Network-Bonding Actions, Quality of Ties, and Channel Member Collaboration: Evidence from UK-based Small Firms

Abstract

We aim to deepen our understanding of the processes through which network-bonding actions affect channel member collaboration in the small firm context. We develop a framework to highlight the mediating roles of quality of ties and moderating role of control mechanisms in such processes. We test our framework using the quantitative method, by analysing survey from 385 UK-based small firms. We find that social interaction tends to affect operation synchronization via goal congruence, while affects intelligence generation via relational embeddedness. Furthermore, contractual governance has a negative moderating effect on the relationship between social interaction and goal congruence.

Keywords: Social Network Theory; Social Capital; Channel Member Collaboration; Small Firm; Supply Chain; Contractual Governance

Introduction

Firms increasingly rely on resources not only within but also outside their boundaries in order to deal with uncertain business environments (Inkpen and Tsang, 2005; Kale *et al.*, 2000). Accessing and attaining external resources often involves establishing a collaborative relationship with business partners. Echoing this perspective, scholars highlight that channel member collaboration (CMC) plays a positive role in fostering firms' competitiveness (Simatupang and Sridharan, 2005) and attempt to explore how firms can deliberately engage in activities designed to nurture CMC (e.g. Cao and Zhang, 2013; Dutta and Hora, 2017; Sukwadi *et al.*, 2013). The current research explores one particular type of antecedent of CMC: network-bonding actions (NBAs). NBAs represent a range of socializing actions, such as social interaction (Carey *et al.*, 2011; Villena *et al.*, 2011), that aim to generate meaningful links among the channel members. In a highly uncertain business environment, NBAs emerge as an important strategic option to enable firms to coordinate exchange and cooperation through the use of informal, relational mechanisms (Bernardes, 2010; Cousins *et al.*, 2006).

Through frequent, in-depth socializing with their channel members, firms can enhance both the communication and collaboration between themselves and their channel members (see the literature overview in Table 1). The extent literature highlights the direct link between various types of NBAs and the different types of CMC (Table 1). Villena *et al.* (2011) go further, suggesting that a curvilinear relationship (inverted-U shape) exists between social interaction and CMC performance outcomes. Nevertheless, a direct NBAs-CMC linkage lacks face validity and fails to explain the importance of the various possible intermediate mechanisms existing between the two. Recently, scholars have attempted to address this under-explored area (e.g. Bernardes, 2010; Chang *et al.*, 2012; Kim, 2014). Although this research line has generated powerful, enduring theoretical insights, limited efforts have centred on differentiating the roles of various intermediate mechanisms in

connecting NBAs with specific CMC. Furthermore, only Yan and Dooley (2013) and Carey *et al.* (2011) examine the presence of contingency factors regarding the NBAs-CMC link. The question of whether a contingency factor can affect NBAs' impact differently in different situations remains under-examined. Understanding exactly under which conditions NBAs affect different CMC is critical for managers charged with designing networking strategies to target specific CMC.

"Insert Table 1 about here"

Furthermore, this research focuses on understanding the relationship between NBAs and CMC in a small firm setting. We define a "small firm" as firms with fewer than 50 employees and an annual turnover of less than £10 million (Ward and Rhodes, 2014)[1]. According to UK business statistics in 2017, there were roughly 5.65 million small firms in the UK, making up 99% of all businesses (Rhodes, 2017). Although important to all firms, CMC is especially crucial for small firms because such collaboration (Matopoulos *et al.*, 2007) mitigates their liability of smallness. Unlike large organizations (with an abundance of resources), that are able to deal with uncertainty in the marketplace alone, small firms (with limited resources) are more likely to survive when facing such uncertainty if they establish collaborative relationships with other channel members (Brettel *et al.*, 2011; Wynarczyk and Watson, 2005). Despite recognizing that small firms often leverage NBAs tactics to develop their competitive business strategy (Elfring and Hulsink, 2003; Gnyawali and Park, 2009), surprisingly, no studies have examined the NBAs-CMC association in the small firm context (Table 1). This contextualization is important in establishing the boundary conditions for our theory. Our findings can offer specific practical implications for small firm managers.

"Insert Figure 1 about here"

[1] We use the definition of 'small firm' employed in the UK, as this research analyzes survey data obtained from UK-based small firms.

To address these gaps, we build on the social network theory to develop a conceptual framework (Figure 1). Specifically, we differentiate two new types of CMC - operation synchronization and intelligence generation. We suggest that small firms can engage in social interaction (a type of NBA) to build operation synchronization and intelligence generation. We also identify two salient types of tie quality (goal congruence and relational embeddedness), which mediate the relationship between social interaction and the two types of CMC differently. Furthermore, we propose contractual governance as a moderator that affects the strength of the relationship between social interaction and the quality of ties. We test our framework by employing survey data on 385 small firms in the UK. In general, our framework aims to explore the processes through which NBAs affect CMC in the small firm context and contribute to the NBAs-CMC association literature in several ways. First, our study sheds new light on this literature by examining the process whereby different types of tie quality mediate the impacts of social interaction on different types of CMC. Second, the study enriches the literature by specifying the contingent role of contractual governance in affecting the strength of the relationship between social interaction and the quality of ties. Finally, this study extends the literature into the new research context of small firms' supply chain management. In the next section, we will discuss how we draw on social network theory to identify and define the central constructs of our framework.

Theoretical Background and Constructs

We anchor our study in social network theory. Social network theory aims to explain how firms are embedded in various social networks and the formation of social connections allows them to produce better economic outcomes via cooperation (Granovetter, 1985; Kim, 2014). The primary focus of social network theory is that economic actions are deeply embedded in the networks of interfirm relations (Kim, 2014; Uzzi, 1997). In accordance with

this premise, social network theory expects firms to collaborate with each another and gain access to scarce resources through their network relations (Bernardes, 2010; Gulati *et al.*, 2000). For small firms, the establishment of business cooperation emerges as an important strategic option that may enable small firms to secure resources and deal with uncertain environments, because small firms' own resources may be insufficient to allow them to cope with the rapid changes occurring in the marketplace alone (Cooke and Wills, 1999; Shaw, 2006). This study builds on the insights of social network theory to develop a conceptual framework that explains the processes whereby NBAs affect CMC in the small firm context.

We conceptualize operation synchronization and intelligence generation as the dependent variables in our framework (Figure 1). Operation synchronization defines as channel members jointly performing activities to optimize the supply chain practice, while intelligence generation refers to the channel members jointly performing activities in order to understand the market environment and customers' needs in greater depth (Malhotra *et al.*, 2005; Simatupang and Sridharan, 2005). This conceptualization builds on social network theory, according to which, interfirm cooperative behaviors represent an important consequence of implementing NBAs (Carey *et al.*, 2011; Gulati *et al.*, 2000). Furthermore, scholars also widely recognize that small firms can improve their chance of survival and competitive advantage in the marketplace by collaborating with other organizations in their supply chain networks (Kaufman *et al.*, 2000).

Among other NBAs (see Table 1), social interaction is argued to be a salient contributor to CMC. Social interaction refers to frequent and deliberate socialization among the firms in the supply chain networks (Carey *et al.*, 2011; Villena *et al.*, 2011). We conceptualize social interaction as the independent variable of our framework. This consideration also builds on social network theory, which argues that social interaction is an important antecedent condition for interfirm collaboration because it enables firms to build

relationships with each other (Gulati *et al.*, 2000; Uzzi, 1997). In connection to our research context, prior studies suggest that small firms often rely on social interactions to improve their relationships with their network partners and so strengthen their resource position and ability to deal with major crises (Elfring and Hulsink, 2003; Petrick *et al.*, 2016).

Prior work on social network theory has increasingly recognized that the implementation of NBAs does not automatically lead to cooperative behaviors among firms. Instead, NBAs enable the improvement of the quality of (social) ties, which in turn enhances cooperation (Gao *et al.*, 2015; Gulati *et al.*, 2000). Applied to our context, the theory suggests that the quality of the ties is a critical intervening variable that explains why firms' engagement in social interaction with other channel members may lead to operation synchronization and intelligence generation within supply chain networks. Inspired by social network theory, this study focuses on two particular types of tie quality[2]: goal congruence and relational embeddedness. Goal congruence refers to the extent to which the channel members share the same goals (Li *et al.*, 2010; Yan and Dooley, 2013), while relational embeddedness means the extent to which trust, respect and reciprocity drive the channel relationships (Kale *et al.*, 2000; Kim, 2014). Unlike large organizations with an abundance of resources, that can invest heavily in installing operational systems in order to manage their supply chain relationships and obtain the resources embedded in these relationships, small firms' supply chain strategy focuses on building high quality relationships with specific partners (Fantazy *et al.*, 2009; Stevenson and Spring, 2007). Such "high quality" relationships allow small firms to request sudden, unscheduled support from their supply chain partners,

[2] According to social network theory, the quality of ties captures the relational connectedness among network actors. It takes different forms, such as tie strength (Granovetter, 1983), goal congruence (Yan and Dooley, 2013, 2014), relational embeddedness (Bernardes, 2010; Kim, 2014), trust (Li *et al.*, 2010; Tsai and Ghoshal, 1998), and social capital (Villena *et al.*, 2011; Yim and Leem, 2013). We recognize that many of the forms identified here are closely interrelated or sometimes overlap (i.e. trust and social capital), depending on how researchers conceptualize their model based on a specific theoretical perspective (Krause *et al.*, 2007; Tsai and Ghoshal, 1998).

who are willing to accommodate the small firms' special, non-routine requests (Fantazy *et al.*, 2009). Scholars have used both goal congruence and relational embeddedness to assess the quality of the ties existing between small firms and their business partners (Musteen *et al.*, 2010).

Drawing further on social network theory, we conceptualize contractual governance as a moderating variable in our framework. According to social network theory, the control mechanisms that govern the actors' exchange behaviors within the network environment may influence the actors' interactions' dynamics (Carey *et al.*, 2011; Granovetter, 1985). Contractual governance, a type of control mechanism, is a legally-binding framework (a contract agreed by all parties involved), that specifies a list of promises regarding the appropriate actions and performance targets for all to follow, with formal laws and regulations to reinforce them (Rai *et al.*, 2012). Prior research has pointed out that small firms' behaviors are influenced by the presence of contractual governance (Bayat *et al.*, 2014; Hara and Kanai, 1994). In comparison to large organizations, small firms (due to their lack of resources) are more vulnerable when dealing with their business partners' opportunistic behaviors (Hara and Kanai, 1994; Zacharakis, 1997). Contractual governance, in this situation, helps small firms to safeguard against such undesirable behaviors (Hudson and McArthur, 1994; Zacharakis, 1997). Overall, contractual governance emphasizes the establishment of formal rules and regulations that reflect the behavioral expectations of the parties who participate in the exchange (Carey *et al.*, 2011). We acknowledge that – per social network theory – contractual governance can influence the effectiveness of NBAs (Gulati *et al.*, 2000; Uzzi, 1997).

