

## Social Capital and Buyer-Supplier Degree Symmetry: Impact on Relationship Satisfaction

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**Abstract:** Social capital represents an emerging theoretical lens for studying buyer-supplier relationships. This paper proposes a model of social capital and its influence on knowledge-sharing routines. The outcome of the model is relationship satisfaction. This research uses dyadic data to ensure that both buyer and supplier perspectives are included in the analysis. Specifically, the research calculates degree symmetry and degree value measures to evaluate the conceptual model within the framework of dyadic relationships between buyers and suppliers. The contributions to the literature include increased understanding of the impact of social capital on knowledge-sharing and perceived relationship satisfaction as well as the use of a dyadic research methodology to incorporate both buyer and supplier perspectives. The results illustrate that social capital elements (e.g., trust and shared vision) positively influence the development of knowledge-sharing routines between buyers and suppliers (namely information sharing and cooperative effort). Knowledge-sharing routines positively impact the level of satisfaction with the buyer-supplier relationship.

**Keywords:** Supplier relationships, Social capital, Knowledge-sharing

### I. Introduction

A key element of successful supply chain management is the ability for supply chain members to develop relationships which provide a competitive advantage; such relationships are often collaborative in that buyers and suppliers work together to share information and to integrate strategic plans and operational processes [4]. A supply chain incorporates the systematic, strategic coordination of functions across supply chain members in order to benefit not just the individual supply chain members, but also the supply chain itself [27]. In this sense, a supply chain involves the social interactions among its members as well as the performance that results from these interactions. These social aspects of exchange are referred to as social capital which is defined as “a quality created between people” and, like any form of capital, can be seen as an asset that provides “opportunities to add value” [5]. One of the key goals for social interaction is to create and transfer knowledge more effectively than competing supply chains in order to achieve a competitive

advantage [23]. Research [28] found that social preferences encourage collaboration as well as increase performance, and concluded that both social and economic incentives can motivate behavior. Not only is knowledge generation or learning a social process, but also the resulting economic performance is “embedded” in the social relationship [13] [36] among supply chain members.

Social capital is a theoretical framework with roots in social exchange theory and is based on the notion that norms of reciprocating behavior guide relationships such that parties cooperate under the expectation that mutual benefits will arise from the relationship [3]. One such benefit is knowledge that develops over time due to the social interactions that occur in the relationship. For example, [11] used the term “relational rent” to describe linkages between firms that would enable specialized knowledge to develop providing a competitive advantage. Such knowledge can be a critical strategic resource within a supply chain [15].

Given that social capital relies on reciprocating behavior, it is important to understand perspectives from both sides of the dyad or relationship. It is not enough to assume the buyers’ perspectives mirror suppliers (or vice versa) – particularly, since recent research suggests that buyers and suppliers may have very different perspectives. For example, researchers [7] found that, while suppliers and their retail customers indicated benefits from collaborative relationships, suppliers were more likely to feel that benefits were not equitably distributed. Given that differences in perception may impact reciprocity [29] from a social capital framework, parties would be less likely to participate or may reduce their participation if they feel the benefits from the relationship are less than the inputs into the relationship. Previous studies have tended to use a social capital framework to study only one side of the buyer-studying the complete buyer-supplier dyad.

Perceptions tend to be more similar across buyers and suppliers when both parties are evaluating easily observable characteristics than when the evaluations focus on more subjective characteristics [37] [19]. Certainly, social actions would be more subjective and, thus, represent a potential challenge if dyadic perceptions are highly dissimilar. This paper examines not only dyadic symmetry (how similar are perceptions) but also the degree or magnitude of the

perception (e.g., value) as outlined by [22]. Similarity is not the only important factor; positive assessments of the relationship are also critically important. In other words, the ultimate measure is not only that a buyer and supplier agree, but also that they agree in a similar way about the characteristic of study – both parties agreeing, for example, that trust exists is better than both parties agreeing that trust does not exist (or one party with a perception of trust and the other with a perception of distrust).

There are two main objectives in this paper. First, this paper proposes and tests a conceptual model of supply chain social capital and its ability to influence relationship satisfaction through knowledge-sharing. Second, this paper uses the degree symmetry and degree value measures to assess dyadic relationships between buyers and suppliers. The contributions to the literature include increased understanding of the impact of social capital on knowledge-sharing and perceived relationship satisfaction from a buying and supplying firm dyadic perspective.

