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## **Social Capital Configuration, Legal Bonds and Performance in Buyer-Supplier**

### **Relationships**

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Academics have increasingly recognized the benefits derived from social networks embedded within companies' buyer-supplier relationships. However, prior research has only examined the influence of social capital elements on performance, either individually or in part. We propose an integrative model examining the relationships among relational, structural and cognitive dimensions of social capital, and between

these dimensions and the cost and innovation performance of the firm. A sample of 163 buyer-supplier relationships is used to test the model. Regression results indicate that the relational dimension of social capital fully or partially mediates the effect of the cognitive dimension on performance, and partially mediates the link between the structural dimension, operationalized as social interaction ties, and innovation performance. Further, high levels of legal bonds were found to moderate the relationship between the relational dimension of social capital and performance outcomes. Implications for theory and managers are discussed.

**Keywords:** buyer-supplier relationships, social capital theory, performance

## **1. Introduction**

Social Capital Theory (SCT) has become an important perspective for theorizing the nature of connection and cooperation between organizations (Adler and Kwon, 2002). As the ‘relational glue’ underpinning effective supply chain relationships (McGrath and Sparks, 2005), social capital is a valuable asset that can help explain how buyer-supplier relationships contribute to a company’s competitive advantage. A growing stream of supply chain management research has examined the effects of the various elements of social capital on performance either independently, or in part. For instance, Cousins, Handfield, Lawson and Peterson (2006) studied the effect of relational capital on buyer performance; Lawson, Tyler and Cousins (2008) explored the effects of relational and structural capital on buyer performance; and Krause, Handfield and Tyler (2007) investigated the effects of structural and cognitive capital in explaining firm performance in terms of quality, delivery and flexibility.

We initiated the present study to provide a more holistic, empirical test of social capital configuration in key buyer-supplier relationships. In doing so, we extend previous work such as Tsai and Ghoshal (1998) who had examined social capital from a network perspective within 15 business units of a multinational electronics company. Our study examines social capital in a supply chain context with the unit of analysis being the strategic relationship between buyers and suppliers of large manufacturing firms. We examine the relationships among all three dimensions of social capital, namely structural, cognitive and relational dimensions, and test the effect of social capital on performance improvements for the buying firm. Moreover, recognizing that buyer-supplier relationships are embedded within a broader legal context, we also test for the moderating effects of legal bonds on performance. Three overarching research

questions guide this study: First, what are the relationships among the three dimensions of social capital in buyer-supplier relationships? Second, what effect does social capital have on the performance of the buying firm? Third, what effect does the presence of legal bonds have on buyer performance in the context of social capital?

Our study contributes to the supply chain and social capital literatures in a number of ways. First, our study extends previous research by examining each dimension of social capital, and highlighting its individual and integrated impact on buyer performance. We do so by analyzing survey data collected from manufacturing firms in the United Kingdom (UK). Second, in examining the configuration of the dimensions of social capital in buyer-supplier relationships, we provide further evidence of the multidimensional nature of social capital. In addition, we examine the contingent effects of complementary governance structures (i.e., legal bonds) on social capital and performance and thus extend existing research on social capital (e.g. Tsai and Ghoshal, 1998). Incorporating a contingency analysis highlights the dynamic nature of social capital formation and its influence on firm performance.

The findings of our study provide important insights into the social exchange process and value creation within strategic buyer-supplier relationships. The remainder of this paper proceeds as follows. Section 2 presents the theoretical foundation on which this study builds. Section 3 develops hypotheses for the relationships between the associated constructs. The research methodology is described in Section 4, while Section 5 presents the data analysis using OLS regression. Section 6 discusses our findings, the implications for theory and practitioners, and summary conclusions.

## **2. Theoretical Foundation**

## *2.1 Social Capital Theory*

SCT provides a theoretical perspective to examine the advantage gained by firms through their social networks. SCT helps characterize an organization's relationships, while its focus on the flow of resources enables an examination of performance differentials within and between organizations (Koka and Prescott, 2002). We define social capital as '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). Nahapiet and Ghoshal (1998) proposed three dimensions of social capital: (1) the relational dimension (trust, identification and obligation); (2) the cognitive dimension (shared ambition, vision and values); and, (3) the structural dimension (strength and number of ties between actors). The relationships among these three dimensions of social capital within strategic buyer-supplier relationships have been relatively underexplored in the literature.

The relational dimension of SCT (relational capital from this point) refers to the trust, obligation, and identification present in personal relationships between people (Nahapiet and Ghoshal, 1998). As a store of 'goodwill between actors' (Burt, 2000; Dyer and Singh, 1998), the trust it represents has been articulated as an essential element of relationships (Anderson and Narus, 1990; Rousseau, Sitkin, Burt and Camerer, 1998). The cognitive dimension of social capital (cognitive capital from this point) is symbolic of shared goals, vision and values between actors in a social system (Tsai and Ghoshal, 1998), which enables them to make sense of information and classify it into perceptual categories (Augoustinos and Walker, 1995). Cognitive capital facilitates the development of common understandings and collective ideologies, outlining appropriate ways for buyers and suppliers to coordinate their exchange, and

share each other's thinking processes (De Carolis and Saporito, 2006). The structural dimension (structural capital from this point) is defined as "the configuration of linkages between people or units...that is, who you reach and how you reach them" (Nahapiet and Ghoshal, 1998). Structural capital has been examined along a range of perspectives, including network characteristics (Burt, 2000; Granovetter, 1973; Yli-Renko, Autio and Sapienza, 2001; Zaheer and Bell, 2005), as information and knowledge sharing (Koka and Prescott, 2002; Lawson, et al., 2008), and as the strength of social interactions (Oh, Chung and Labianca, 2004; Tsai and Ghoshal, 1998).

This study builds on the latter approach conceptualizing structural capital as the strength of the social interaction ties existing between buyer and supplier (Tsai and Ghoshal, 1998). Social interaction ties facilitate cooperation in dyadic buyer-supplier relationships, and are defined as purposefully designed, specialized processes or events, implemented to coordinate and structurally embed the relationship between buyer and supplier (Cousins, et al., 2006; Nahapiet and Ghoshal, 1998; Yli-Renko, et al., 2001). Examples include organized social events, team building exercises, joint problem solving workshops and cross-functional teams.

Our study also examines the effects of social capital dimensions on specific indicators of buying-firm performance, namely innovation and cost improvement. Cost and innovation represent two of the five key strategic priorities in operations management (Krause, Pagell and Curkovic, 2001; Ward, McCreery, Ritzman and Sharma, 1998). Cost is a crucial competitive priority for many firms, and is generally used as the initial indicator of the success of a supplier relationship (Krause, et al., 2007; Krause, et al., 2001). Major cost savings in the supply chain have been attributed to increased supplier integration and collaboration (Chen, Paulraj and Lado, 2004; Eng,

2006), while Stuart et al (1998) associated cost reductions and the development of problem solving capabilities as a key benefit accrued from relational trust. Equally, improvements in buyer innovation performance through collaborative buyer-supplier relationships are increasingly critical to improvements in product design, process design, ability to innovate and shorter product development times (Lawson, et al., 2008; Petersen, Handfield and Ragatz, 2005).