As Figure 1 shows, our study builds on the insights of social network theory and investigates the processes through which social interaction affects operation synchronization and intelligence generation in the small firm context. Drawing on social network theory, we

also investigate the role of goal congruence, relational embeddedness (mediators), and contractual governance (moderator) in such processes. In the following section, we further elaborate on the relationships among the key constructs of our conceptual framework and develop our hypotheses.

Hypotheses Development

Social Interaction and Channel Member Collaboration

According to social network theory, close, frequent interactions between firms and others in the networks promote interfirm cooperation (Granovetter, 1985; Uzzi, 1997). Building on this insight, we expect social interaction to be a driver of operation synchronization and intelligence generation. More specifically, social interaction allows a firm and its channel members to communicate frequently and develop strong linkages, especially in the small firm context. Unlike large organizations, which have formal, dedicated departments for handling the interfirm relationships that exist within the supply chain, small firms often rely on network-based informal contacts between different entities' individual managers/employees (Cooke and Wills, 1999; Petrick *et al.*, 2016; Sukwadi *et al.*, 2013). Engaging in social interaction with other channel members allows small firms to initiate two-way information-sharing about their supply chain networks' operational processes (Krause *et al.*, 2007; Yim and Leem, 2013) and business plans (Villena *et al.*, 2011). When a small firm and its channel members can develop a deeper understanding of other's operational processes, such as inventory handling and lead time management, they are more likely to work together to match the supply and demand and so optimize the supply chain practice (Cousins *et al.*, 2006). Thus, social interaction affects operation synchronization. Sharing information about business plans, such as product innovation and technological R&D, also enables small firms and their channel members to shift their focus from traditional supply chain operational improvement towards exploring or creating new markets (Villena *et al.*, 2011). These channel

members are thus more likely to work together towards understanding their market environment and customers' needs. Thus, social interaction affects intelligence generation. Accordingly, we hypothesize the following[3]:

Hypothesis 1: Social interaction is positively associated with operation synchronization.

Hypothesis 2: Social interaction is positively associated with intelligence generation.

Goal Congruence and Relational Embeddedness as Mediators

According to the logic of social network theory, through engaging in frequent, close interaction, firms are able to develop high quality ties with others in the networks which, in turn, promotes cooperative behaviors (Gao *et al.*, 2015; Gulati *et al.*, 2000). We apply these insights to this research context and argue that the quality of the ties acts as a mediator in linking social interaction and two types of CMC. In particular, in this study, we examine the mediating roles of two salient types of tie quality – goal congruence and relational embeddedness. Large organizations 1) have a resources advantage that enables them to influence supply chain-level decisions and force other to align their interests with them (Morgan *et al.*, 2007) and 2) have well-structured operating systems to manage exchanges in complex network environments (Angeles, 2005; Vaidyanathan, 2005). In comparison, small firms that wish to establish a collaborative relationship with others in the supply chain must begin by engaging in social interaction with potential supply chain partners in order to establish goal congruence and relational embeddedness. This is because goal congruence creates shared interests within supply chain networks (Bernardes, 2010; Yan and Dooley, 2013) while relational embeddedness improves the degree of closeness of the channel members' relationships (Chang *et al.*, 2012; Kim, 2014). Both goal congruence and relational

[3] Although these two hypotheses are similar to what has been previously hypothesized (see Table 1). We formalize these two hypotheses to facilitate the flow of this article, as it may be easier for readers to understand the mediating role of goal congruence and relational embeddedness after we conceptualize the main effects. We thank a reviewer to pointing out this limitation.

embeddedness function as a social lubricant to prevent potential conflicts and promote cooperation (Gao *et al.*, 2015; Gulati *et al.*, 2000).

More specifically, we anticipate a positive relationship between social interaction and goal congruence in the small firm context, for two main reasons. First, when small firms engage in social interaction with their channel members, they can develop a better understanding of each other's operational processes, since they will be able to communicate informally and develop a better awareness of all sides' perspectives regarding the supply chain operations (Fawcett *et al.*, 2007; Whipple *et al.*, 2010). Second, such actions also enable both sides to share their business plans and develop a better understanding of the difficulties that each side experiences when designing and implementing business plans in the marketplace (Villena *et al.*, 2011; Yan and Dooley, 2013). This awareness will help all parties to see the potential value of working collectively to integrate their resources and pursue shared goals (Adler and Kwon, 2002; Gnyawali and Park, 2009). Thus, a small firm and its channel members may achieve far greater mutual agreement about their goals as a result of engaging in social interaction.

We also anticipate that a positive association exists between social interaction and relational embeddedness in the small firm context. When a small firm and its channel members interact, such action assuages their doubts about their potential partners' possible opportunistic behaviors during supply chain operations (Kaufman *et al.*, 2000; Kim, 2014). Social interaction will give them a better understanding of each side's operational processes and business plans (Bernardes, 2010; Fawcett *et al.*, 2007), which increases the likelihood that they will perceive each other as trustworthy supply chain partners (Brunetto and Farr- Wharton, 2007; Carey *et al.*, 2011; Kim, 2014). Social interaction also increases the prospects of reciprocity. As employees from both sides spend longer together in both work and social contexts, there may be more opportunities to offer and repay favors related to

supply chain operations (Cousins *et al.*, 2006; Kim, 2014). Hence, relational embeddedness within supply chain networks may emerge through social interaction between a small firm and its channel members. Together, we propose:

Hypothesis 3: Social interaction is positively associated with goal congruence.

Hypothesis 4: Social interaction is positively associated with relational embeddedness.

We expect goal congruence to influence operation synchronization and intelligence generation differently. When a small firm and its channel members share the same supply chain goals, they are more likely to perceive that their individual objectives are satisfied by the pursuit of shared goals (Cao and Zhang, 2010; Yan and Dooley, 2014). This perception, in turn, means that they are more likely to orchestrate decisions around planning and operating the supply chain in order to achieve optimal effectiveness and efficiency. We apply a similar logic to the goal congruence-intelligence generation relationship. When the channel members share the same supply chain goals, they are more likely to collaborate in gathering market information that may benefit the overall supply chain, believing that their *individual* goals can be achieved as a direct result of working towards these *shared* goals. However, we do not anticipate an equally strong association in the goal congruence-operation synchronization relationship or the goal congruence-intelligence generation relationship.

A small firm and its channel members' shared goals produce greater internal cohesiveness (Yan and Dooley, 2013), enabling them to form a very close team at the supply chain level, which accordingly gives them a strong incentive to collaborate when making operating decisions. This is in line with previous researchers, who suggest that internal cohesion leads to joint problem-solving, effective collaboration, and information sharing (Cao and Zhang, 2010; Simatupang and Sridharan, 2005). Simultaneously, extensive cohesion among its members also makes the team (group of individuals/ firms) more

inwardly-focused (Ancona and Bresman, 2013). Thus, a team (a small firm and its channel members at the supply chain level) with high internal cohesion tends to strive more to share information internally than to capture new information externally, which is the essence of intelligence generation. Based on the proceeding discussion, although goal congruence can facilitate both operation synchronization and intelligence generation, the internal cohesion generated by a small firm and its channel members' goal-sharing may offer less incentive for them to work together to develop market intelligence. Thus,

> Hypothesis 5: goal congruence has a stronger positive effect on operation synchronization than intelligence generation.

We also expect relational embeddedness to influence operation synchronization and intelligence generation differently. When a small firm and its channel members enjoy mutual respect and trust, and expect reciprocity in their relationships, they are more willing to work together to improve the supply chain operation's effectiveness and efficiency. In this situation they are less concerned about their counter-parties' possible self-interest and opportunism, and thus more likely to orchestrate supply chain operational decisions that will benefit all parties (Brettel *et al.*, 2011; Kaufman *et al.*, 2000). We also expect relational embeddedness to contribute to intelligence generation. When the supply chain relationship contains mutual trust and the norms of respect and reciprocity, a small firm and its channel members are less likely to view each other as competitors, but rather as part of a team, depending on each other to execute the supply chain operations (Krause *et al.*, 2007; Yim and Leem, 2013). Thus, they are more likely to collaborate over market information gathering and analysis to identify potential business opportunities that can benefit the entire supply chain, and less likely to fear that individual channel members will use such information against them during business transactions (Patnayakuni *et al.*, 2006).

Furthermore, we also suggest that relational embeddedness fosters higher intelligence generation than operation synchronization. When a small firm and its channel members develop mutual trust and respect, and, most importantly, normalize reciprocity, they become more confident that their partners will reciprocate these benefits during supply chain operations (Cousins *et al.*, 2006). Therefore, they tend to neglect jointly orchestrating and planning supply chain operations. Conversely, a high level of trust, respect and reciprocity within a small firm and its channel members' relationship promotes collaboration over joint strategic planning for the overall supply chain's long-term competitiveness (Hult *et al.*, 2007; Wynarczyk and Watson, 2005). This leads them to seek and acquire new, relevant knowledge about the market environment (Cao and Zhang, 2010; Malhotra *et al.*, 2005). In general, relational embeddedness can facilitate intelligence generation and operation synchronization, extensive trust, and respect, while reciprocity among a small firm and its channel members can make them feel less concerned about developing joint plans to manage the supply chain operations and more focused on obtaining information about future business opportunities. Thus,

> Hypothesis 6: relational embeddedness has a stronger positive effect on intelligence generation than operation synchronization.

Building on these proceeding arguments and the social network theory (Gulati *et al.*, 2000; Uzzi, 1997), we suggest that both goal congruence and relational embeddedness act as mediators in these relationships. As discussed before, the social network theory posits that engagement in NBAs can promote the development of strong linkages among the network parties, which in turn enables them to work more collaboratively (Gao *et al.*, 2015; Granovetter, 1985). Social interaction can be positioned as bonding actions that strengthen the relationship between a small firm and its channel members (Carey *et al.*, 2011; Villena *et al.*, 2011). Goal congruence (Krause *et al.*, 2007; Yan and Dooley, 2013) and relational

embeddedness (Cousins *et al.*, 2006; Kim, 2014) suggest that the quality of the ties can be viewed as robust links among firms within supply chain networks. Both types of CMC - operation synchronization and intelligence generation - represent the ways in which a small firm and its channel members work collaboratively to ensure that their supply chain is efficient and responsive to the dynamic market needs (Cao and Zhang, 2010; Simatupang and Sridharan, 2005). The causal chain from social interaction through to the quality of the ties (goal congruence and relational embeddedness) to CMC (operation synchronization and intelligence generation) is consistent with the bonding actions-linkage-collaboration connections suggested by the social network theory (Gao *et al.*, 2015; Uzzi, 1997).

