and Li, 2009; Kim *et al.*, 2011; Kim, 2014; Carter *et al.*, 2015). However, few studies have dedicated their efforts to differentiate the performance impact of the two embeddedness-based mediators as we did in this study. Our results suggest that the two forms of supplier embeddedness indeed play different mediating roles. In terms of buyer economic performance, unlike the dyadic embeddedness, supplier external embeddedness has no significant influence. However, such embeddedness influences buyer innovation performance. Therefore, we find evidence supporting the concept that when the buyer and supplier utilize the supplier's external ties to expand their outlook, there is the potential to minimize the inhibition caused by the over-embeddedness in the buyer–supplier dyad in relation to exploratory learning and innovation.

7. Conclusions

The growing attractiveness of social capital research brings with it some danger in that its popularity may be outpacing its conceptual and empirical development (Moran, 2005; Pillai *et al.*, 2017). More work is needed where alternative theoretical lenses can be carefully distinguished and tested (Alghababsheh and Gallear, 2020). Particularly in the context of buyer–supplier collaborative relationships, there are risks of taking buyer–supplier dyadic embeddedness as the sole means of insight for the measure of social relations and their benefits as social capital. As some studies on embeddedness testify, there is much more to understand about how social relations and exchange in an extended buyer–supplier network may operate as social capital (Choi and Kim, 2008; Kim *et al.*, 2015; Yan *et al.*, 2017).

Whereas much of the existing literature has been concerned with buyer–supplier dyadic embeddedness of social capital for studying buyer–supplier relationships and buyer performance, this research recognizes a need to consider supplier external embeddedness. For supply chain practitioners, a challenging question for buyer–supplier relationship management is not simply about how a buyer leverages a supplier's competence, but more about how a supplier's competence is created. In relation to this, the supplier's external network can play a crucial role as a strategic resource for such competence development.

In this study, we introduce two theory-based mediators (buyer–supplier dyadic embeddedness and supplier external embeddedness) to decompose the link between the long-term buyer–supplier relationship and buyer performance, providing rich insights into causal mechanisms for the findings about the performance consequences of buyer–supplier collaboration. In data analysis, we employed SPSS AMOS to test the measurement model and utilized a bootstrapping procedure to examine the mediating effects of the two dimensions of supplier embeddedness simultaneously.

7.1 Theoretical contributions

This study makes several important contributions to the SCM literature. First, research on buyer–supplier relationship has grown noticeably over the years, yet knowledge gaps exist regarding the causal processes linking relationship duration with performance (Palmatier *et al.*, 2013; Shamsollahi *et al.*, 2021). Accordingly, and building on social capital theory, we highlight the need to consider the intervening role of both buyer–supplier dyadic embeddedness and supplier external embeddedness and find that the two dimensions of supplier embeddedness are indeed two effective conduits through which the long-term development of buyer–supplier partnership can translate into improved buyer economic and innovation performance.

Second, this study provides rich insights into the findings about the performance outcomes of buyer–supplier partnership by adding clarity and detail to the distinction

between buyer–supplier dyadic embeddedness and supplier external embeddedness. Echoing the growing literature on examining buyer–supplier relationships in a broader inter-organizational network (Yan *et al.*, 2017; Kim and Choi, 2021), our consideration of two mediators provides a new explanation for how buyers, facing the constrained resources due to the over-embeddedness within buyer–supplier dyad, can still find ways to actualize their innovation performance goals through utilizing the supplier's external network.

The third contribution of this research pertains to the consideration of the relative mediating influence of the two dimensions of supplier embeddedness. By simultaneously examining the distinct mediating effects of the two different types of embeddedness, this study empirically demonstrates that different forms of social capital building processes can co-exist when managed properly by the buyer. Our findings provide the novel revelation that the development of the two different types of supplier embeddedness benefits a buyer differentially when directed at distinct performance goals. A buyer cannot only use network closeness but also network brokerage strategy in its supplier relationship management to obtain various performance benefits. Specifically, buyer–supplier dyadic embeddedness with a structure of network closure is of great value to a buyer's economic performance in terms of trust development, effective communication and cooperation, while supplier external embeddedness increases a buyer's exposure to new knowledge, ideas and opportunities, thus contributing to the buyer's innovation performance. Accordingly, future researchers dealing with comprehensive evaluation of the value of long-term buyer–supplier collaborative relationships need to distinguish between internal and external embeddedness and take both into account.

7.2 Practical implications

Some prior studies have found that duration of buyer–supplier collaborative relationships had no significant linear effect on buyer performance (e.g. Krause *et al.*, 2007; Wagner *et al.*, 2011). A possible explanation for the insignificant effect can be related to the distinct mediating influence of internal embeddedness and external embeddedness on distinct types of buyer performance. Expressed differently, the insignificant effect of long-term buyer–supplier relationships could be eliminated if both embeddedness dimensions are considered. From a managerial viewpoint, buyers need to recognize the importance of the distinction between buyer–supplier dyadic embeddedness and supplier external embeddedness. If we assume that social capital developed in supplier external embeddedness is of strategic value to buyer and supplier performance and the buyer's knowledge of the supplier's external ties become crucial, buyers may need to reassess their firm's supply management strategies and current practices for supplier selection, evaluation and supplier development.