## *2.2 The nature of legal bonds*

In this study, we also explore the contingent effect of legal bonds on the relationship between relational capital and buyer performance – an area of on-going interest among researchers (e.g., Gulati, 1995b; Poppo and Zenger, 2002; Zaheer and Venkatraman, 1995). Legal bonds, as a form of contractual governance, have a strong ability to constrain opportunism (Williamson, 1985), or to act as a supporting mechanism, fostering commitment and improvements in performance between buyers and suppliers (Dyer and Singh, 1998). Poppo and Zenger (2002), for example, find support for the positive influence of formal contracts on the level of relationship satisfaction between buyers and suppliers in the information services industry. Cannon et al (2000) found that contractual agreements can help ensure the continuity of the exchange when both parties share relational norms. Defined as “the extent to which detailed and binding contractual agreements are used to specify the roles and obligations of the parties” (Cannon, et al., 2000), legal bonds incorporate the expectations and obligations of both parties in the relationship. For example, legal bonds can formally stipulate how complaints and disputes will be dealt with, the operational requirements of the good or service provided, and how the performance of the supplier is to be evaluated.



### **3. Hypotheses Development**

Our model examines the relationships among the relational, structural and cognitive dimensions of social capital, and between these dimensions and cost and innovation performance of the firm. These relationships are illustrated in Figure 1. Previous studies examining the relationships among the dimensions of social capital have suggested that cognitive and structural capital are antecedents to relational capital (Gittell, 2002; Inkpen and Tsang, 2005; Tsai and Ghoshal, 1998). Thus, we propose hypotheses linking cognitive and structural capital to the development of relational capital within buyer-supplier relationships. Subsequently, we hypothesize a mediating role of relational capital in linking both cognitive and structural capital to cost and innovation performance. Finally, we examine the moderating influence of legal bonds on the relationship between relational capital and performance outcomes.

[Insert Figure 1 about here]

#### *3.1 Antecedents to the development of relational capital*

Early work on social capital (Coleman, 1988; 1990) suggested that mutual trust develops from exchange reciprocity in an environment where norms are well-enforced and the risk of free-riding reduced. Barber (1983), for example, stated that a trusting relationship between two actors implies that “common goals and values have brought and kept them together”. Since cognitive capital emphasizes shared values and beliefs, adherence to the associated norms of behavior is likely to breed trust as the parties identify and conform to the shared ideologies underpinning the relationship (Nahapiet and Ghoshal, 1998). Relational capital is thus unlikely to accrue in a buyer-supplier

relationship if neither party understands the other (Adler and Kwon, 2000). Relational capital stems from the availability of a common belief system in cognitive capital, and the associated ability of actors to make sense of common experiences (Nahapiet and Ghoshal, 1998). If systems of meaning are incongruent, interactions in a buyer-supplier relationship can lead to misinterpretation (Inkpen and Tsang, 2005; Krause, et al., 2007). We argue when cognitions are shared between buyers and suppliers both parties become more inclined to trust one another, with the expectation of reciprocity, interaction and working towards collective goals (Tsai and Ghoshal, 1998). Thus,

**Hypothesis 1a:** *Cognitive capital is positively associated with the level of relational capital in a buyer-supplier relationship*

Structural capital, operationalized as social interaction ties, describes the extent to which actors are linked in a relationship and how they come to understand ‘who knows what’. Social interaction ties act as conduits for information and resource flows providing the time, opportunity and motivation to strengthen the relational aspects of the relationship (Yu, Liao and Lin, 2006; Zaheer, McEvily and Perrone, 1998a). Organized social events and team building between buyer and supplier facilitate interaction, enabling buyers to personally evaluate the trustworthiness and commitment of supplier representatives. The openness of this interaction encourages behavioral transparency, while simultaneously discouraging free-riding and information asymmetries in the relationship. Other work has shown that organizations also develop trust based on direct experiences with each other (Bell, Oppenheimer and Bastien, 2002; Granovetter, 1985). Thus, we propose that the strength of social interaction ties (as a

conceptualization of structural capital) is likely to increase the level of relational capital present within a buyer-supplier relationship.

**Hypothesis 1b:** *Social interaction ties are positively associated with the level of relational capital in a buyer-supplier relationship*

### *3.2 The mediating influence of relational capital*

The following section develops our arguments that the effects of cognitive capital and social interaction ties on buyer cost and innovation performance are transmitted *via* relational capital. We develop these mediation hypotheses firstly by outlining the potential effect of cognitive capital and social interaction ties on performance outcomes; and secondly, by proposing relational capital as the mediating variable. Regarding cognitive capital, it is expected that if shared cognitions exist, both parties in the relationship will have a common understanding of what constitutes improvements in cost and innovation performance, and how to accomplish such improvements. This argument is partly supported by Krause et al (2007) who find support for the positive effect of shared values on cost reduction. Shared meaning is a critical mechanism in ensuring coordination (Handfield, Ragatz, Petersen and Monczka, 1999), and has been linked to improved subjective and objective measures of performance improvement (Hult, Ketchen and Slater, 2004; Zaheer, McEvily and Perrone, 1998b). Consistent with these findings, complementary cognitions between buyers and suppliers are likely to positively affect the performance of the buying firm from a cost and innovation perspective.

Similarly, social interaction ties have also been linked to performance improvements and value creation in buyer-supplier relationships (Cousins, et al., 2006;

Kale, Singh and Perlmutter, 2000), because they provide a forum whereby buyers and suppliers can share information and identify gaps that may exist in current work practices. Through joint workshops and cross-functional teams, buyers and suppliers can share information and experience relating to new ideas and technology, and identify problems upfront (Ragatz, Handfield and Petersen, 2002). Social interaction ties such as these have been linked to formal integration, conflict management, enhanced quality and cost savings (Stuart, 1998), improved product design and operational efficiencies (Cannon and Perreault, 1999; Cousins and Menguc, 2006; Prahinski and Benton, 2004).

Our study explores *why* cognitive capital and social interaction ties are effective in improving buying firm performance. We argue that such links exist because of the presence of relational capital between buyer and supplier. When buyers and suppliers ‘invest’ in establishing social interaction ties, they create a store of trust, goodwill and reciprocity which, in turn, can be directed by the firm to generate benefits such as reduced costs, greater capacity to innovate, and reduced new product development time. Although previous work has found direct links between cognitive capital, social interaction ties and buyer performance, we hypothesize that cognitive capital and social interaction ties actually work indirectly through relational capital in achieving these improvements.

Relational capital improves relationship performance by reducing the expectation of opportunistic behavior, increasing the confidence of both parties, and decreasing transaction costs (Dyer and Singh, 1998). Relational capital can help buyers and suppliers more effectively combine knowledge that could only be shared by operating jointly (Collins and Hitt, 2006; Dyer and Chu, 2003; Wu, 2008). Specific benefits include lower operating and product costs, early insights into new technologies,

reduced new product development cycle times and improved new product and process design (Corsten and Felde, 2005; Cousins, et al., 2006; Handfield, et al., 1999).