In particular, when small firms engage in social interaction with their channel members, this improves the supply chain networks' goal congruence and relational embeddedness. A high level of goal agreement between a small firm and its channel members ensures an internal (within the supply chain networks) cohesiveness that motivates them to orchestrate decisions in order to optimize their supply chain operations. However, as argued earlier in hypothesis 5, the internal cohesiveness resulting from goal congruence also promotes an inward-focus and limits a small firm and its channel members' incentive to work together to process market information. Thus, goal congruence should play a more vital role in conveying the effects of social interaction onto operation synchronization rather than intelligence generation. On the other hand, a high level of relational embeddedness between a small firm and its channel members can inspire everyone to work together to obtain and process market information, in order to develop a joint strategy that will promote the overall supply chain's long-term competitiveness. Yet, as argued earlier in hypothesis 6, the presence of a high level of relational embeddedness provides less of an incentive for small firms and their channel members to work together in organizing joint supply chain operations. Thus,

relational embeddedness should play a stronger role in conveying the effects of social interaction onto intelligence generation rather than operation synchronization. Thus,

> Hypothesis 7: Goal congruence plays a more prominent role in mediating the direct relationship between social interaction and operation synchronization, than that between social interaction and intelligence generation.

> Hypothesis 8: Relational embeddedness plays a more prominent role in mediating the direct relationship between social interaction and intelligence generation, than that between social interaction and operation synchronization.

Contractual Governance as a Moderator

According to the social network theory, the effectiveness of network bonding actions can be influenced by contingent factors (Gao *et al.*, 2015; Gulati *et al.*, 2000; Uzzi, 1997). In particular, the control mechanisms that govern the actors' exchange behaviors within the network environment may influence the dynamics of the actors' interactions (Carey *et al.*, 2011; Luo *et al.*, 2011). Drawing on the theory, we conceptualize contractual governance as a moderating variable in our framework. Contractual governance emphasizes the establishment of formal rules and regulations that reflect the members' (firms of all sizes) behavioral expectations, who participate in the exchange (Luo *et al.*, 2011; Rai *et al.*, 2012). We suggest that the presence of contractual governance weakens the association between social interaction and the quality of the ties (goal congruence and relational embeddedness) in the small firm context.

More specifically, a high level of contractual governance (detailed contracts) reduces the effect of social interaction on goal congruence. This is because a detailed contract codifies a small firm and each of its channel members' obligations and responsibilities regarding supply chain operations (Li *et al.*, 2010; Luo *et al.*, 2011). When the presence of a detailed contract regulates the supply chain operations, a small firm and its channel members are fully aware of how to behave as supply chain partners. In this situation, engaging social interactions to develop a bilateral understanding and shared vision in order to achieve tasks

and outcomes in the supply chain becomes less effective. Similarly, a high level of contractual governance also reduces the effect of social interaction on relational embeddedness. A detailed contract clarifies any uncertainty and risks associated with opportunistic behaviors within a supply chain relationship (Li *et al.*, 2010; Zhou and Xu, 2012). It helps both parties (a small firm and its channel members) to build mutual trust, norms of reciprocity, and mutual respect relatively quickly (Li *et al.*, 2010). As a result, using social interaction to develop and maintain relational embeddedness between a small firm and its supply chain partners also become less effective.

Furthermore, small firms are less likely to have spare resources (in comparison with large organizations) that allow for more discretionary and flexible usage (Taylor and Banks, 1992). Consequently, the managers of small firms are less likely to allocate resources to activities that offer few returns. In this situation, where contractual governance is well-established to regulate the channel members' behaviors, our prior arguments suggest that social interaction will have less effect on goal congruence and relational embeddedness. This means that the returns on investing in activities related to social interaction shrink when contractual governance is strong. As a result, we argue that small firms' managers will be less likely to allocate resources to social interaction. This further reduces the effectiveness of social interaction in constructing goal congruence and relational embeddedness in the supply chain network. Combining the above discussion, we hypothesize:

Hypothesis 9: Contractual governance negatively moderates the relationship between social interaction and goal congruence

Hypothesis 10: Contractual governance negatively moderates the relationship between social interaction and relational embeddedness.

Research Method

Data Collection

Our data relate to a cross-sectional questionnaire survey of small firms in the UK wholesale and retail sector. We chose this particular sector for two reasons. First, the effectiveness and efficiency of supply chain operations are critical for firms' success in this sector (Matopoulos *et al.*, 2007). Second, prior research reports that participation in networking and socialization activities helps these firms to improve their supply chain relationship and business performance (Elg and Johansson, 1996).

We contacted a marketing company to request the contact information of small firms in the UK wholesale and retail sector. We randomly selected 1,500 firms and sent out four waves of emails to increase the response rate. We then sent a cover letter to the CEO (or general manager) of the firm to ask him/her to complete the questionnaire on behalf of that firm, in 2015. Following the recommendations of previous researchers regarding the supply chain relationship (e.g. Bernardes, 2010; Li *et al.*, 2010), we asked the CEOs to answer all of the questions based on their relationship with a major supplier. Finally, we obtained 385 usable questionnaires from organizations with an average annual revenue of £3.348 million, 39.777 employees, and 10.564 years of business establishment. On comparing the answers between the early and late respondents, we found no significant differences (Armstrong and Overton, 1977). Therefore, the probability of non-response bias is minimal.

Measurement

We measured all of the variables using multi-item, Likert-type scales (see appendix 1). For *social interaction*, we adapted measurement items from Sun *et al.* (2012), Villena *et al.* (2011) and Yli Renko *et al.* (2001) to assess the activities that small firms pursue in order to socialize and develop their relationships with their channel member colleagues. We used measurement items adapted from relevant studies (Kale *et al.*, 2000; Sun *et al.*, 2012) as a basis for assessing *relational embeddedness*, that highlights mutual respect, trust and

reciprocity in the relationship between a small firm and its channel members. For *goal congruence*, we adapted and modified measurements from prior studies (Li *et al.*, 2010; Yan and Dooley, 2014) to assess the extent to which a small firm and its channel members share the same goals. For *contractual mechanism*, we adapted the measurement items of Luo *et al.* (2011) and Rai *et al.* (2012) to assess the use of formal contracts within supply chain operations. We adopted and modified the measurements from prior studies (Malhotra *et al.*, 2005; Simatupang and Sridharan, 2005) to assess *operation synchronization* and *intelligence generation* (jointly performing activities to optimize supply chain operation and improve market intelligence, respectively).

Finally, we also used the firm's size (based on revenue), age, employee numbers, business area (within the wholesale or retail sectors), competitive intensity, market turbulence, risk-sharing, resource-sharing, communication style and channel commitment as the control variables, in line with the relevant literature (Cao and Zhang, 2010; Matopoulos *et al.*, 2007). We applied logarithmic transformation to variables such as firm size, age, and employee number, in line with prior studies in the field (e.g. Villena *et al.*, 2011; Yan and Dooley, 2013). We created business area dummies, using "Miscellaneous" as the benchmark group. We adopted and modified two items to assess competitive intensity ("the competition in our industry is cutthroat"), and market turbulence ("channel members need changes all the time") from Hult *et al.* (2007). We used a single item to assess risk-sharing ("our firm and supply chain partners share risks"), resource-sharing ("our firm and supply chain partners share financial and non-financial resources"), communication style ("our firm and our supply chain partners influence each other's decisions through discussion rather than requests"), and channel commitment ("our business functions are integrated in serving the needs of our supply chain partners"), adopted and modified from various sources (e.g. Cao and Zhang, 2010; Yim and Leem, 2013).

All of the variables in our model feature in prior studies, using multi-item scales with a few item variations (usually 1 or 2 different items). To ensure that we captured the essence of the measurement, we first selected a few highly-regarded studies and adopted all of the measurement items (including both repeated and different items) to form our initial survey design. We then conducted a pre-test with seven representatives from small firms. These respondents answered all of the survey items and provided feedback about the clarity of the survey questions and instructions as well as the aptness of the terminology. Finally, we deleted inappropriate items, refined the language of the remaining items, and finalized the survey, based on the respondents' suggestions.

Validity and Reliability

We followed Podsakoff *et al.* (2012) in using multiple statistical remedies to ensure that common method bias was not an issue for this study. First, we performed Harman's single factor test by subjecting all of the items in our study to exploratory factor analysis. The result of an unrotated principal component analysis indicated that a single method factor fails to explain the majority of the variance (the highest single variance extracted from the data is 41.442%). Second, we used CFA common latent factor techniques (Podsakoff *et al.*, 2012). We first compared the factor loading between the CFA model, with and without the common latent factor, and found that the differences were not significant. Furthermore, we constrained the factor loadings to the common factor to be equal. We squared the constrained factor loading and found that it only accounted for 31.697% of the variance (less than the majority of the variance). In general, all of the results suggested that common method variance is not a concern for this study.

"Insert Table 2 about here"

We then performed confirmatory factor analysis to compare different models. According to suggestions by Hair *et al.* (2010) regarding the comparative fit index (CFI), normed fit index (NFI), goodness of fit index (GFI), and root mean square error of approximation (RMSEA), our hypothesized model exhibited the best fit (X^2 = 169.528; *df* = 75; X^2/df = 2.260; p = .000; NFI = .938; CFI = .964; GFI = .944; RMSEA = .057) (see Table 3). We also calculated the value of the composite reliability (CR) and average variance extracted (AVE). Table 2 showed that the CR value is greater than .70 for all of the constructs in our findings, so the construct reliability is confirmed (Hair *et al.*, 2010). The value of the AVE for all constructs exceeded the .50 benchmark (Fornell and Larcker, 1981). Furthermore, we calculated the square root value of the AVE for each construct and found that the results were greater than those for all of the correlations with other constructs (see Table 2). Finally, we calculated the variance inflation factors (VIFs) to assess the possibility of multicollinearity. The results suggested that all of the VIFs were below 3, so multicollinearity is not a serious problem in this analysis (Hair *et al.*, 2010)

"Insert Table 3 about here"

Analysis and Results

To assess our hypotheses, we performed structural equation modeling using SPSS Amos. Table 4 presents the results of our analysis. To examine the direct effects between social interaction and the different types of CMC, as indicated in hypotheses 1 and 2, we estimated Model 1 (X^2 = 93.437; *df* = 72; X^2/df = 1.298; p = .046; NFI = .959; CFI = .989; GFI = .979; RMSEA = .028). We found strong support for our Hypothesis 1 regarding the positive effect of social interaction on operation synchronization (Model 1: $\beta = .209$, $p < .010$), as well as hypothesis 2 regarding the positive effect of social interaction on intelligence generation (Model 1: $\beta = .289$, $p < .001$).