## II. Literature review

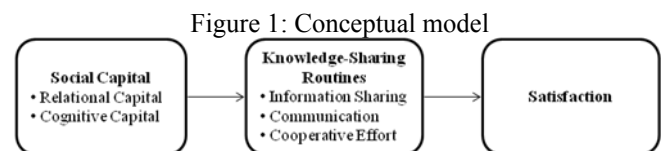
Social capital has been defined as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” [31]. In this sense, social capital encourages norms and behaviors to evolve in a manner that benefits the relationship while discouraging opportunistic behaviors that could potentially damage the relationship [31]. [13] expressed social capital as two forms of embeddedness “concrete personal relations” and “structure... of such relations”. From this work, other authors have used the same distinction between structural embeddedness and relational embeddedness to distinguish between “the configuration of one’s network and the quality of those relationships” [30]. [31] proposed an additional dimension of social capital called cognitive which refers to a common code of understanding that creates a shared vision among its members [35].

Although only recently applied to the study of supply chains, social capital theory offers an opportunity for supply chain analysis as it offers a richer understanding of the complexities associated with supply chain relationships [24] [2]. To illustrate, [17] indicate that social capital “plays a critical role in the transfer and exchange” of knowledge, while [2] propose that supply chain capital (a form of social capital) leads to supply chain knowledge development which involves the sharing, use and development of information.

Knowledge-sharing routines have been defined by [11] based on the work of [14] as “a regular pattern of interfirm interactions that permits the transfer, recombination, or creation of specialized knowledge.” [16] found that knowledge-sharing encouraged the improvement of existing

knowledge (specifically, exploitative knowledge-sharing) positively impacted both customer and vendor’s perceptions of performance. [11] propose that buyer-supplier relationships with advanced knowledge-sharing routines will result in relationship rents and ultimately lead to inter-organizational competitive advantages. Knowledge-sharing routines between buyers and suppliers which result in positive relationship rents are likely to lead to successful relationships. [1] used relationship satisfaction as a proxy for partnership success and indicated that satisfaction may be a greater measure of future intention than concepts such as perceived effectiveness. Satisfaction is defined as an overall positive measure or evaluation of the aspects of a firm’s working relationship with another firm [10] and is considered to be an affective assessment [1]. [15] found that organizational learning in strategic sourcing units led to customer satisfaction. Given that this research is focused on social interactions, a measure of success that is affective as opposed to a more operational assessment (e.g., perceived performance) is most appropriate.

Given that structural embeddedness has been researched to a greater extent [30] and that dyadic perspectives are less likely to be similar when more subjective assessments are evaluated [33] [19], our research focuses on the relational and cognitive elements of social capital as antecedents to knowledge-sharing routines. Perceived satisfaction is proposed as an outcome of knowledge-sharing routines. A conceptual model is shown in Figure 1.



### Social Capital

Relational capital involves the personal relationships that develop among parties and, as such, becomes the “assets that are rooted in these relationships” [35]. Relational capital is generally represented as a measure of trust given that trust is developed over time through embedded ties [36]. Relational capital relies on close interaction at a personal or individual level which encourages trust, which, in turn, supports greater information exchange [20]. Trust is considered a core element of success in buyer-supplier relationships and was shown to facilitate the relationship by reducing risk of opportunism – in other words, trust becomes a self-enforcing agreement between buyers and suppliers [36] [24].

The cognitive dimension of social capital is developed through shared vision and exists when partners have similar goals and objectives [35]. As such, cognitive capital is generally expressed as a measure of shared vision. Shared vision represents the “collective goals and aspirations” that enable buyers and suppliers to have similar perceptions,

mutual understanding, and a bonding mechanism through which integrated knowledge is developed [17]. If firms have a shared vision, they are more likely to recognize the importance of knowledge-sharing routines as a way to reach common goals and objectives.