As a resource (Oh, et al., 2004), relational capital is the mechanism by which cognitive capital and social interaction ties act to improve a buyer firm's cost and innovation performance. Regarding cognitive capital, relational capital helps to activate and translate shared cognitions between buyer and supplier into value-enhancing mechanisms, through the confidence and assurance it provides that equitable gains will be made. Improving aspects of innovation performance such as product and process design, and manufacturing flexibility, mean that more tacit, and organization-specific information has to be shared between buyers and suppliers, which requires trust (Blomqvist, Hurmelinna and Seppanen, 2005). Relational capital may reduce the concerns associated with this information sharing, encouraging buyers and suppliers to act on their shared vision, ambitions and goals. In addition, although cost reduction goals may be shared, the trust and reciprocity embodied in relational capital may build confidence that both parties will act in good faith in negotiations related to the achievement and sharing of cost reductions. Thus, we propose that the effects of cognitive capital on the cost and innovation performance of a buyer firm are mediated by the level of relational capital present in the relationship. Thus,

**Hypothesis 2a:** *Relational capital is positively associated with buyer innovation improvement and mediates the cognitive capital - buyer innovation improvement relationship*

**Hypothesis 2b:** *Relational capital is positively associated with buyer cost improvement and mediates the cognitive capital - buyer cost improvement relationship*

Similarly, the informational advantages obtained through social interaction ties operate through relational capital in improving cost and innovation performance. More sensitive cost and operational information is likely to be shared between buyers and suppliers, through social interaction ties, when they have trust in one another (Cousins and Menguc, 2006). During social events or when working in teams, each party has the opportunity to share information about opportunities for innovation or cost improvements. Relational capital acts as a form of credible assurance to both parties when engaging in value creation initiatives such as “sharing fine-grained tacit knowledge, exchanging resources that are difficult to price, or offering innovations or responsiveness” (Dyer and Singh, 1998: 671). These opportunities are realized through relational capital, which provides the stock of goodwill to attain these performance gains (Dyer and Singh, 1998; Dyer, 1997). We argue that the effects of social interaction ties on the performance of a buyer firm are mediated by relational capital. Thus,

**Hypothesis 3a:** *Relational capital is positively associated with buyer innovation improvement and mediates the social interaction ties - buyer innovation improvement relationship*

**Hypothesis 3b:** *Relational capital is positively associated with buyer cost improvement and mediates the social interaction ties - buyer cost improvement relationship*

### 3.3 Moderating influence of legal bonds

The relationship between contractual and relational governance has typically been viewed from two perspectives: as substitutes or complements. A substitution view of governance argues that relational agreements based on trust and reciprocity supplants the need for formal control exhibited by legal bonds (e.g. Dyer and Singh, 1998; Gulati, 1995a; Larson, 1992; Wuyts and Geyskens, 2005). Proponents of substitution argue that trust (relational capital) reduces the need to monitor and safeguard an exchange, and thus negates the need for formal contracts, which are typically associated with adversarial exchange. By comparison, other authors propose a complementary effect where contracts explicitly define the roles and obligations of each party, increasing the level of confidence in the relationship and enhancing the quality of the exchange (Liu, Luo and Liu, 2009; Luo, 2002; Poppo and Zenger, 2002). For example, Poppo and Zenger (2002) find support for the positive influence of formal contracts on the level of relationship satisfaction between buyers and suppliers in the information services industry. In a cross-sectional study of 396 buyer-seller relationships, Cannon et al (2001) found that by clarifying obligations and expectations, contractual agreements help ensure the continuity of the exchange when both parties share relational norms. This stream of literature is consistent with the view that the contract itself represents a form of coordination, and in turn facilitates coordination between buyers and suppliers (Furlotti, 2007).

Consistent with the complementarity perspective, we argue that legal bonds, as a form of contractual governance, complements relational capital and its effect on buyer innovation and cost improvement. Legal bonds help detail the formal expectations of both buyers and suppliers in the relationship, whilst relational capital controls the social aspects of relational exchange. We argue that relational capital does not preclude

opportunism (Chaserant, 2003), and thus legal bonds act as a form of security outlining the *ex ante* details of the exchange and assisting in continuous monitoring (Alchian and Demsetz, 1972). Granovetter (1985: 491) states that “the more complete the trust, the greater the potential gain from malfeasance.” Thus, over-reliance on relational capital could leave actors subject to the “paradox of trust”, in that there is still the opportunity for abuse through opportunism (Dyer and Singh, 1998; Granovetter, 1985).

As opposed to reactive safeguarding, we align with a growing stream of research that views legal bonds as supporting mechanisms through which parties can proactively undertake joint problem solving and documentation of their plans for the relationship (Carson, Madhok and Wu, 2006; Das and Teng, 1998; Mayer and Argyres, 2004). Legal bonds help delineate the rights and obligations of parties, improve the commitment of both buyer and supplier (Jap and Ganesan, 2000), and encourage the documentation of unspoken assumptions relating to performance goals for product quality, process development, cycle time and product cost (Cannon, et al., 2000). Although legal bonds are by nature an incomplete form of contractual governance, they can, for example, support social exchange (relational capital) by reducing uncertainties relating to the verification of costs. Moreover, Mahnke and Serden (2006) state that a deeper understanding of uncertainty is important in leveraging relational governance towards the pursuit of collaborative innovation. Legal bonds and their ability to clarify expectations and obligations relating to cost and innovation performance, complement the effect of trust and reciprocity between buyer and supplier in achieving these types of performance. Thus,

**Hypothesis 4a:** *Legal bonds positively moderate the relationship between relational capital and buyer innovation improvement*



**Hypothesis 4b:** *Legal bonds positively moderate the relationship between relational capital and buyer cost improvement*

## **4. Methodology**

### *4.1 Survey administration and data collection*

The data were collected via a postal survey sent to 1600 medium-to-large UK-based manufacturing organizations, sampled from a database held by the Chartered Institute of Purchasing and Supply (CIPS), UK. Data were collected primarily from senior buyers and purchasing/supply chain managers or directors. Each survey was sent to a named individual at business unit-level within the sampled organizations. Respondents were asked to report on their company's relationship with a strategic supplier that provided their firm with a critical material or component. To ensure they were knowledgeable about the supplier, respondents were instructed to answer the survey with regards to a supplier relationship in which they had high degree of knowledge and involvement over the previous three years. Post-hoc items showed respondents evaluated their knowledge of the supplier relationship as 5.8 out of seven, and had an average organizational tenure of 10.5 years (s.d., 9.3), providing evidence of knowledgeable respondents.

The sample frame included organizations from six industries: (1) electronic equipment and industrial equipment; (2) general manufacturing; (3) aerospace and automotive; (4) chemicals and chemical products; (5) pulp and paper products; and, (6) basic metals and fabricated metal products. Further sample characteristics are provided in Table 1.

[Insert Table 1 about here]

The questionnaire was pilot tested and validated through semi-structured interviews with 13 purchasing executives. Six academic experts in supply chain management also provided feedback. Minor changes were made to the survey instrument. The survey was then administered following the procedures consistent with Dillman's total design method (2000). The initial mailing included hard copies of the cover letter, survey and return envelope. Respondents were sent a reminder email two weeks after the initial survey postal mailing, and another email reminder three weeks after the initial mailing complete with the survey attached. Finally, hard copies of the survey packet were mailed to non-respondents approximately one month after the initial mailing. The final mailing included an amended cover letter in which the importance of the survey was re-iterated.

After removing 15 surveys returned due to company policies not to respond and 20 incomplete surveys, a total of 163 valid responses were received (10.3% response rate). Tan and Wisner (2003) note the increasing level of survey fatigue among practitioners. This response rate is consistent with response rates of similar supply chain studies in the area. To ensure a representative sample, we tested for non-response bias, and gathered data from a second set of respondents.