"Insert Table 4 about here"

We estimate Model 2 (X^2 = 335.263; df = 179; X^2/df = 1.873; p = .000; NFI = .912; CFI = .954; GFI = .941; RMSEA = .048) to examine the various associations among the variables proposed in hypotheses 3-6. The results in Table 4 reveal that social interaction has a positive relation with goal congruence (Model 2: β = .289, p < .001), supporting hypothesis 3, as well as that social interaction has a positive relation to relational embeddedness (Model 2: β = .378, p < .001), supporting hypothesis 4. We also found that goal congruence has a positively relationship to operation synchronization (Model 2: β = .398, p < .001), whereas goal congruence does not have a significant effect on intelligence generation (Model 2: β = .091, n.s.). This result supports hypothesis 5. On the other hand, relational embeddedness has no significant effect on operation synchronization (Model 2: β = -.019, n.s.), while relational embeddedness has a positive relationship with intelligence generation (Model 2: β = .256, p < .001). This result supports hypothesis 6.

To examine the mediating relationship proposed in hypotheses 7 and 8, we estimate Model 3 (X^2 = 324.176; df = 177; X^2/df = 1.832; p = .000; NFI = .915; CFI = .957; GFI = .943; RMSEA = .048), which includes both direct and indirect effects in a single structural equation model simultaneously (Jose, 2013). Hypothesis 7 infers that goal congruence plays a more prominent role in mediating the direct relationship between social interaction and operation synchronization than that between social interaction and intelligence generation. Our results show that the social interaction-goal congruence association (Model 3: β = .272, p < .001) and goal congruence-operation synchronization association (Model 3: β = .371, p < .001) are positive and significant when accounting for the effect of social interaction on operation synchronization. We then conducted the Sobel test (Sobel, 1982) to examine the signifcance of the indirect effect. We found that this indirect path was signficant (Sobel test statistic = 3.015, p < .010). In contrast, our results show that the indirect path from social interaction through goal congruence to intelligence generation is poorly-connected, as it has

no goal congruence and so no significant effect on intellignence generation (Model 3: β = .052, n.s.). Further, the Sobel test also confirms the insignificance of the indirect effects (Sobel test statistic =.080, n.s.). In general, hypothesis 7 is supported.

Hypothesis 8 posits that relational embeddedness plays a more prominent role in mediating the direct relationship between social interaction and intelligence generation than that between social interaction and operation synchronization. We adopt the same method as above to test this hypothesis. Our results show that the indirect path from social interaction through relational embeddedness (Model 3: β = .367, p < .001) to operation synchronization is poorly-connected, due to the insignificant effect of relational embeddedness on operation synchronization (Model 3: β = -.076, n.s.). The result of the Sobel test further confirms this (Sobel test statistic = -1.1051, n.s.). In contrast, the indirect path from social interaction through relational embeddedness (Model 3: β = .367, p < .001) to intelligence generation (Model 3: β = .176, p < .050) is positively connected. The result of the Sobel test further confirms the significance of the indirect effect (Sobel test statistic = 2.112, p < .050). Thus, hypothesis 8 is supported.

Hypothesis 9 posits that contractual governance negatively moderates the relationship between social interaction and goal congruence, while hypothesis 10 posits that contractual governance negatively moderates the relationship between social interaction and relational embeddedness. We follow Kenny and Judd (1984) to create a latent interaction term that includes all of the possible products of the measurement items (total 3 x 2 = 6 items) of social interaction (3 items) and contractual governance (2 items). We estimated a new structural equation model, including the direct effect of social interaction, contractual governance, and interaction term on both goal congruence and relational embeddedness (X^2 = 502.597; *df* = 281; X^2/df = 1.789; p = .000; NFI = .904; CFI = .953; GFI = .927; RMSEA = .045). Our results show that a negative and significant effect exists between the interaction term and goal

congruence (Model 4: β = -.084, p < .050), but no significant effect exists between the interaction term and relational embeddedness (Model 4: β = -.047, n.s.). These results support hypothesis 9, but reject hypothesis 10. Figure 2 illustrates this graphically, showing that the effects of social interaction on goal congruence are weaker when the contractual governance is high. Finally, we estimated a full model (Model 5: X^2 = 638.470; *df* = 375; X^2/df = 1.708; p = .000; NFI = .900; CFI = .953; GFI = .953; RMSEA = .043). We found that all path relationships still hold and are in line with our earlier models.

"Insert Figure 2 about here"

Discussion and Conclusion

Academic Contributions

Our research makes several important contributions. First, whereas prior studies focus on understanding the direct link between NBAs and CMC, few studies attempt to understand the processes through which NBAs contribute to CMC (see Table 1). Our findings clarify the roles of goal congruence and relational embeddedness (two types of ties quality) by revealing that social interaction (a type of NBA) mainly affects operation synchronization (a type of CMC) via goal congruence, while mainly affecting intelligence generation (another type of CMC) via relational embeddedness. This is the first study to shed light on the specific role of different mediators in transferring the impact of NBAs to different CMCs. Furthermore, we develop the conceptual reasoning based on social network theory to explain such differential intermediate mechanisms. According to social network theory, frequent and close interactions improve the quality of the ties between a focal firm and its network partners, which ultimately promotes interfirm cooperation (Gao *et al.*, 2015; Gulati *et al.*, 2000; Uzzi, 1997). More specifically, the theory offers a general description about the mediating role of tie quality in the NBAs-CMC relationship. We refine this theoretical lens by distinguishing the

role that different types of tie quality play in connecting NBAs with different types of CMC, and empirically confirm the distinct intermediate mechanisms. In doing so, our work enriches social network theory's perspective of the NBAs-CMC relationship.

Second, prior research offers limited insights on the contingency factors that influence the NBAs-CMC relationship (see Table 1). Our research contributes to this line of enquiry by investigating the contingent role of contractual governance in moderating the strength of the relationship between NBAs and the quality of ties, which subsequently affects the NBAs-CMC association. Our results suggest that contractual governance negatively moderates the relationship between social interaction and goal congruence, but we do not find negative moderating effects of contractual governance significant in the relationship between social interaction and relational embeddedness. One possible explanation is that, even though the overall effectiveness of using social interaction to build relational embeddedness is weaker when a detailed contract exists, small firm managers can still expect to gain additional mutual respect, trust and reciprocity in the supply chain relationship by engaging in frequent, close interactions with their channel member colleagues. This is because the development of a very high level of mutual respect, trust and reciprocity in the supply chain relationship requires ongoing communication and socialization over a long time period (Cousins *et al.*, 2006; Krause *et al.*, 2007). In other words, a small firm that decides to engage in frequent, close interaction with it channels members can still advance the relational embeddedness within the supply chain, despite the presence of contractual governance.

As another important contribution to social network theory's perspective of the NBAs-CMC relationship, this study is the first, to our knowledge, to address the conceptually implied but unexamined contingency factors. More specifically, the use of formal contracts is very common practice in managing supply chain operations (Li *et al.*, 2010; Zhou and Xu, 2012). In an attempt to extend the social network theory, we seek deeper insights on the role

of contractual governance as a contingency factor that might affect the strength of the relationship between social interaction and goal congruence/relational embeddedness. We reason that the use of formal contracts reduces the effectiveness of social interaction because it replaces certain functions of social interaction by enabling the establishment of bilateral understanding and reduces the motives for opportunistic behaviors by a small firm and its channel members (Li *et al.*, 2010; Luo *et al.*, 2011; Zhou and Xu, 2012). According to our findings, this is particularly true when a small firm intends to engage in frequent, close interaction with its channel member colleagues for the purpose of developing goal congruence. Altogether, we enrich social network theory's perspective of the NBAs-CMC relationship by offering a contingency perspective.

Our final contribution pertains to the empirical context. Whereas prior studies focus on understanding the impact of NBAs on CMC generally (see Table 1), we focus specifically on the small firm context. More specifically, we identify that NBAs (social interaction) and the quality of the ties (goal congruence and relational embeddedness) are closely related to small firms' business strategy in the network environment. We also identify two types of CMC (operation synchronization and intelligence generation), as well as a moderator (contractual governance) that is common among small firms when conducting supply chain management. On the one hand, we argue that NBAs are more important for small firms than large organizations, due to the former's lack of organizational resources. Therefore, small firms must rely on NBAs if they are to complete in the marketplace (Cooke and Wills, 1999; Elfring and Hulsink, 2003). CMC can help small firms to overcome their resource limitations and pursue business opportunities (e.g. Brettel *et al.*, 2011; Dutta and Hora, 2017; Matopoulos *et al.*, 2007; Petrick *et al.*, 2016). Thus, it is important to understand the relationship between NBAs and CMC in the small firm context. Our research demonstrates the processes through which NBAs affect CMC in a small firm context and how control

mechanisms can affect such processes. Although our study provides only a snapshot of small firms' approach to employing NBAs in their supply chain management strategy, our findings, in combination with those of previous studies, can provide valuable insights into how such an approach mitigates their liability of smallness in developing competitive strategies to employ in dynamic marketplaces.

Management Implications

Our findings offer several important management implications. First, our findings suggest that social interaction is an important antecedent condition for developing operation synchronization and intelligence generation in supply chain operations, as well as enhancing the goal congruence and relational embeddedness between a small firm and its channel member colleagues. This means that small firm managers who wish to promote operation synchronization and intelligence generation within the supply chain can deliberately socialize and interact with the firms' key supply chain partners. Furthermore, small firm managers can also choose to invest in facilitating social interaction actions to promote goal congruence and relational embeddedness within the supply chain relationship.

Second, our results challenge the conventional wisdom that assumes that a high level of tie quality can always lead to strong, positive CMC (Krause *et al.*, 2007; Yan and Dooley, 2014; Yim and Leem, 2013). This is based on our finding that goal congruence has stronger effects on operation synchronization than intelligence generation, while relational embeddedness has stronger effects on intelligence generation than operation synchronization. Therefore, small firm managers should exercise caution regarding where they invest their resources in order to improve a specific type of tie quality. Unlike large organizations, small firms are more likely to face resource constraints related to the number of projects in which they invest (Cooke and Wills, 1999; Elfring and Hulsink, 2003). Understanding the effects of

different types of tie quality on CMC can help small firm managers to develop more effective strategic investment plans to target a particular type of CMC.