#### **Knowledge-sharing routines**

Knowledge-sharing routines would need to focus on sharing information and know-how through regular interactions in order for information to be transferred and for new knowledge to be created [11]. Knowledge-sharing is enabled through routines that support active collaboration as working together helps team members share ideas, creates common perspectives and increases understanding [32]. Such cooperative effort has been linked to improved internal integration [26], has been identified as a key activity for success in collaborative relationships [33], and has been shown to impact satisfaction. Social capital is a critical antecedent to tacit knowledge-sharing. Social capital encourages the development of information channels through linkages in the social network. [34] show that social capital fosters cooperation. Also [36] indicated that close social relationships offer the benefit of making information more credible and also entail joint problem solving opportunities.

#### **Satisfaction**

Prusak and Cohen [34] discuss the need to facilitate social interaction in order to promote knowledge exchange, help accomplish goals, and enhance satisfaction from social membership.

### **III. Research methodology**

At least since John and Reve [19], researchers have been calling for research that examines supply chain relationships from both parties' perspectives – after all if the effort is joint, each party's perspectives should be considered – yet, there is a paucity of such research. Most often, the benefits of such dyadic data are most often superseded by the challenges of collecting it. Thus, while there have been hundreds of studies on various different aspects of buyer-supplier collaboration over the preceding three decades, less than a score of studies have employed matched buyer-supplier data. Our primary methodological goal was thus to gather an appropriate dataset that would allow us to dyadically match buyers and suppliers.

With the goal of incorporating both buyers and suppliers' perspectives, the research design was employed with an explicit understanding that some degree of statistical power (i.e., utilize a relatively small sample size) would be traded off in order to examine dyadic, multiple informants. To achieve this goal, approximately 15 manufacturing firms were contacted. Each firm was sufficiently large to employ multiple purchasing agents/buyers who spent all or most of their time working with suppliers. The target sample

represented a variety of industries and firm sizes in order to increase generalizability of the results. Each participating company provided a list of purchasing agents/buyers who were willing to participate in the study; the buyers were also asked to provide contact information for two of their suppliers. Once the buyers returned the completed questionnaires, the identified suppliers were sent a mirror questionnaire.

The questionnaire was developed with twin goals: (1) to balance parsimony and completeness and (2) to ensure the instrument was applicable to both buyers and suppliers. The constructs and items used in the survey were developed through an extensive literature review. Constructs and items from published studies were employed where possible provide strong reliability and validity. We modified each of the items into pairs of questions such that one set of questions focused on asking the buyers their opinion of the suppliers' firm and the paired or mirrored questions focused on asking the suppliers their opinion of the buyers' firm.

The initial draft of the questionnaire was reviewed by a panel of five business professors familiar with the collaborative literature as well as the supply chain literature. Modifications to the questionnaire were made based on the panel's recommendations. The modified questionnaire was then administered to participants during a site visit to a Midwestern manufacturing firm that employs over 300 people and has been growing at a 25% rate over the last 4-5 years. This site visit allowed us an opportunity to sit with a group of managers and buyers in order to administer the survey in person, as well as to debrief the participants after the surveys were completed in order to assess the survey instrument for readability and clarity. This site visit resulted in a few minor changes to the survey and also provided support that the survey was appropriate in length, format and presentational style. The data collection process began with a target sample of manufacturing firms which the authors contacted through their network of executive education and research contacts. Each of the firms was a successful manufacturing firm, primarily in the Midwest of the U.S. Contacts at the manufacturing firm provided the names and contact information for 3 to 15 purchasing agents in their firm. These participants were sent an electronic copy of the survey. The principles of Dillman's [9] total design method were followed to encourage a higher response rate. Upon receipt of a completed buyer questionnaire, the selected supplier(s) was sent an electronic copy of the supplier survey. Again, the principles of Dillman's [9] total design method were followed.

The size of the companies in our sample ranged from \$500 million to \$10 billion in annual sales. We worked with a total of 21 companies and 182 purchasing agents. On the buyer side, we received 108 completed surveys for a response rate of 59.3%. Note that while we asked for

responses and contact information for two suppliers per buyer, we only received contact information for 176 suppliers, an average of 1.63 suppliers per buyer: 68 of our buyers provided contact information for two suppliers while 40 provided information for a single supplier. Out of a total of 176 suppliers we contacted, we received a total of 110 completed responses for a response rate of 62.5%. While we have 182 total buyer responses, we only had 110 matched buyer-supplier responses. Three buyer-supplier pairs were removed from the sample due to an unacceptable number of missing values in either the buyer or supplier survey. In summary, our sample (107 matched buyer-supplier dyads) is consistent in size and response rate with similar published work. Furthermore, the 59% overall response rate is far in excess of that seen in the vast majority of studies that focus on a single company.