#### *4.2 Non-response bias*

To ensure that the sample of responses obtained was representative of the population, non-response bias was examined through a comparison of early and late waves of returned surveys (Armstrong and Overton, 1977). Responses between early and late respondents were compared using two tailed *t*-statistics across all the variables included

in the survey ( $p < .10$ ). No statistically significant differences among the variables were identified, suggesting that non-response may not be a concern in this study.

#### *4.3 Second respondent data*

We also collected responses from a second subset of respondents who were knowledgeable about the same supplier relationship reported on by the primary respondent. Testing the level of agreement between respondents within the same organization helps to verify the validity of our data and minimizes concerns related to common method bias (Kumar, Stern and Anderson, 1993; Pagell and Krause, 2005). Data was collected from 30 second respondents. The Interclass Correlation (ICC) method (Futrell, 1995) was used to examine the level of agreement, comparing the average level of variation between primary and secondary respondents (within group variance-*MSW*), with the average variation between the primary responses (between group variance-*MSB*). All correlations are above the suggested .60 standard, indicating acceptable inter-rater reliability and lending validity to our results (Boyer and Verma, 2000).

#### *4.4 Measures*

The survey scales were either established scales or developed from the extant literature. The following items were measured on a 1-7 Likert scale ranging from “Not at all”, to “A very great extent” or “Strongly Disagree”, to “Strongly Agree” as appropriate. All items can be found in Appendix 1.

*Buyer innovation improvement* - Buyer innovation improvement was measured using a six-item scale, adapted from Kotabe et al, (2003). The scale assessed the degree to which the supplier relationship had, over the previous 2-3 year period, helped improve

product design, process design, product quality, ability to innovate, manufacturing flexibility and, shorten new product development cycle times.

*Buyer cost improvement* - Cost improvements achieved as a result of the relationship were examined using a two-item scale tested and validated by Krause et al (2007). Respondents were asked to indicate the extent of total cost improvements and lower product cost achieved with the supplier in the past 2-3 years.

*Relational capital* – Relational capital was assessed using a five-item scale developed by Kale, Singh and Perlmutter (2000), building on the earlier work of Dyer and Singh (1998) and Madhok (1995). Respondents were asked to indicate to what extent the supplier relationship was characterized by close interaction, mutual trust, mutual respect, friendship, and high levels of reciprocity.

*Cognitive capital* – Cognitive capital was assessed using scales developed for intra-firm networks (Tsai and Ghoshal, 1998; Weick, 1995) and modified to an inter-organizational context. Respondents were asked the extent of shared business values, ambitions and vision, goals for the business, and levels of agreement on what was in the best interest of the relationship.

*Social interaction ties* - Following Tsai and Ghoshal (1998), social interaction ties were used as a proxy for structural capital. A five-item scale, building on previously tested and validated measures of social interaction (Cousins, et al., 2006; Cousins and Menguc, 2006) was used, measuring the extent to which the buyer and supplier engage in social events, joint workshops, cross functional teams, team building exercises, and co-location.

*Legal bonds* – Measures of legal bonds were adapted from the three-item scale of Cannon and Perreault (1999), with two further items developed from the literature. The

resultant five-item scale examined the extent of formal written agreements with the supplier, including operational requirements, supplier performance monitoring, warranty policies, handling of disputes, and expected levels of service.

*Control variables* - Six additional variables were included in the analysis. The buyer's percentage of total annual purchasing spend from the supplier was included to control for the importance of the relationship (Buvik and Gronhaug, 2000). Firm size was controlled for as the number of employees, while relationship length was measured as the total number of months that the buyer and supplier have been in a relationship. Three additional dummy variables were used to control for the specific impact of different industries (aerospace and automotive, electronic and industrial equipment and general manufacturers).

#### *4.5 Data analysis*

Exploratory factor analysis using maximum likelihood extraction, with direct oblimin (oblique) rotation, was used to extract factors with eigenvalues greater than 1.0 (Tabachnick and Fidell, 2001). Bartlett's Test of Sphericity (3244,  $p < .000$ ) and the Kaiser-Meyer-Olkin (KMO) statistic (.817) confirmed the suitability of items for factor analysis (Vogt, 2005). All items were analyzed together, and as no one factor accounted for most of the variance, common method variance was not considered an issue (Podsakoff, MacKenzie, Lee and Podsakoff, 2003). Results of the factor analysis are presented in Table 2 and suggest a six-factor solution. All factor loadings were considerably above .40 and are therefore considered significant (Hair, Anderson, Tatham and Black, 1998). A scree test confirmed that no more than six factors should be retained (Costello and Osborne, 2005). One item (namely, "The relationship is

characterized by close interaction at multiple levels”) loaded on both relational capital (.62), and legal bonds (.26). The weak loading was removed from further analysis as it was deemed to not compromise the integrity of the data (Costello and Osborne, 2005), and was below the defining value of a “crossloader” (.32) (Tabachnick and Fidell, 2001). Table 3 provides descriptive statistics, correlations among factors and Cronbach’s coefficient alphas. The Cronbach’s alphas ranged from 0.82 to 0.90, consistent with DeVellis (2003) who noted that alpha levels between 0.80 and 0.90 are very good.

[Insert Table 2 about here]

[Insert Table 3 about here]

## **5. Results**

OLS regression was used to formally test the hypothesized framework. Tests of normality indicated that none of the assumptions of OLS regression were violated, aside from three control variables (importance of relationship; size; and, duration of the relationship) which deviated significantly from normal. To attenuate this skewness, natural logarithm transformations were performed. Variance inflation factors (VIF) were examined to test for multicollinearity. All VIFs ranged from 1.22 to 1.81. There are no coefficients with VIFs greater than 2.0; therefore it is reasonable to conclude that the data set is clean of any multicollinearity issues (Hair, et al., 1998).

### *5.1 Tests of mediation*

Our model examines whether the level of relational capital present in the buyer-supplier relationship mediates the relationships between cognitive capital and social interaction

ties on buyer performance. Mediated multiple regression was used to test the hypothesized model, and required the examination of three equations (Baron and Kenny, 1986). In step one, the predictor variables (cognitive capital and social interaction ties) were regressed against the mediator variable, relational capital. Step two examined the predictor variables against each dependent variable (cost and innovation performance) to establish there was an effect to be mediated. Finally, step three regressed the dependent variables on both the mediator and predictor variables. To indicate mediation, all these effects must be significant, with the significance of each association between the predictor and outcome reduced by adding the mediator to the model (Baron and Kenny, 1986). The results for Hypotheses 1-3 are presented in Table 4.

[Insert Table 4 about here]

The results of the analysis indicate support for Hypotheses 1a and 1b, with both cognitive capital ( $\beta=.44, p<.001$ ) and social interaction ties ( $\beta=.34, p<.001$ ) positively and significantly related to the level of relational capital. Hypothesis 2 requires that relational capital mediate the relationship between cognitive capital and buyer performance. The results indicate that cognitive capital is positively related to both buyer innovation improvement ( $\beta=.18, p<.05$ ) and buyer cost improvement ( $\beta=.31, p<.001$ ), satisfying step two of the mediation test. Model 2 shows the results for H2a. Relational capital is shown to be positively related to buyer innovation improvement ( $\beta=.17, p<.05$ ), with the previously significant cognitive capital-buyer innovation improvement relationship no longer significant ( $\beta=.11, ns$ ), providing full support for Hypothesis 2a. Model 3 provides the results for Hypothesis 2b. Relational capital was positively and significantly related to buyer cost improvement ( $\beta=.23, p<.05$ ). Upon the inclusion of the mediator, cognitive capital continued to be significantly related to cost

improvement ( $\beta=.21, p<.05$ ), providing evidence of partial mediation and thus partial support for Hypothesis 2b.