Third, our further investigation also revealed two very specific mediation paths, which have important managerial implications. More specifically, small firm managers should understand that the benefits of social interaction in improving operation synchronization depend on the development of congruent business objectives between the firm and its channel member colleagues. On the other hand, simply engaging in social interactions with their fellow channel members is insufficient; it is more important to develop mutual respect, a norm of reciprocity, and mutual trust between a firm and its channel members that will help to promote intelligence generation activities. Small firm managers who organize the implementation of social interaction should guide such actions toward building either goal congruence or relational embeddedness, which in turn foster different types of CMC.

Finally, our results indicate that contractual governance has negative moderating effects on the social interaction-goal congruence relationship but not on the social interaction-relational embeddedness relationship. Thus, small firm managers should recognize that the presence of a detailed contract might harm the firm's efforts to engage in frequent, close interactions with its channel member colleagues in certain situations. Accordingly, we recommend that small firm managers who wish to promote goal congruence between the firm and its channel members by engaging in social interaction should not initiate any contractual arrangements, since a high level of contractual governance will reduce the effectiveness of social interaction in enhancing goal congruence.

Limitations and Future Research

We acknowledge a number of limitations and future research opportunities. First, our study's cross-sectional design prevents us from drawing any definite conclusions about the causal relationships and raises concerns about common method variance, despite our precautionary measures and the statistical evidence opposing its presence (Podsakoff *et al.*, 2012). Future researchers might employ a longitudinal research design in order to confirm this causality empirically and reduce the amount of common method variance. Furthermore, we asked the CEOs from our sample small firms to answer all of the questions based on the firm's relationship with a major supplier, which is a method that many previous researchers have adopted in supply chain relationship research (e.g. Carey *et al.*, 2011), but this may still have led to selection bias. Future studies might try other ways of specifying the supply chain relationship in their empirical design.

Second, the key variables (such as social interaction, goal congruence, etc.) within our conceptual framework capture, at best, the dyadic aspect of the supply chain relationship. Due to the difficulty of obtaining objective data about dyadic relationship dynamics, consistent with prior studies that adopt a similar research focus (e.g. Bernardes, 2010; Li *et al.*, 2010), we relied on the managers' perceptions in evaluating these dyadic relationship dynamics. Future researchers may develop lab- or quasi-experiments to capture these more effectively. Third, engaging in social interaction may allow small firms not only to bond with their existing channel member colleagues but also to recruit new ones (Cousins *et al.*, 2006; Villena *et al.*, 2011). Scholars refer to this as network-bridging, drawing on the bridging aspect of SCT (Newell *et al.*, 2004). Future researchers might focus on exploring network bridging's influence on CMC. Together, we can offer a more comprehensive picture of the SCT perspective of CMC.

Fourth, by focusing specifically on the perspective of small firms, this study ignores the debate regarding whether NBAs, the quality of ties, and control mechanisms may also be

relevant to CMC in the large organization context. Future researchers should conduct similar studies using the perspective of large organizations. Based on the findings of this study, we can offer a more comprehensive picture regarding the use of NBAs in formulating a supply chain management strategy for firms of all sizes. Lastly, we used a sample of small-sized, UK-based wholesale and retail firms in this research. We need to recognize that we may need to limit the generalizability of our findings to firms within a specific industry and country context. Future studies on different industries or countries than our setting could help to generalize our findings more widely and expand the boundary conditions further.

Reference

Adler, P. S., and S. W. Kwon. (2002). Social capital: Prospects for a new concept. *Academy of Management Review,* 27 (1), 17-40.

Ancona, D., and H. Bresman. (2013). *X-teams: How to build teams that lead, innovate, and succeed*. Boston: Harvard Business Press.

Angeles, R. (2005). Rfid technologies: Supply-chain applications and implementation issues. *Information Systems Management,* 22 (1), 51-65.

Armstrong, J. S., and T. S. Overton. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research,* 14 (3), 396-402.

Bayat, M., T. Schøtt, and M. R. Zali. (2014). Firms' collaboration networks benefitting innovation: Embeddedness in high-and low-trust culture, denmark and iran. *International Journal of Entrepreneurship and Small Business,* 23 (1-2), 168-190.

Bernardes, E. S. (2010). The effect of supply management on aspects of social capital and the impact on performance: A social network perspective. *Journal of Supply Chain Management,* 46 (1), 45-55.

Brettel, M., A. Engelen, T. Müller, and O. Schilke. (2011). Distribution channel choice of new entrepreneurial ventures. *Entrepreneurship Theory and Practice,* 35 (4), 683-708.

Brunetto, Y., and R. Farr- Wharton. (2007). The moderating role of trust in sme owner/managers' decision-making about collaboration. *Journal of Small Business Management,* 45 (3), 362-387.

Cao, M., and Q. Zhang. (2010). Supply chain collaboration: Impact on collaborative advantage and firm performance. *Journal of Operations Management,* 29 (3), 163-180.

Cao, M., and Q. Zhang. (2013). *Supply chain collaboration: Roles of interorganizational systems, trust, and collaborative culture*. London: Springer.

Carey, S., B. Lawson, and D. R. Krause. (2011). Social capital configuration, legal bonds and performance in buyer–supplier relationships. *Journal of Operations Management,* 29 (4), 277-288.

Chang, M.-L., C.-F. Cheng, and W.-Y. Wu. (2012). How buyer-seller relationship quality influences adaptation and innovation by foreign mncs' subsidiaries. *Industrial Marketing Management,* 41 (7), 1047-1057.

Cooke, P., and D. Wills. (1999). Small firms, social capital and the enhancement of business performance through innovation programmes. *Small Business Economics,* 13 (3), 219-234.

Cousins, P. D., R. B. Handfield, B. Lawson, and K. J. Petersen. (2006). Creating supply chain relational capital: The impact of formal and informal socialization processes. *Journal of Operations Management,* 24 (6), 851-863.

Dutta, D. K., and M. Hora. (2017). From invention success to commercialization success: Technology ventures and the benefits of upstream and downstream supply-chain alliances. *Journal of Small Business Management,* 55 (2), 216-235.

Elfring, T., and W. Hulsink. (2003). Networks in entrepreneurship: The case of high-technology firms. *Small Business Economics,* 21 (4), 409-422.

Elg, U., and U. Johansson. (1996). Networking when national boundaries dissolve. *European Journal of Marketing,* 30 (2), 61-74.

Fantazy, K. A., V. Kumar, and U. Kumar. (2009). An empirical study of the relationships among strategy, flexibility, and performance in the supply chain context. *Supply Chain Management: An international journal,* 14 (3), 177-188.

Fawcett, S. E., P. Osterhaus, G. M. Magnan, J. C. Brau, and M. W. McCarter. (2007). Information sharing and supply chain performance: The role of connectivity and willingness. *Supply Chain Management: An international journal,* 12 (5), 358-368.

Fornell, C., and D. F. Larcker. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research,* 18 (1), 39-50.

Gao, G. Y., E. Xie, and K. Z. Zhou. (2015). How does technological diversity in supplier network drive buyer innovation? Relational process and contingencies. *Journal of Operations Management,* 36 (1), 165-177.

Gnyawali, D. R., and B.-J. Park. (2009). Co-opetition and technological innovation in small and medium-sized enterprises: A multilevel conceptual model. *Journal of Small Business Management,* 47 (3), 308-330.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology,* 91 (3), 481-510.

Granovetter, M. S. (1983). The strength of weak ties: A network theory revisited. In P. V. Marsden & N. Lin (Eds.), *Social structure and network analysis* (pp. 105-130). Beverly Hills, CA: Sage.

Gulati, R., N. Nohria, and A. Zaheer. (2000). Strategic networks. *Strategic Management Journal,* 21 (3), 203-215.

Hair, J. F., W. Black, C., B. J. Babin, and R. E. Anderson. (2010). *Multivariate data analysis (7th edition)*. Upper Saddle River, NJ.: Prentice Hall.

Hara, G., and T. Kanai. (1994). Entrepreneurial networks across oceans to promote international strategic alliances for small businesses. *Journal of Business Venturing,* 9 (6), 489-507.

Hudson, R. L., and A. W. McArthur. (1994). Contracting strategies in entrepreneurial and established firms. *Entrepreneurship Theory and Practice,* 18 (3), 43-59.

Hult, G. T. M., D. Ketchen, and M. Arrfelt. (2007). Strategic supply chain management: Improving performance through a culture of competitiveness and knowledge development. *Strategic Management Journal,* 28 (10), 1035-1052.

Inkpen, A. C., and E. W. K. Tsang. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review,* 30 (1), 146-165.

Jose, P. E. (2013). *Doing statistical mediation and moderation*. New York: Guilford Press.

Kale, P., H. Singh, and H. Perlmutter. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management Journal,* 21 (3), 217-237.

Kaufman, A., C. H. Wood, and G. Theyel. (2000). Collaboration and technology linkages: A strategic supplier typology. *Strategic Management Journal,* 21 (6), 649-663.

Kenny, D. A., and C. M. Judd. (1984). Estimating the nonlinear and interactive effects of latent variables. *Psychological Bulletin,* 96 (1), 201-210.

Kim, D.-Y. (2014). Understanding supplier structural embeddedness: A social network perspective. *Journal of Operations Management,* 32 (5), 219-231.

Krause, D. R., R. B. Handfield, and B. B. Tyler. (2007). The relationships between supplier development, commitment, social capital accumulation and performance improvement. *Journal of Operations Management,* 25 (2), 528-545.

Li, J. J., L. Poppo, and K. Z. Zhou. (2010). Relational mechanisms, formal contracts, and local knowledge acquisition by international subsidiaries. *Strategic Management Journal,* 31 (4), 349-370.

Luo, Y., Y. Liu, L. Zhang, and Y. Huang. (2011). A taxonomy of control mechanisms and effects on channel cooperation in china. *Journal of the Academy of Marketing Science,* 39 (2), 307-326.

Malhotra, A., S. Gosain, and O. A. E. Sawy. (2005). Absorptive capacity configurations in supply chains: Gearing for partner-enabled market knowledge creation. *MIS Quarterly,* 29 (1), 145-187.