This line of thought can be carried a bit further. When selecting new suppliers to form long-term strategic relationships, buyers would need to identify the supplier's important business ties within and across the buyer's main industry and the nature of those relationships (e.g. long-term or short-term; strong or weak). Knowledge of a future supplier's business network could assist a buyer in more accurately envisioning that supplier's potential values, prospect of business success and level of risk management (Choi and Kim, 2008; Kim, 2014; Yan *et al.*, 2020). For current suppliers, practitioners may need to reassess each supplier's true potential in terms of their respective external networks. A task of importance for strategic supplier management of the buyer is to bring in the supplier's external network. Thus, buying firms might need to proactively get involved in the formation and reconfiguration of their suppliers' external interorganizational ties or external networks.

7.3 Limitations and future research

Like any other study, our research also has certain limitations that need to be acknowledged as they reveal new avenues for future research. First, the limitations of this study mainly come from the dependence on informants' perceptions on various constructs. Therefore, future study may consider collecting objective data as the complement to perceptual survey data. For example, use the number of ties in the supplier's external network as the measure of supplier external embeddedness. Second, it is possible that there are other mediators linking the duration of buyer–supplier relationships with buyer performance, which may or may not relate to social capital. We need to continue to explore the mediating mechanisms for a deep understanding of the performance implications of buyer–supplier relationships. Third, conditional factors such as industrial, economic, social or cultural factors may also influence the linkages investigated in the present study. Future research may consider incorporating conditional factors into the proposed research model, possibly through the development of moderated mediation models.

A supplier oftentimes functions as a bridging tie between the internal and the external network. Because of geographical and operational diversity of each supplier, these bridging roles of suppliers are especially relevant for further investigation. For instance, one supplier role can be to function as a channel for the transfer of information from its external network to the buyer. But another role, a less investigated one, is to connect its external network with other suppliers in the buyer's supply chain network (Bellamy *et al.*, 2014). Future research might investigate how different bridging roles of a supplier could affect buyer performance.

Another research opportunity may arise regarding how the buyer and the supplier make strategic choices for their respective external networks. The buyer may choose to make investments in developing the suppliers' external networks or expanding their own external network. The suppliers may choose to keep their networks apart from the buyer or act as the bridge. It would be interesting to investigate the interplay among three networks (buyer external network, supplier external network and buyer–supplier dyad) as the antecedent for alternative choices and outcomes.

Besides economic and innovation performance, future research can also investigate other types of performance outcomes. For example, with the increased awareness of the damage caused to the natural environment and human life by industrialization, the notion of social sustainability has gained momentum within the field of supply chain relationships (Awan *et al.*, 2018; Awan and Sroufe, 2020). Future research might consider how the buyer utilize the two dimensions of supplier embeddedness to improve both buyer and supplier's social performance in protecting human rights, improving occupational health and safety, etc.

Note

1. The authors obtained first-hand information about this company through a case study. The name of the company is not revealed to ensure confidentiality.

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Appendix
Measures

Environmental dynamism
Item 1 1 = Our firm rarely changes its marketing practices; 7 = Our firm must change its marketing practices extremely frequently
Item 2 1 = Demand and consumer tastes are fairly easy to forecast; 7 = Demand and consumer tastes are almost unpredictable
Item 3 1 = The production/service is not subject to very much change and is well established; **7 =** The modes of production/service change often and in a major way

Using a seven-point scale (1 = strongly disagree, 7 = strongly agree), please indicate the extent to which you agree with the following statements about your firm's relationship with your top strategic supplier- Supplier X

Buyer-supplier dyadic embeddedness
Item 1 We can count on Supplier X to follow through on their promises
Item 2 Supplier X shares our goals for this business
Item 3 Our relationship with Supplier X is long-term in nature due to what we have done for each other

Supplier external embeddedness
Item 1 Supplier X has positive relationships with other firms within the industry
Item 2 Supplier X has positive relationships with firms outside the industry
Item 3 Supplier X has well-managed business relationships in different geographic regions

Using a seven-point scale (1 = strongly disagree, 7 = strongly agree), please indicate the extent to which your firm receive the following benefits as the result of its relationship with this Supplier X in the last 3–5 years

Buyer economic performance
Item 1 Our relationship with Supplier X contributes significantly to our firm's sales
Item 2 Our relationship with Supplier X brings us cost benefits
Item 3 Our relationship with Supplier X increases my firm's profitability

Buyer innovation performance
Item 1 Increase responsiveness to new market
Item 2 Increase frequency of new product/service introduction to market
Item 3 Reduce product development cycle time

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