### Measurement Scales

Survey items were adopted from past studies based on relevant literature and, where appropriate, were adapted to specific contexts (e.g., buyer versus supplier perspective). We tested our hypothesized model using partial least squares (PLS), specifically PLS Graph version 3.0. PLS uses component-based estimation in order to maximize the variance explained in the dependent variable, does not require multivariate normality of the data, and accommodates both formative and reflective constructs (Chin, 1998). PLS is particularly useful for smaller sample sizes, since it places minimal demands on measurement scales and distributional assumptions [21] [6]. We follow the guidelines of [12] who suggest that sample sizes with ten times more data points than the number of items in the most complex construct is a basic requirement for applying PLS. Since the most complex construct consist of 5 items, we can say that 107 data points is more than sufficient to measure the hypothesized model. The data set has a total of 1.9% missing observations that are missing at random according to Little's MCAR test ( $\chi^2 = 1101.427$ ,  $df = 7598$ ,  $p > 0.05$ ). To handle these missing values, we replaced missing values by the mean value for the dataset for that item.

### Degree and Symmetry in Dyads

We used the technique of [22] to analyze the dyadic data. This technique conceptualizes degree symmetry as a combination of the degree (or value) and the symmetry (or similarity). In other words, a dyad of data considers of the degree or average value of the buyer-supplier ratings and the symmetry or similarity. To illustrate, a buyer-supplier dyad with ratings of 5 and 3 has a degree/value of 4, which is the same as the dyad where both buyer and supplier rate the item as a 4, but in the first instance the symmetry is lower because of the dissimilarity of the two ratings. Specifically, we employ Klein et al. [22] technique to construct values as follows:

a. All items are standardized to a value between 0 and 1, yielding a buyer value CB and a supplier value CS.

b. The mean value of the buyer and supplier values, CB and CS, yields the degree value CDV.

c. The smaller degree value is divided by the larger value yields a standardized value between 0 and 1, reflecting the symmetry of the construct CSV.

d. Finally, the product of degree, CDV, and symmetry, CSV, yields the degree-symmetry value of the item CDS.

### Measurement Model

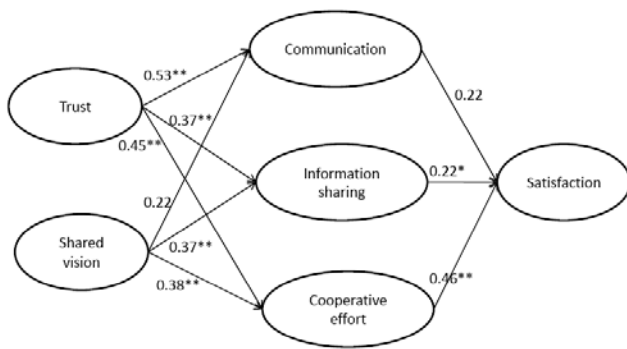
For the measurement model, each construct was modelled to be reflective, with the exception of the dependent variable, which is modelled as formative. The formative items, in contrast to the reflective construct items, do not necessarily have to co-vary, are not interchangeable, and the direction of causality is from the items to the latent construct [18]. Reflective constructs were validated using standard factorial validity for PLS as described by [12], whereas the formative construct is validated following the recommendations of [8].

For reflective constructs, the internal consistency and convergent validity were evaluated by examining the item-to-construct loadings, composite reliability, and average variance extracted (AVE). Based on these measures, we could conclude that our measures possess sufficient reliability and discriminant validity. Formative constructs require a different approach for validation, since the assessment of convergent validity is not meaningful for these constructs [6]. To evaluate discriminant validity for formative constructs, we examined item-construct correlations and correlations with other constructs. Overall, the measurement instruments exhibited sufficiently strong psychometric properties to support valid testing of the proposed measurement models. We also tested for Common Method Bias and could conclude that this is not a significant issue in this study.