Matopoulos, A., M. Vlachopoulou, V. Manthou, and B. Manos. (2007). A conceptual framework for supply chain collaboration: Empirical evidence from the agri-food industry. *Supply Chain Management: An international journal,* 12 (3), 177-186.

Morgan, N. A., A. Kaleka, and R. A. Gooner. (2007). Focal supplier opportunism in supermarket retailer category management. *Journal of Operations Management,* 25 (2), 512-527.

Musteen, M., J. Francis, and D. K. Datta. (2010). The influence of international networks on internationalization speed and performance: A study of czech smes. *Journal of World Business,* 45 (3), 197-205.

Newell, S., C. Tansley, and J. Huang. (2004). Social capital and knowledge integration in an erp project team: The importance of bridging and bonding. *British Journal of Management,* 15 (1), 43-S57.

Patnayakuni, R., A. Rai, and N. Seth. (2006). Relational antecedents of information flow integration for supply chain coordination. *Journal of Management Information Systems,* 23 (1), 13-49.

Petrick, I., C. Maitland, and N. Pogrebnyakov. (2016). Unpacking coordination benefits in supply networks: Findings from manufacturing smes. *Journal of Small Business Management,* 54 (2), 582-597.

Podsakoff, P. M., S. B. MacKenzie, and N. P. Podsakoff. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology,* 63 (1), 539-569.

Rai, A., M. Keil, R. Hornyak, and K. Wüllenweber. (2012). Hybrid relational-contractual governance for business process outsourcing. *Journal of Management Information Systems,* 29 (2), 213-256.

Rhodes, C. (2017). *Business statistics*. London: House of Commons Library.

Shaw, E. (2006). Small firm networking. *International Small Business Journal,* 24 (1), 5-29.

Simatupang, T. M., and R. Sridharan. (2005). An integrative framework for supply chain collaboration. *International Journal of Logistics Management,* 16 (2), 257-274.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology* (Vol. 13, pp. 290-312). San Francisco: Jossey-Bass.

Stevenson, M., and M. Spring. (2007). Flexibility from a supply chain perspective: Definition and review. *International Journal of Operations & Production Management,* 27 (7), 685-713.

Sukwadi, R., H. M. Wee, and C. C. Yang. (2013). Supply chain performance based on the lean–agile operations and supplier–firm partnership: An empirical study on the garment industry in indonesia. *Journal of Small Business Management,* 51 (2), 297-311.

Sun, Y., Y. Fang, K. H. Lim, and D. Straub. (2012). User satisfaction with information technology service delivery: A social capital perspective. *Information Systems Research,* 23 (4), 1195-1211.

Taylor, G. S., and M. C. Banks. (1992). Entrepreneurs, small business executives, and large business executives: A comparison of the perceived importance of current business issues. *Journal of Small Business Management,* 30 (4), 24-40.

Tsai, W., and S. Ghoshal. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal,* 41 (4), 464-476.

Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly,* 42 (1), 35-67.

Vaidyanathan, G. (2005). A framework for evaluating third-party logistics. *Communications of the ACM,* 48 (1), 89-94.

Villena, V. H., E. Revilla, and T. Y. Choi. (2011). The dark side of buyer–supplier relationships: A social capital perspective. *Journal of Operations Management,* 29 (6), 561-576.

Ward, M., and C. Rhodes. (2014). Small businesses and the uk economy. *Economic Policy and Statistics*. Retrieved from http://s3.amazonaws.com/academia.edu.documents/40263052/UK.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1493117424&Signature=8cqUrCUQEdU%2BQC2u%2FynC3AgksHg%3D&response-content-disposition=inline%3B%20filename%3DStandard_Note.pdf (accessed on April 2017).

Whipple, J. M., D. F. Lynch, and G. N. Nyaga. (2010). A buyer's perspective on collaborative versus transactional relationships. *Industrial Marketing Management,* 39 (3), 507-518.

Wynarczyk, P., and R. Watson. (2005). Firm growth and supply chain partnerships: An empirical analysis of uk sme subcontractors. *Small Business Economics,* 24 (1), 39-51.

Yan, T., and K. Dooley. (2013). Communication intensity, goal congruence, and uncertainty in buyer–supplier new product development. *Journal of Operations Management,* 31 (7), 523-542.

Yan, T., and K. Dooley. (2014). Buyer–supplier collaboration quality in new product development projects. *Journal of Supply Chain Management,* 50 (2), 59-83.

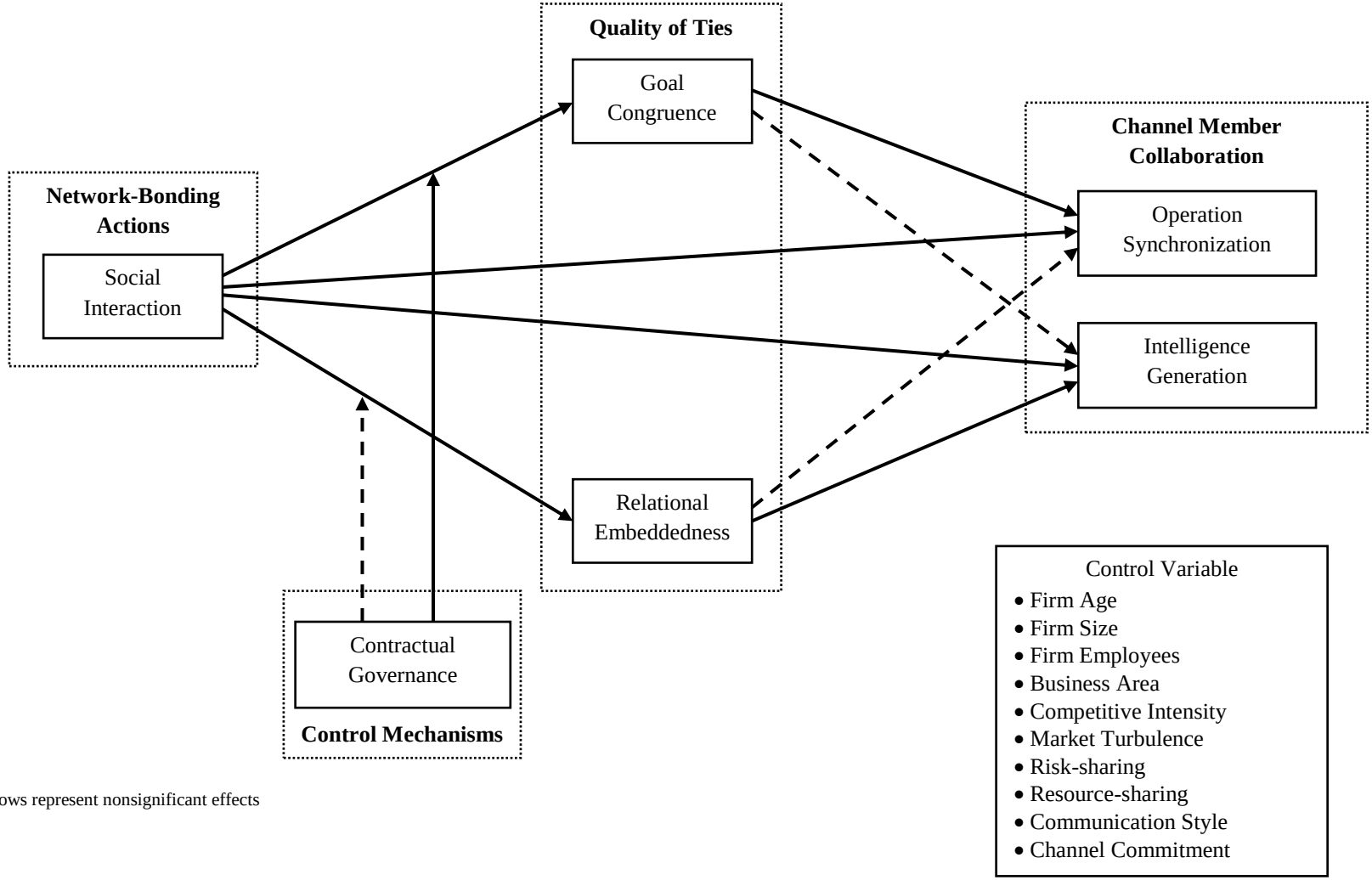
Yim, B., and B. Leem. (2013). The effect of the supply chain social capital. *Industrial Management & Data Systems,* 113 (3), 324-349.

Yli Renko, H., E. Autio, and H. J. Sapienza. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology based firms. *Strategic Management Journal,* 22 (7), 587-613.

Zacharakis, A. L. (1997). Entrepreneurial entry into foreign markets: A transaction cost perspective. *Entrepreneurship Theory and Practice,* 21 (3), 23-40.

Zhou, K. Z., and D. Xu. (2012). How foreign firms curtail local supplier opportunism in china: Detailed contracts, centralized control, and relational governance. *Journal of International Business Studies,* 43 (7), 677-692.