Hypothesis 3 states that relational capital mediates the relationship between social interaction ties and buyer performance. The results indicate that social interaction ties is positively related to buyer innovation improvement ( $\beta=.25, p<.001$ ), satisfying step two. With the addition of relational capital in step three, social interaction ties continue to be significantly related to buyer innovation performance ( $\beta=.19, p<.05$ ); providing support for partial mediation in H3a. Pertaining to Hypothesis 3b, model 3 shows that social interaction ties were not significantly related to improvements in the buying firm's costs. As this aspect of the test for mediation was not satisfied, no support was found for Hypothesis 3b.

The Sobel test (Sobel, 1982) was used to directly examine the significance of the mediation effects. As an additional test for mediation, Mackinnon et al. (2002) suggest that the Sobel test is superior in terms of power and intuitive appeal. The Sobel test lends additional support for the mediated relationships hypothesized through a change in significance of the indirect effect. In sum, we found support for the role of relational capital in fully mediating cognitive capital to buyer innovative improvement ( $t=2.68, p<.05$ ), and partially mediating both cognitive capital to buyer cost improvement ( $t=2.41, p<.05$ ) and social interaction ties to buyer innovation improvement ( $t=3.32, p<.05$ ).

## 5.2 *Tests of moderation*

Hypothesis 4 postulated that legal bonds positively affect the relationship between relational capital and each aspect of buyer performance. The data were examined using



moderated hierarchical OLS regression techniques, with the results presented in Table 5. Control variables are entered in step 1, followed by the two independent variables (relational capital and legal bonds) in step 2. The independent variables were mean-centered prior to the multiplication of the interaction term, which was entered in step 3.

Support was found for Hypothesis 4a, with the interaction term being significant and positive ( $p < .001$ ), indicating that legal bonds positively moderate the relationship between relational capital and buyer innovation improvement. Hypothesis 4b was also supported, with the interaction term being significant and positive ( $p < .05$ ), providing evidence of a moderation effect.

[Insert Table 5 about here]

To further probe these moderated effects, we calculated regression equations for the relationship between relational capital and each performance variable at high and low levels of legal bonds. We define high and low values as plus and minus one standard deviation from the mean (Cohen and Cohen, 1983). Figures 2 and 3 illustrate these effects. High levels of legal bonds are shown to positively reinforce the relationship between relational capital and buyer innovation performance, supported by a significant simple slope calculation ( $b = .57, p = .001$ ). Conversely, low levels of legal bonds have no significant effect ( $b = .01, n.s.$ ). Therefore, support is found for H4a relating to the positive moderating effect of high levels of legal bonds on the relationship between relational capital and buyer innovation performance.

[Insert Figure 2 about here]

Regarding Hypothesis 4b, Figure 3 indicates that high levels of legal bonds make relational capital more effective in gaining cost improvements with the supplier. Under conditions of low legal bonds, the effect of relational capital on cost

improvement remains virtually unaffected. Simple slope computations for high levels of legal bonds were significant ( $b=.48, p<.001$ ), while the slope calculation for low levels of legal bonds were non-significant ( $b=.11, n.s$ ). Overall, the results indicate support for Hypothesis 4b.

[Insert Figure 3 about here]

Finally, we note that the control variable, relationship duration, had a significant, negative association with buyer cost improvement. This finding may reflect the greater opportunity for cost reduction in the early stages of the relationship, with diminishing scope to achieve further cost reductions as the relationship continues. It may be that emphasis shifts over time towards alternative forms of joint value creation beyond cost.

## **6. Discussion**

The growing body of supply chain research that builds on SCT is indicative of its value and relevancy to the discipline (Cousins, et al., 2006; Hitt, Lee and Yucel, 2002; Krause, et al., 2007; Lawson, et al., 2008). The results of this study add to this stream of research. The analysis provided support for Hypothesis 1a, indicating that cognitive capital positively influences the level of relational capital between buyer and supplier. Consistent with previous literature (Nahapiet and Ghoshal, 1998), these results provide support for the idea that shared ambitions, goals, vision and values help foster trust, identification and obligation within the relationship. Similarly, the results for H1b indicate that structural capital, conceptualized through social interaction ties, structurally embeds buying firms and their key suppliers, encouraging reciprocated communication and information sharing, and providing a forum through which parties can evaluate the trustworthiness of others (Krause, et al., 2007). These results suggest

that purchasing managers who spend the time and resources to foster structured social interactions with their key suppliers, may see improvements in these relationships in terms of increased mutual trust and higher levels of reciprocity.

We also found support for Hypothesis 2a that relational capital acts to mediate the relationship between cognitive capital and buying firm performance. Specifically, relational capital fully mediates cognitive capital-buyer innovation performance. In other words, relational capital, and the trust, obligation and identification it embodies, is the means by which the intrinsic value of shared norms and values are translated into performance, measured in terms of product and process design, product quality, and new product development cycle times. The mere shared understanding that both buyers and suppliers strive to achieve, for example, through improved product design, is not enough to materialize this aim. Instead, relational capital provides security and reciprocity within the relationship, where the supplier is more likely to provide new technologies or knowledge in the confidence that they will, in turn, share the benefits.

Relational capital was found to partially mediate the cognitive capital-buyer cost performance relationship (H2b). In other words, when buyers and suppliers have congruent goals, vision and values, improvements in total cost and product cost can be achieved, both independently of, and indirectly through, relational capital. This result is consistent with Krause et al (2007) who found that cognitive capital was important in explaining buyer performance achievements relating to cost and total cost. Further, Gittell (2000; 2002) suggested that the harmonization of interests through cognitive capital reduces the incentive for the buyer or supplier to act opportunistically, thereby reducing the transaction costs associated with safeguarding and monitoring. Our findings suggest that cost improvements in ongoing buyer-supplier relationships can be

made when there is compatibility in what both buyer and supplier view as appropriate cost targets, irrespective of the existence of relational capital.

Our results provide partial support for Hypothesis 3. For H3a, relational capital only partially mediates the influence of social interaction ties on buyer innovation improvements. Social interaction ties, such as cross-functional teams and joint workshops, are independently linked to improvements in buyer innovation performance, as well as indirectly through relational capital. This result is consistent with prior research that indicates the benefits of frequent, social interaction on new product development, regardless of the existence of trust, obligation and identification (Lawson, et al., 2008). Krause et al (2007) also found that structural capital, in the form of direct supplier involvement activities were important in explaining firm performance in terms of quality, delivery and flexibility.

We did not find support for Hypothesis 3b, that relational capital would mediate the social interaction ties-cost performance relationship. Social interaction ties did not directly influence reductions in cost, thus necessary conditions for mediation were not met. Performance outcomes in product quality, manufacturing flexibility and process design depend more on direct interaction through social interaction ties than cost performance outcomes, mirroring the findings of Krause et al (2007). Thus, cost improvement efforts may be addressed by the respondent firms during periodic contractual negotiations (Krause, et al., 2007), rather than through organized social events or cross-functional teams.