### Structural Model

With a satisfactory measurement model in place, the next step was to test the structural model. A bootstrapping sample of 500 was used to estimate standard errors and to test the statistical significance of structural paths, since PLS does not provide traditional t-tests. The resulting model explained a significant amount of variance in the dependent variable. Figure 2 presents the final predictive model, and provides the standardized path coefficients.

Figure 2: Structural model



\*  $P < 0.05$ , \*\*  $p < 0.01$

The structural model fits the hypothesized relationships well. Seven of the nine hypothesized relationships are significant. The only two relationships that are not significant are shared vision and communication, and communication and satisfaction. The exogenous variables, trust and shared vision, explain 32.9% of the variance in Communication, 27.4% of the variance in information sharing and 34.7% of the variance in cooperative effort. In turn, these exogenous variables explain 30.8% of the variance in satisfaction with the relationship. The data in Figure 2 support seven of the nine hypotheses. In particular, there are very strong relationships between trust and communication, trust and cooperative effort, and cooperative effort and satisfaction.

#### IV. Discussion

Social capital theory has not been applied significantly in supply chain research [24] [2], yet, it offers an important theoretical lens to study buyer-supplier relationships given that social capital is capital developed between individuals that provides value [5] and offers resources embedded within the relationship [31]. Social capital offers a unique perspective in comparison to more economic-based theories given that social relations often impact economic performance [36]. This paper proposes and tests a model of social capital and its direct impact on knowledge-sharing, and, ultimately, on satisfaction. Our results illustrate that social capital (in the form of relational and cognitive capital) have a positive impact on knowledge-sharing routines. Specially, relational capital (measured as trust) positively impacts knowledge-sharing routines, such as communication, information sharing, and cooperative effort.

Similarly, cognitive capital (measured as shared vision) positively impacts knowledge-sharing routines, but only information sharing and cooperative effort. Information sharing and cooperative effort (knowledge-sharing routines) positively impact satisfaction with the relationship. [25] used a construct called information integration which combined information sharing and collaboration to represent one type of integration mechanism that could impact profitability.

The authors found that information sharing alone was not sufficient to significantly impact profitability – instead collaboration was also required [25]. Our results are similar in that both information sharing and cooperative efforts were needed to impact relationship satisfaction. Social capital has an important indirect influence on satisfaction via the creation of knowledge-sharing routines. Considering the development of relational rent, [11] determined that specialized knowledge created between buyers and suppliers could result in a sustainable competitive advantage. As such, through the development of social capital, firms are able to increase knowledge-sharing routines which not only positively impact satisfaction with the relationship, but may also contribute to a competitive advantage.

The research results underscore the critical importance of trust in buyer-supplier relationships – trust is strongly correlated with all three endogenous factors (i.e., communication, information sharing and cooperative effort). In contrast, shared vision is only associated with information sharing and cooperative effort, but not communication. Given that the research used information sharing to represent the type of information being shared (where information is required to convey meaning) and communication to represent the way that the information is actually shared, it makes intuitive sense that the path between shared vision and communication is not significant. A shared vision is not a prerequisite for having a method for communicating. In turn, information sharing and cooperative effort both correlate well with satisfaction with the relationship, while communication does not. This is important since achieving satisfaction with a relationship is intuitively linked with achieving success in a relationship.

This research offers another important contribution to the literature, given that the aforementioned results were assessed from a dyadic perspective. As developed in the literature review, there has been a great deal of research on supply chain relationships between buyers and sellers. However, the vast majority of this research has focused on a single side of the relationship: either the purchasing side or the supplying side. This research places the unit of analysis on the relationship and offers an additional assessment of degree-symmetric constructs.

While the data provides insight into buyer-supplier relationships and confirms some elements of prior research but in a dyadic as opposed to single-sided research setting, there remain limitations and opportunities to further this research stream. For example, the outcome variable, satisfaction with the relationship is more subjective than other possible measures of relationship success. Future research could endeavor to link social capital and knowledge-sharing routines with additional, more objective outcomes of inter-organizational relationships (e.g., such as economic-based satisfaction and/or actual performance

metrics that are not perceptual). Much of the extant research on supply chains implicitly assumes that collaborative relationships with strong social capital and good knowledge-sharing routines will lead to better financial success for multiple parties. Despite much anecdotal support for this proposition and strong intuitive appeal, there remains a need for further empirical research that uses a dyadic approach to test more economic-oriented outcomes.

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