Figure 1: Conceptual Framework



Note:
Dashed arrows represent nonsignificant effects

Table 1: Literature Overview

Author(s)	Network-Bonding Actions (NBAs)	Channel Member Collaboration (CMC)	Impact paths	Moderating the impacts of NBAs	Finding summaries	Context
Cousins *et al.* (2006)	Socialization (formal; informal)	Product design; process design; lead time	Indirect impact (via relational capital)	None	Informal socialization generates relational capital, which in turn can lead to improved supplier relationship outcomes. Formal socialization plays a lesser role in deriving these benefits.	Mixed firms
Patnayakuni *et al.* (2006)	Relational interaction routines	Information flow integration	Direct impact	None	Formal and information interaction routines enable integration of information flows across firms' supply chain.	Practitioners (mixed firms)
Fawcett *et al.* (2007)	Connectivity; Willingness	10 various types of CMC include (unique product & service, faster R&D cycle times, superior quality, etc.)	Direct impact	None	Many companies are found to have placed most of their emphasis on connectivity, often overlooking the willingness construct.	Practitioners (mixed firms)
Krause *et al.* (2007)	Supplier development	Cost; quality; delivery; and flexibility	Direct impact	None	Buyer commitment and social capital accumulation with key suppliers can improve buying company performance.	Mixed firms
Bernardes (2010)	Network-relational embeddedness	Customer responsiveness	Indirect impact (via network-shared cognition)	None	Relational embeddedness should be treated as a critical antecedent to performance	Practitioners (mixed firms)
Whipple *et al.* (2010)	Relationship activities (collaborative; transactional)	Operation Performance	Direct impact	None	Collaborative relationships offer higher levels of satisfaction and performance than transactional relationship.	Practitioners (Mixed firms)
Carey *et al.* (2011)	Social interaction ties	Buyer innovation improvement; buyer cost improvement	Indirect impact (via trust, obligation, identification)	Legal bonds	Trust, obligation, and identification partially mediate the link between social interaction ties and innovation performance.	Mixed firms
Villena *et al.* (2011)	Social interaction	Strategic performance; operation performance	Direct impact (curvilinear)	None	There is an inverted curvilinear relationship between social capital and performance.	Mixed firms
Chang *et al.* (2012)	Frequency of contact	Financial performance	Indirect impact (via innovation and adaptation)	None	Innovation and adaptation function as the mediating mechanism delivering the beneficial influences of relationship quality to performance	Mixed firms
Yan and Dooley (2013)	Communication intensity	Design quality; design efficiency	Direct impact	Uncertainty (Task; relational)	Communication intensity is positively associated with project performance when either tasks or relationship uncertainty is high, but negative associated with performance when task uncertainty is low.	Mixed firms
Yim and Leem (2013)	Network use; Network appropriateness	Supply chain integration (information sharing; collaboration and resource exchange)	Direct impact	None	Supply chain integration played a mediating role in the relationships between structural capital (network use and network appropriateness) and firm performance.	Mixed firms
Kim (2014)	Understanding suppliers structural embeddedness	Financial performance; operation performance	Indirect impact (via relational embeddedness)	None	The results indicate that the understanding of the structural dimension does help to enhance operational performance of a buying firm, but it does not lead to better financial performance.	Mixed firms
This study	Social interaction	Operation synchronization; Intelligence generation	indirect impact (via goal congruence; relational embeddedness	Contractual governance	Social interaction tends to affect operation synchronization via goal congruence, while affects intelligence generation via relational embeddedness. Contractual governance has stronger negative effect on the relationship between social interaction and goal congruence than the relationship between social interaction and relational embeddedness.	Small firms
	Contribution 1: Simultaneously examining two new types of CMC and distinguishing indirect impacts of NBAs on specific CMC through different mediators			**Contribution 2:** Introducing a new moderator and examining its effects on the impacts of NBAs		**Contribution 3:** Focusing on small firm context

Notes:
Mixed Firms = Mixed large, medium and small firms

Table 2: Descriptive Statistics, Correlations and Reliabilities

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Firm Age	---																				
2. Firm Size	.146*	---																			
3. Firm Employees	.177*	.508*	---																		
4. Building and Construction	.039	.047	.034	---																	
5. Chemicals	.048	-.064	-.058	-.156*	---																
6. IT, Computer, and Electronics	.085	.077	.082	-.238*	-.133*	---															
7. Machinery and Equipment	-.099	-.096	-.053	-.167*	-.094	-.143*	---														
8. Clothing and Textile	.048	.112*	.048	-.190*	-.106*	-.162*	-.114*	---													
9. Medical Devices and Supplies	-.054	-.005	-.038	-.202*	-.113*	-.172*	-.121*	-.137*	---												
10. Competitive Intensity	.015	.033	.069	.085	-.110*	.031	-.002	.035	.017	---											
11. Market Turbulence	-.019	-.065	.001	.108*	-.032	-.008	.020	-.054	-.048	.416*	---										
12. Risk-sharing	.002	.068	.115*	.005	-.087	-.039	.009	.088	-.017	.092	.062	---									
13. Resource- sharing	.006	.091	.188*	.033	-.06	-.015	.015	.058	-.079	.162*	.067	.467*	---								
14. Communication Style	.052	.067	.122*	-.002	-.057	-.111*	.015	.208*	-.115*	.088	-.018	.415*	.413*	---							
15. Channel Commitment	.103*	.028	.009	-.003	.019	-.054	.044	.075	-.042	.095	.115*	.200*	.215*	.259*	---						
16. Social Interaction	.056	.140*	.134*	.136*	.020	.011	-.145*	.027	-.120*	.146*	.039	.325*	.298*	.454*	.331*	**.738**					
17. Goal Congruence	.032	.092	.069	.070	-.052	-.033	-.025	.108*	-.087	.094	.022	.358*	.236*	.496*	.345*	.412*	**.812**				
18. Relational Embeddedness	.001	.028	-.038	.054	.031	-.093	.029	.087	-.112*	.018	.082	.358*	.287*	.517*	.380*	.524*	.535*	**.756**			
19. Contractual Governance	.014	.145*	.293*	-.012	-.067	.025	.001	.096	-.066	.160*	.046	.315*	.404*	.398*	.327*	.347*	.464*	.371*	**.824**		
20. Operation Synchronization	-.018	.089	.152*	.002	-.072	-.015	-.055	.160*	-.036	.125*	.067	.549*	.500*	.436*	.370*	.404*	.499*	.390*	.539*	**.764**	
21. Intelligence Generation	.069	.086	.130*	.046	-.082	-.069	.095	.079	-.087	.167*	.104*	.432*	.436*	.541*	.380*	.443*	.437*	.492*	.416*	.474*	**.789**
Mean	.964	.538	1.207	---	---	---	---	---	---	3.304	2.922	2.660	2.500	3.320	3.327	3.102	3.829	3.604	3.157	2.800	3.305
Standard deviation	.313	.290	.589	---	---	---	---	---	---	.735	.764	1.027	1.013	1.008	.939	.869	.746	.692	.904	.909	.933
Composite Reliability	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.778	.853	.790	.809	.735	.768
Average Variance Extracted	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.544	.659	.572	.679	.583	.623

Notes:
N = 385; *p < .05
Average Variance Extracted (AVE) square roots are show in bold on the correlation matrix diagonal
Firm Age is measured as log(year since establishment)
Firm Size is measured as log(annual revenue £million in 2015)
Firm employee is measured as log(employee number)
Business Area dummies: we choose "Miscellaneous" as the benchmark group

Table 3: Confirmatory Factor Analysis - Model Fit

Factor Structure Model	Chi-Square $(X)^2$	Degree of Freedom *(df)*	X^2/df	p-value	Comparative fit index (CFI)	Normed fit index (NFI)	Goodness of fit index (GFI)	Root mean square error of approximation (RMSEA)
6 Factor Model: Hypothesized Model	169.528	75	2.260	.000	.964	.938	.944	.057
5 Factor Model: SI, (GC + RE), CG, OS, IG	377.987	80	4.725	.000	.887	.862	.872	.098
4 Factor Model: SI, (GC + RE), CG, (OS + IG)	466.958	84	5.559	.000	.854	.829	.841	.109
3 Factor Model: (SI + GC + RE), CG, (OS + IG)	658.650	87	7.571	.000	.783	.759	.785	.131
2 Factor Model: (SI + GC + RE + CG), (OS + IG)	827.523	89	9.298	.000	.719	.697	.753	.147
1 Factor Model: Omnibus Model	884.857	90	9.832	.000	.698	.676	.745	.152

Note:
SI = Social Interaction;
GC = Goal Congruence
RE = Relational Embeddedness
CG = Contractual Governance
OS = Operation Synchronization
IG = Intelligence Generation

Table 4: Findings

Path Relationship	Model 1	Model 2	Model 3	Model 4	Model 5
Framework Model Path:					
Social Interaction → Operation Synchronization	.209(2.902)**		.153(1.921)†		.137(1.789)†
Social Interaction → Intelligence Generation	.289(3.956)***		.218(2.658)**		.211(2.654)**
Social Interaction → Goal Congruence		.289(3.821)***	.272(3.596)***	.193(2.718)**	.180(2.541)*
Social Interaction → Relational Embeddedness		.378(4.573)***	.367(4.460)***	.328(4.278)***	.324(4.220)***
Goal Congruence → Operation Synchronization		.398(6.068)***	.371(5.531)***		.396(5.871)***
Goal Congruence → Intelligence Generation		.091(1.470)	.052(.811)		.060(.940)
Relational Embeddedness → Operation Synchronization		.019(.294)	.076(1.079)		.049(.704)
Relational Embeddedness → Intelligence Generation		.256(3.652)***	.176(2.394)*		.173(2.367)*
Contractual Governance → Goal Congruence				.406(5.712)***	.432(6.158)***
Contractual Governance → Relational Embeddedness				.251(3.750)***	.248(3.717)***
Social Interaction X Contractual Governance → Goal Congruence				-.084(-1.822)*	-.080(-1.747)†
Social Interaction X Contractual Governance → Relational Embeddedness				-.047(-1.057)	-.054(-1.222)
Control Variables Path:					
Firm Age → Operation Synchronization	-.074(-1.642)	-.065(-1.502)	-.062(-1.423)		-.061(-1.406)
Firm Age → Intelligence Generation	.046(1.024)	.048(1.071)	.052(1.191)		.055(1.243)
Firm Age → Goal Congruence		-.023(-.501)	-.024(-.516)	-.006(-.133)	-.003(-.064)
Firm Age → Relational Embeddedness		-.026(-.601)	-.026(-.591)	-.029(-.678)	-.027(-.641)
Firm Size → Operation Synchronization	-.031(-.593)	-.037(-.750)	-.048(-.965)		.075(1.499)
Firm Size → Intelligence Generation	.003(.054)	.009(.187)	-.006(-.109)		.037(.724)
Firm Size → Goal Congruence		.035(.659)	.037(.701)	.042(.839)	-.153(-2.855)**
Firm Size → Relational Embeddedness		.028(.556)	.029(.580)	.041(.856)	-.207(-3.826)***
Firm Employees → Operation Synchronization	.062(1.198)	.083(1.651)†	.071(1.407)		-.050(-1.005)
Firm Employees → Intelligence Generation	.010(.198)	.053(1.023)	.035(.687)		-.007(-.135)
Firm Employees → Goal Congruence		-.036(-.671)	-.035(-.656)	-.146(-2.710)**	.046(.905)
Firm Employees → Relational Embeddedness		-.130(-2.516)*	-.129(-2.493)*	-.208(-3.845)***	.042(.862)
Building and Construction → Operation Synchronization	-.004(-.065)	-.015(-.271)	-.023(-.421)		-.024(-.447)
Building and Construction → Intelligence Generation	.002(.044)	.008(.139)	-.004(-.074)		-.006(-.102)
Building and Construction → Goal Congruence		.052(.906)	.054(.929)	.076(1.375)	.078(1.425)
Building and Construction → Relational Embeddedness		.021(.387)	.022(.399)	.045(.859)	.045(.848)
Chemicals → Operation Synchronization	-.021(-.419)	.005(.094)	-.005(-.102)		-.003(-.062)
Chemicals → Intelligence Generation	-.054(-1.090)	-.043(-.870)	-.056(-1.140)		-.058(-1.185)
Chemicals → Goal Congruence		-.024(-.472)	-.023(-.444)	.003(.062)	.005(.099)
Chemicals → Relational Embeddedness		.011(.235)	.012(.244)	.045(.955)	.044(.946)
IT, Computer, and Electronics → Operation Synchronization	.037(.681)	.039(.743)	.033(.625)		.034(.649)
IT, Computer, and Electronics → Intelligence Generation	-.034(-.627)	-.022(-.401)	-.031(-.577)		-.032(-.606)
IT, Computer, and Electronics → Goal Congruence		.029(.508)	.030(.532)	.025(.461)	.023(.435)
IT, Computer, and Electronics → Relational Embeddedness		-.020(-.370)	-.019(-.352)	-.012(-.239)	-.012(-.242)
Machinery and Equipment → Operation Synchronization	-.034(-.668)	-.059(-1.217)	-.032(-.633)		-.035(-.712)
Machinery and Equipment → Intelligence Generation	.132(2.606)**	.078(1.581)	.116(2.276)*		.116(2.287)*
Machinery and Equipment → Goal Congruence		.018(.348)	.016(.308)	.016(.322)	.015(.298)
Machinery and Equipment → Relational Embeddedness		.106(2.084)*	.105(2.068)*	.100(2.064)*	.101(2.074)*
Clothing and Textile → Operation Synchronization	.109(2.059)*	.091(1.794)†	.101(2.006)*		.100(1.991)*
Clothing and Textile → Intelligence Generation	-.011(-.211)	-.030(-.577)	-.014(-.270)		-.012(-.244)
Clothing and Textile → Goal Congruence		.030(.559)	.029(.547)	.030(.586)	.029(.572)
Clothing and Textile → Relational Embeddedness		.009(.172)	.009(.181)	-.002(-.049)	-.001(-.017)
Medical Devices and Supplies → Operation Synchronization	.041(.776)	.038(.753)	.045(.894)		.047(.925)
Medical Devices and Supplies → Intelligence Generation	.004(.083)	-.003(-.066)	.007(.141)		.007(.128)
Medical Devices and Supplies → Goal Congruence		-.002(-.036)	-.002(-.037)	.004(.085)	.004(.070)
Medical Devices and Supplies → Relational Embeddedness		-.018(-.348)	-.017(-.335)	-.010(-.203)	-.010(-.210)
Competitive Intensity → Operation Synchronization	-.004(-.071)	.004(.082)	-.017(-.348)		-.013(-.260)
Competitive Intensity → Intelligence Generation	.035(.728)	.091(1.866)†	.062(1.250)		.061(1.244)
Competitive Intensity → Goal Congruence		.011(.228)	.013(.261)	.002(.051)	.001(.020)
Competitive Intensity → Relational Embeddedness		-.158(-3.153)**	-.157(-3.124)**	-.163(-3.332)***	-.161(-3.298)**