Finally, for H4a and 4b, we found support for the complementarity of contractual and relational methods of governance in driving improvements in performance (Cannon, et al., 2000; Zaheer and Venkatraman, 1995). Building on

previous literature, high levels of legal bonds are shown to increase the level of security added to the relationship when a high degree of trust and goodwill is already present (Cannon, et al., 2000; Jap and Ganesan, 2000; Liu, et al., 2009). These results suggest that when buyers and suppliers have a relationship characterized by mutual trust and reciprocity, the formalization of expectations relating to operational requirements and protection of shared knowledge, will further help lower product cost and total cost, and drive improvements in products and processes.

These results imply that purchasing/supply chain managers should not consider a close social relationship as a replacement for a contract, since stipulation of legal bonds can facilitate improvements in cost and innovation performance. Overall, the results of our research lend credence to the value of trust-building activities between industrial buying firms and their key suppliers, and the importance of shared ambitions and goals across these organizations. We find that whilst the presence of legal contracts in relationships based on trust, obligation and identification can increase the likelihood of buyer performance improvements, the effect is strongest where the contracts are highly specified.

### *6.1 Managerial implications*

Practitioners can benefit from our results by noting the importance of social and relational factors in forming relationships between industrial buying firms and their key suppliers. For this study, we asked buying firm respondents to report on one of their key strategic suppliers that provided their firm with a critical material or component. While these important supply relationships are often characterized as cooperative (Dyer, Cho and Chu, 1998), they can also turn contentious when problems occur. For

example, disagreements may occur during price-related negotiations, or in relation to transactional problems such as expedited or late deliveries, quality issues, delivery quantity or location changes, or cost disputes. Although such disagreements may not be avoidable, our results indicate that there are performance implications resulting from the nature of the social interaction that takes place between the parties.

Our research underlines the performance benefits for companies whose purchasing personnel manage the social aspects of their relationships with key suppliers from a long-term perspective. Recent discussions with purchasing managers about the results of our research have reinforced the notion that conflicts occur in even the closest supply relationships. However, those companies that emphasize social interaction through activities such as training workshops, supplier site visits and the creation of cross-organizational teams, and also report significant efforts to share corporate values, business goals, and technology roadmaps, tend to characterize their relationships with key suppliers as exhibiting high levels of trust, respect and reciprocity. In turn, these relationships appear to be more robust in dealing with conflict that inevitably arises, and allow the parties to focus on the long-term performance success of the relationship, instead of focusing on whether the other party has reaped short-term losses or gains.

Thus, shared goals and business values, coupled with social events and other efforts that involve social interaction between firms, can help to build trust and reciprocity, and these traits in turn are associated with performance enhancements for the buying firm. Further, the social capital that is built may help the two parties work through disagreements, even where neither party may be completely happy with the outcome in the short-term, but where both parties continue to perform based on trust, respect and reciprocity that is integral to the relationship. Moreover the managers,

referred to above, reported that they rarely consulted their legal contracts with these key suppliers, although they considered the contracts important from a risk management perspective.

Thus, firms need to pay attention to how, and how often, they interact socially. While cross-functional teams, social events and supplier conferences are often dismissed as time wasting events (Cousins and Menguc, 2006), the evidence suggests that organizations can benefit by fostering social interaction ties with their key suppliers, both formally and informally. These ties can be encouraged through the allocation of resources to facilitating social events and putting more supply management in the field, working with suppliers, understanding the challenges they face, and providing knowledge and technical advice where possible. Also, the development of cross-organizational teams and joint workshops geared towards leveraging operational improvements (e.g., Six Sigma/process improvements) or sustainability initiatives, for example, can improve these supply chain relationships. In addition, they can directly improve innovation abilities, such as product quality and process design, through information sharing and problem solving that is characteristic of frequent, routinized interaction with suppliers. In an era dominated by e-communication, email and fax, this study highlights the importance of face-to-face social interaction, and the social solidarity created.

The importance of shared ambitions, goals and values between buyers and suppliers was also highlighted in this research as important to relationships with key suppliers. With communication on both the operational and strategic levels, practitioners can understand what is in the best interests of their key suppliers and work toward shared business values, ambitions, and vision. Our results suggest that the

benefits of these efforts help not only in achieving operational improvements such as cost savings, but also during innovation efforts such as new product development projects.

From a governance perspective this study offers important managerial implications pertaining to the use and effectiveness of contracts (legal bonds). We show that legal bonds do not directly improve performance; rather they do so via the confidence they provide in promoting the relationship between close, collaborative supply chain relationships and supplier's contributions to buying firm performance. Our results emphasize the need to focus on the development of relationships characterized by trust, respect and reciprocity. Thus, managers need to focus more on how they interact with suppliers, rather than attempting to manage through contractual governance.

## *6.2 Limitations and future directions*

While considerable attention has been paid to ensure the validity and reliability of this study, there are limitations. First, a cross-sectional survey by its nature limits the depth of understanding of social capital, since relational behaviors between actors are complex and develop over time. Second, cause-effect relations cannot be inferred due to the static nature of the survey. Longitudinal settings would enable scholars to explore buyer-supplier relationships over time, regarding how social capital evolves through the relationship lifecycle. Third, although we control for potential confounding variables in the model, other variables may also impact on the constructs of interest. Future work could examine other contingency factors (e.g., environmental uncertainty) that may



influence the formation of social capital and its influence on relationship performance. Finally, the data collected represented only the buyer's side of the dyadic relationship.

Directions for future research include re-exploring the mediating role of relational capital on the social interaction ties-buyer cost improvement relationship. Also of interest is the nature of social capital in the wider context of supply chains, i.e., triadic relationships between one buyer and two key suppliers that may or may not compete for a buying firm's business (Wu and Choi, 2005). Social capital from the supplier's perspective should also be more thoroughly examined. Further refinement of measurement items is also of interest. Finally, while much recent research focuses on the positive effects of social capital, it may be beneficial to examine the degradation of social capital and associated consequences.

## **7. Conclusion**

This paper developed an integrative framework of social capital in industrial buyer-supplier relationships and tested its effect on buyer performance. Our findings present a range of issues for supply chain and purchasing managers seeking to manage their supplier relationships effectively in order to improve performance. Social capital was shown to be the relational glue of buyer-supplier exchange through its facilitation of cooperation and collaboration. In considering how to identify, design and manage the dimensions of social capital, we highlight that practitioners can benefit from understanding each component, its effectiveness, how to leverage it and the implications for its existence in a buyer-supplier relationship. In particular, the mediating role of relational capital is foremost. Legal bonds are also shown to be an effective, complementary means of governance, adding value when used in conjunction with

relational capital. Overall, the results of this study provide guidance for managers and academics considering how to identify, design and manage the dimensions of social capital within buyer-supplier relationships.