Note:

*** p < 0.001; ** p < 0.010; * p < 0.050; † p < 0.100

Standardized Coefficients are reported with t-value in parathions

Table 3: Findings (Continue)

	Model 1	Model 2	Model 3	Model 4	Model 5
Control Variables Path (Continue):					
Market Turbulence → Operation Synchronization	.016(.318)	.014(.301)	.025(.526)		.008(.162)
Market Turbulence → Intelligence Generation	.054(1.133)	.025(.519)	.040(.831)		.097(2.086)*
Market Turbulence → Goal Congruence		-.008(-.158)	-.009(-.171)	.008(.166)	.022(.477)
Market Turbulence → Relational Embeddedness		.091(1.885)†	.090(1.870)†	.096(2.077)*	.040(.845)
Risk Sharing → Operation Synchronization	.351(6.486)***	.298(5.596)***	.289(5.456)***		.282(5.365)***
Risk Sharing → Intelligence Generation	.135(2.591)*	.120(2.258)*	.106(2.021)*		.107(2.055)*
Risk Sharing → Goal Congruence		.148(2.743)**	.152(2.797)**	.138(2.667)**	.139(2.712)**
Risk Sharing → Relational Embeddedness		.119(2.271)*	.121(2.309)*	.104(2.083)*	.107(2.137)*
Resource Sharing → Operation Synchronization	.257(4.828)***	.292(5.618)***	.282(5.443)***		.285(5.522)***
Resource Sharing → Intelligence Generation	.176(3.395)***	.191(3.686)***	.179(3.486)***		.179(3.475)***
Resource Sharing → Goal Congruence		-.081(-1.503)	-.080(-1.490)	-.160(-3.010)**	-.163(-3.092)**
Resource Sharing → Relational Embeddedness		-.026(-.504)	-.026(-.507)	-.068(-1.338)	-.067(-1.318)
Communication Style → Operation Synchronization	.078(1.339)	.009(.141)	-.013(-.217)		-.029(-.484)
Communication Style → Intelligence Generation	.280(4.812)***	.241(3.818)***	.209(3.320)***		.210(3.381)***
Communication Style → Goal Congruence		.301(4.932)***	.308(5.031)***	.241(4.109)***	.240(4.112)***
Communication Style → Relational Embeddedness		.307(4.788)***	.311(4.833)***	.262(4.373)***	.264(4.395)***
Channel Commitment → Operation Synchronization	.213(4.286)***	.168(3.399)***	.150(3.050)**		.143(2.913)**
Channel Commitment → Intelligence Generation	.165(3.390)***	.153(3.053)**	.128(2.572)*		.126(2.530)
Channel Commitment → Goal Congruence		.181(3.575)***	.185(3.632)**	.098(1.966)*	.096(1.933)†
Channel Commitment → Relational Embeddedness		.153(3.057)**	.153(3.064)**	.114(2.345)*	.114(2.350)*
Fit Index:					
Chi-Square (X^2)	93.437	335.263	324.176	502.597	638.740
Degree of Freedom (*df*)	72	179	177	281	374
X^2/df	1.298	1.873	1.832	1.789	1.708
p-value	.046	.000	.000	.000	.000
Comparative fit index (CFI)	.989	.954	.957	.953	.953
Normed fit index (NFI)	.959	.912	.915	.904	.900
Goodness of fit index (GFI)	.979	.941	.943	.927	.916
Root mean square error of approximation (RMSEA)	.028	.048	.047	.045	.043

Note:

*** p < 0.001; ** p < 0.010; * p < 0.050; † p < 0.100

Standardized Coefficients are reported with t-value in parathions

Model 3: Indirect Relationship:

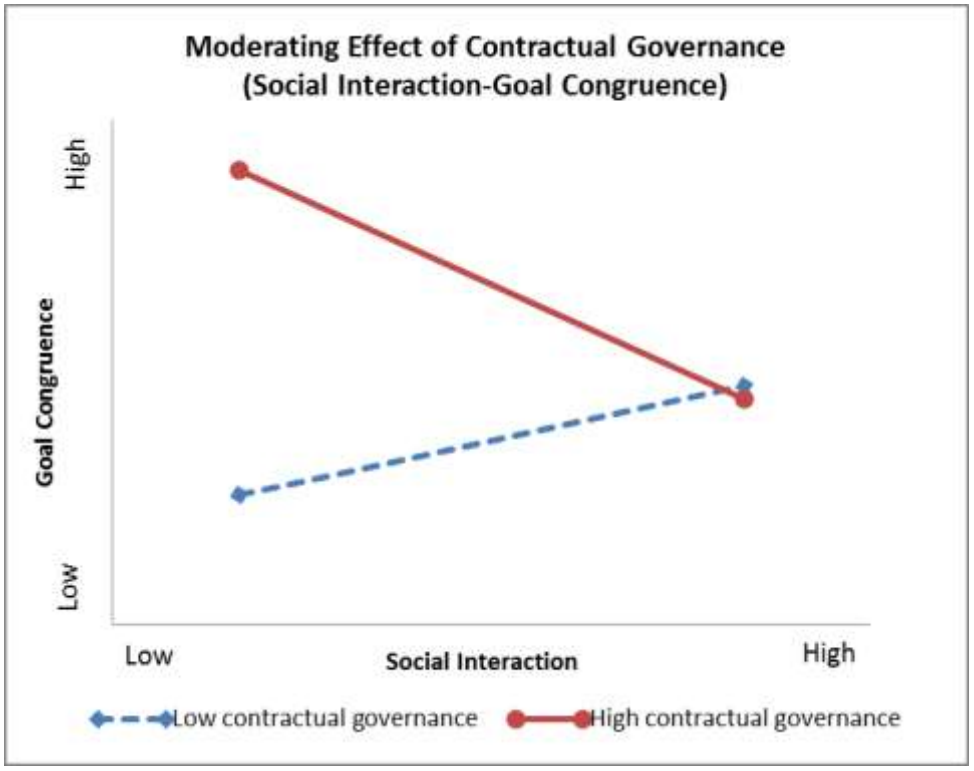
Social Interaction → Goal Congruence → Operation Synchronization: Sobel Test Statistic = 3.015, p = .002**

Social Interaction → Goal Congruence → Intelligence Generation: Sobel Test Statistic = .080

Social Interaction → Relational Embeddedness → Operation Synchronization: Sobel Test Statistic = 1.051

Social Interaction → Relational Embeddedness → Intelligence Generation: Sobel Test Statistic = 2.112, p = .034*

Figure 2: Graphical Representation: Moderating Effects



Appendix 1: Measurement and Factor Loading

Measurement	Loading*
Operation Synchronization	
…….. jointly develop demand forecasts	.696
…….. jointly manage inventory	.825
Intelligence Generation	
…….. jointly identify customer needs	.785
…….. jointly search for and acquire relevant knowledge about market	.794
Social Interaction	
…….. maintain close social relationships	.581
…….. spend a lot of time interacting with each other	.825
Employees in our firm know some employees of our supply chain partners at a personal level	.783
Goal Congruence	
…….. have agreement on the goals of the supply chain	.786
…….. have agreement on the importance of collaboration across the supply chain	.832
…….. have the understanding that by achieving the goals of the supply chain, individual firm's specific goals will be achieved at the same time.	.816
Relational Embeddedness	
The relationship between …….. is characterized by mutual respect	.475
The relationship between …….. is characterized by mutual trust	.831
The relationship between …….. is characterized by high degree of trade and exchange of favors	.894
Contractual Governance	
…….. receive clear performance targets and measures and these are well defined in our contracts with them	.832
In our supply chain operation contracts, it is defined in detail when and how new requirements can be implemented and under which conditions	.816

***** Factor loadings are standardized
…….. = Our firms and our supply chain partner