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**Table 1 Sample characteristics**

<b>(1) Industry</b>	<b>Frequency</b>	<b>%</b>
Electronic equipment and industrial equipment	27	16.6
General manufacturing	34	20.8
Aerospace and automotive	37	22.7
Chemicals and chemical products	12	7.4
Pulp and paper products	11	6.7
Basic metals and fabricated metal products	10	6.2
Not reported	32	19.6
<i>Total</i>	<i>163</i>	<i>100</i>

<b>(2) Business Units' Annual Sales</b>	<b>Frequency</b>	<b>%</b>
Under £25M	30	18.4
£25 - £50M	17	10.4
£50- £100M	14	8.6
£100 - £250M	19	11.7
£250 - £500M	22	13.5
Over £500M	47	28.8
Missing	14	8.6
<i>Total</i>	<i>163</i>	<i>100.0</i>

<b>(3) Titles</b>	<b>Frequency</b>	<b>%</b>
Purchasing Manager	33	20.2
Senior Buyer	48	29.4
Supply Chain Manager	24	14.7
Procurement Director	28	17.3
Other	16	9.8
Missing	14	8.6
<i>Total</i>	<i>163</i>	<i>100.0</i>



**Table 2 Factor loadings**

Items	1	2	3	4	5	6
<i>1. Buyer Innovation Improvement</i>						
... improve product design	.94					
... improve process design	.84					
... improve our product quality	.72					
... improve our ability to innovate	.75					
... improve our manufacturing flexibility	.45					
... shorten our new product development cycle times	.61					
<i>2. Buyer Cost Improvement</i>						
... achieve total cost reductions		.67				
... lower product cost		.93				
<i>3. Relational Capital</i>						
The relationship is characterized by close interaction at multiple levels			.69			
The relationship is characterized by mutual trust at multiple levels			.91			
The relationship is characterized by mutual respect at multiple levels			.78			
The relationship is characterized by mutual friendship at multiple levels			.71			
The relationship is characterized by high levels of reciprocity			.67			
<i>4. Cognitive Capital</i>						
Both parties often agree on what is in the best interest of the relationship				.57		
Both parties share the same business values				.91		
This supplier does not share our goals for this business*				.61		
We share the same ambitions and vision				.87		
<i>5. Social Interaction Ties</i>						
Social events					.54	
Joint workshops					.61	
Cross functional teams					.71	
Team building exercises					.69	
Co-location					.77	
<i>6. Legal Bonds</i>						
We have formal written agreements outlining the operational requirements of this supplier						.83
We have formal written agreements that detail how this supplier's performance will be monitored						.67
We have formal written agreements outlining warranty policies						.78
We have formal written agreements outlining how to handle complaints and disputes						.77
We have formal written agreements outlining the level of service expected from this supplier						.78

\* - reversed scored

**Table 3 Correlation matrix and descriptive statistics** <sup>a,b</sup>

Construct	Mean	S.D	1	2	3	4	5	6	7	8	9	10	11
<b>1</b> Relational capital	4.54	1.27	<b>.90</b>										
<b>2</b> Buyer innovation improvement	4.00	1.41	.32	<b>.89</b>									
<b>3</b> Buyer cost improvement	4.61	1.64	.30	.54	<b>.87</b>								
<b>4</b> Cognitive capital	4.82	1.26	.50	.27	.29	<b>.88</b>							
<b>5</b> Social interaction ties	2.99	1.39	.41	.27	.10	.18	<b>.82</b>						
<b>6</b> Legal bonds	3.30	1.35	-.44	-.21	-.32	-.51	.10	<b>.90</b>					
<b>7</b> Industry - electronic	0.13	0.34	.06	.12	.07	.07	-.04	-.08	-				
<b>8</b> Industry - general manufacturing	0.20	0.40	.06	.11	-.02	.18	.07	.01	-.20	-			
<b>9</b> Industry - aerospace	0.23	0.42	-.10	.18	-.15	-.22	.08	.34	-.21	-.27	-		
<b>10</b> Importance of relationship	11.93	14.12	.12	.11	-.05	.04	.02	.09	.06	.16	.007	-	
<b>11</b> Size (Employees)	2288	5385	-.06	.04	.03	-.01	.07	.09	.09	.01	.18	-.02	-
<b>12</b> Duration of relationship	11.48	8.16	.18	.03	.00	.04	.02	-.07	-.03	.08	-.01	.09	-.03

<sup>a</sup> Correlation coefficients of .19 or greater are significant at  $p < .01$ ,  $n=163$

<sup>b</sup> Cronbach's alpha shown in bold on diagonal

**Table 4 Results of regression analysis for mediation**

	<b>Model 1 - Relational Capital</b>		<b>Model 2 - Buyer Innovation Improvement</b>			<b>Model 3 - Buyer Cost Improvement</b>		
	Step 1		Step 2	Step 3		Step 2	Step 3	
	$\beta$	$\beta$	$\beta$	$\beta$	B	$\beta$	$\beta$	$\beta$
<b>Controls</b>								
Industry - electronic	.05	.03	.09	.08	.08	.03	.01	.01
Industry - manufacturing	.02	-.07	.07	.02	.03	-.03	-.07	-.05
Industry - aerospace	-.08	-.03	-.16*	-.15*	-.15*	-.13	-.08	-.07
Relationship importance	.09	.09	.09	.09	.07	.01	.01	-.01
Size	-.04	-.07	.06	.05	.06	.04	.03	.05
Relationship duration	.10	.03	.02	-.01	-.01	-.19*	-.25**	.25**
<b>Direct effects</b>								
Social interaction ties		.34***		.25***	.19*		.06	-.02
Cognitive capital		.44***		.18*	.11		.31***	.21*
<b>Mediating effects</b>								
Relational capital					.17*			.23*
$\Delta R^2$	.04	.34***	.06	.11***	.12*	.06	.10***	.13*
Overall $R^2$	.04	.38	.06	.17	.19	.06	.16	.19
Adjusted $R^2$	.00	.35	.02	.13	.14	.03	.12	.15
Overall Model $F$	.99	11.79***	1.67	3.90***	3.87***	1.75	3.69***	4.09***

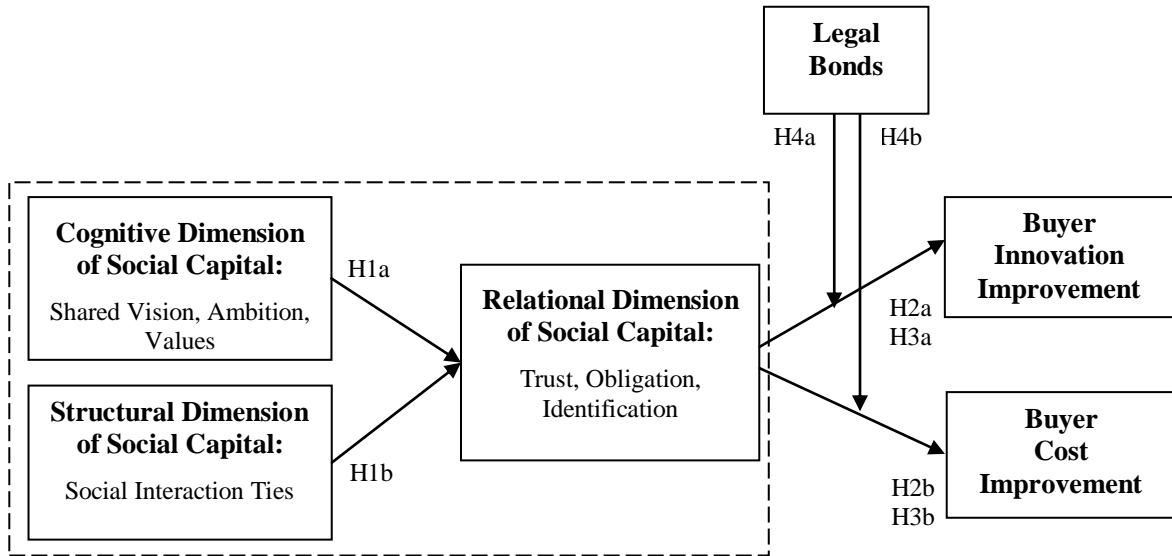
\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 5 Results of regression analysis for moderation by legal bonds**

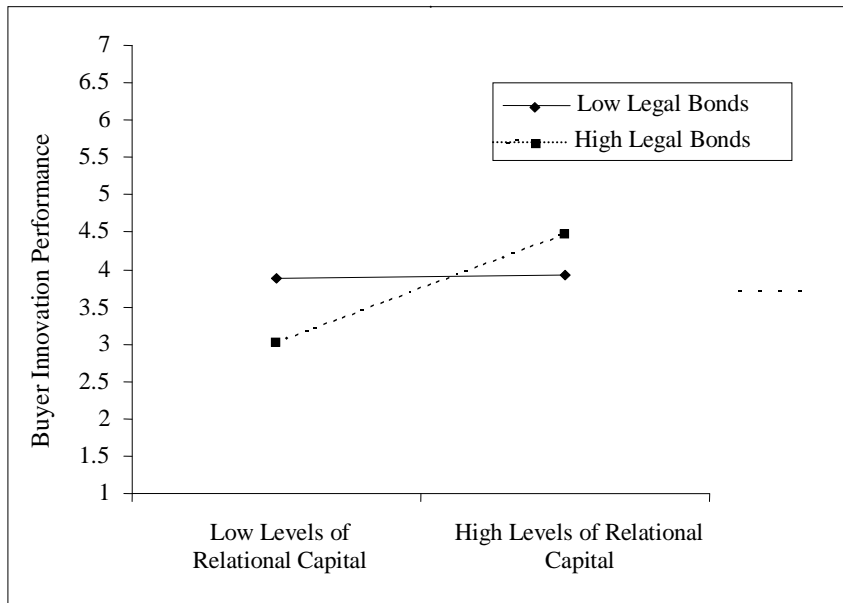
	<b>Model 1 - Buyer Innovation Improvement</b>			<b>Model 2 - Buyer Cost Improvement</b>		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
	$\beta$	$\beta$	$\beta$	$\beta$	$\beta$	B
<b>Controls</b>						
Industry – electronic	.09	.07	.04	.03	.02	.00
Industry – manufacturing	.07	.07	.06	-.03	-.01	-.02
Industry – aerospace	-.16	-.11	-.12	-.13	-.04	-.04
Relationship importance	.09	.07	.05	.01	.00	-.01
Size	.06	.08	.06	.04	.06	.05
Relationship duration	.02	-.01	.00	-.19*	-.22*	-.21*
<b>Main effects</b>						
Relational capital		.28***	.26**		.24**	.23**
Legal bonds		-.05	-.06		-.20*	-.20*
<b>Moderating effect</b>						
Relational capital x legal bonds			.26***			.15*
$\Delta R^2$	.06	.09***	.07***	.06	.13***	.02**
$\Delta F$	1.67	8.12	13.22	1.74	12.02	4.03
Overall $R^2$	.06	.15	.22	.06	.19	.22
Adjusted $R^2$	.02	.10	.17	.03	.15	.17
Overall model $F$	1.67	3.39***	4.72***	1.74	4.50***	4.52***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

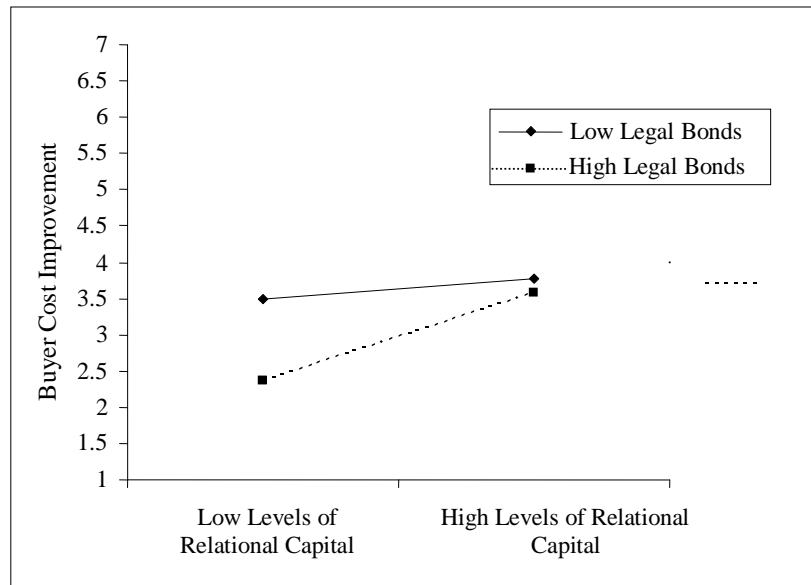
**Figure 1 Theoretical framework**



**Figure 2 Relational capital and buyer innovation performance by legal bonds**



**Figure 3 Relational capital and buyer cost improvement by legal bonds**



## Appendix 1. Constructs and Items

*Relational Capital: (Not at all – A very great extent); 7-point Likert scale*

**To what extent do the following statements describe your firm's relationship with this supplier?**

The relationship is characterized by close interaction at multiple levels.

The relationship is characterized by mutual trust at multiple levels.

The relationship is characterized by mutual respect at multiple levels.

The relationship is characterized by mutual friendship at multiple levels.

The relationship is characterized by high levels of reciprocity.

*Cognitive Capital: (Strongly disagree – strongly agree); 7-pt Likert scale*

**To what extent do you agree or disagree with the following statements regarding your firm's relationship with this supplier?**

Both parties often agree on what is in the best interest of the relationship.

Both parties share the same business values.

This supplier does not share our goals for this business (reversed).

We share the same ambitions and vision.

*Social Interaction Ties (Not at all – A very great extent); 7-pt Likert scale*

**To what extent do you engage in the following types of activities with this supplier?**

Organized social events

Joint workshops

Cross-functional teams

Co-location

Team building exercises

*Legal Bonds: (Strongly disagree – strongly agree); 7-pt Likert scale*

**To what extent do you agree or disagree with the following statements regarding your firm's agreements with this supplier?**

We have formal written agreements outlining the operational requirements of this supplier.

We have formal written agreements that detail how this supplier's performance will be monitored.

We have formal written agreements outlining warranty policies.

We have formal written agreements outlining how to handle complaints and disputes.

We have formal written agreements outlining the level of service expected from this supplier.

*Buyer Cost Improvement: (Strongly disagree – strongly agree); 7-point Likert scale*

**Over the last 2-3 years, this supplier relationship has helped ....**

... achieve total cost reductions.

... lower product cost.

*Buyer Innovation Improvement: (Strongly disagree – strongly agree); 7-point Likert scale*

**Over the last 2-3 years, this supplier relationship has helped ....**

... improve product design.

... improve process design.

... improve our product quality.

... improve our ability to innovate.

... improve our manufacturing flexibility.

... shorten our new product development cycle times.