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Supply Chain Collaboration and Trust in the Philippines

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ABSTRACT

This paper presents the relationship between supply chain collaboration and trust, two important concepts in supply chain management. The transaction costs and stakeholder theories were used as frameworks in analyzing supply chain collaboration and trust. These constructs were developed through literature review and in consultation with industry experts. Factor analysis was conducted to identify the underlying dimensions of these constructs while correlation analysis was done to determine their association. A total of 57 companies from Philippine manufacturing and service sectors participated in the study. From the factor analyses, two important dimensions of supply chain collaboration emerged: (1) joint planning and decision making and (2) information sharing. The trust construct, on the other hand, revealed two important perspectives: (1) relational perspective (the long-term relationship of the supply chain partners and their familiarity with their respective organizations) and (2) risk perspective (the propensity and willingness to take risk under conditions of uncertainty). Correlation analyses reveal that information sharing, a measure of supply chain collaboration, is significantly correlated with the relational perspective of trust. The study contributes to the supply chain management (SCM) literature by providing comprehensive and pragmatic definitions of supply chain collaboration and trust. It also provides practitioners with a listing of SCM strategies that they can employ to achieve better collaboration.

Keywords: *trust, supply chain collaboration, information sharing, supply chain management, stakeholder theory, transaction costs theory, relational perspective, risk perspective*

1. INTRODUCTION

The field of supply chain management (SCM) is an exciting discipline. Several authors have noted the long-term and strategic orientation of SCM and its importance in a company's survival (Vieira et al., 2013; Valmohammadi, 2013). SCM involves the interplay and integration of various stakeholders of the supply chain (Cooper and Ellram, 1993; McLaren et al., 2002). Supply chain collaboration is one of the critical components of supply chain integration (Agan, 2011; Basnet and Wisner, 2012). When stakeholders in the supply chain—such as the customers, the suppliers, and the firm (whether manufacturing or service)—collaborate, they are able to make joint decisions and share benefits and costs from these decisions (Simatupang and Sridharan, 2005).

Supply chain collaboration is founded on long-term and trustworthy relationships (Mentzer et al., 2001; Chin et al., 2004). To achieve long-term buyer-supplier relationship and competitiveness, trust among the stakeholders is very important (Ganesan, 1994; Izquierdo and Cillian, 2004; Chu and Fang, 2006; Rascovic and Morec, 2013). Trust allows the supply chain partners to understand their respective responsibilities in the partnership (Potocan, 2009). Trust also enables supply chain partners to understand each other's needs and concerns, thereby reducing agency and transaction costs (Beccerra and Gupta, 1999). Evoking trust, however, is challenging given the different orientations and motivations of the supply chain players (Gullet et al., 2009). The success of supply chain collaboration also depends on sharing of information and decision-making power among the supply chain partners (Blackwell and Blackwell, 1999; Kumar, 2001).

This study seeks to determine the different dimensions of supply chain collaboration and trust and the association between these two constructs. An initial level of trust enables the supply chain parties to participate in an engagement, and an even higher level of trust provides the parties with the confidence to open up to each other about their problems and issues, thereby reducing the level of risk. This particular research focuses its analysis on the supply chain collaboration activities with suppliers and customers in two important supply chain functions: demand management and supply management. With regard to the trust construct, there is a stream of researches on trust that focus on its various dimensions (Hurley et al., 2013), its various levels (Nguyen and Liem, 2013), and its different types (Shih et al., 2013). This research will likewise explore such link between supply chain collaboration and trust, but it will also explore other perspectives of trust. In particular, it will show the relational and risk perspectives of trust. This paper seeks to enrich the literature on supply chain management by understanding the interplay of these two important concepts in buyer-supplier relationship. To the best knowledge of the researcher, no similar studies in the Philippines have been done. The research provides both academics and practitioners a glimpse of the dynamics of supply chain collaboration and trust under Philippine setting. Since the research reflects the practices of manufacturing and service firms in the country, this will also provide the literature with insights on the applicability of these SCM concepts in the service industry.

Section 1 presents the study's objectives while section 2 of the paper presents a literature review on supply chain collaboration, trust, and the relationship of these two concepts. Research gaps were identified, and the study's contribution to address these gaps was discussed. The research hypotheses are presented in section 3 while the methodology is described in section 4. Section 5 presents

the results and analysis while the remaining sections show the conclusion, limitations of the study, and areas for further study.

2. SUPPLY CHAIN COLLABORATION AND TRUST

Supply chain management involves planning and management of all supply chain activities from sourcing and procurement up to logistics, integrating both the supply and demand management functions (CSCMP, 2013). Managing the flow of goods, information, and money from one part of the supply chain to the other requires a smooth interplay between and among the stakeholders of the supply chain. Efficiency and effectiveness of coordination of supply chain activities are needed to meet the customers' requirements on time and accurately. Supply chain integration (SCI), which involves the coordination of the upstream and downstream levels of the supply chain between the company and its key suppliers and customers and their respective networks (Naslund and Hutlen, 2012), is gaining prominence as a research theme in SCM (Chatzoudes and Chatzoglou, 2011). However, several authors pointed out the limited and fragmented researches on supply chain integration, the mechanisms to achieve it, and the measures needed to assess its impact on performance (Basnet and Wisner, 2012; Ashtiani and Bosak, 2013). Researchers have also found that there is a need to achieve internal integration first prior to a successful external integration with suppliers and customers (Chatzoudes and Chatzoglou, 2011; Basnet and Wisner, 2012). Despite such difficulty, the need to understand the different forms and mechanisms of supply chain integration is important (Otchere et al., 2013). In 2011, Agan conceptualized supply chain integration to include different forms of integration: (1) operational integration (to include collaboration), (2) marketing integration, and (3) information technology integration. SCI is also based on cooperation, collaboration, information sharing, trust, and partnerships (Otchere et al., 2013).

In 2008, Fawcett et al. studied the practices and requirements for successful collaboration to include top management commitment, people and relationship management, performance management, and trust, among others. They concluded that the lack of collaboration is not because firms do not implement the above practices but because the firms are not able to manage the changes brought about by collaboration. Anbanandam et al. (2011) similarly identified the following variables to constitute a collaboration index: top management commitment, information sharing, trust, and relationship among the supply chain partners, and risk and reward sharing. The practices in both the studies of Fawcett et al. (2008) and Anbanandam et al. (2011) show the responsibilities that parties need to embrace for a partnership to work and to have an impact on performance.

If properly executed and if founded on a trusting and long-term relationship, supply chain collaboration indeed leads to better operational performance (Anbanandam et al., 2011; Hua et al., 2009) and to global competitive advantage (Jones et al., 2010; McDowell et al., 2013; Nguyen and Liem, 2013; Rascovic and Morec, 2013). Soosay et al. (2008) reported that having collaborative relationship is important in inculcating a culture of continuous innovation. They also reported that performance varies according to the level of collaboration between supply chain parties. Fawcett et al. (2008) emphasized the importance of a nurturing organizational culture to achieve high collaboration. Hadaya and Cassivi (2007), however, observed that while a strong relationship is necessary for collaboration to exist, joint decision-making activities in fact strengthens even more an existing partnership. Supply chain collaboration, however, is not developed overnight. It is a long-term relationship wherein the partners are committed to achieving a common goal (Mentzer et al., 2000; Chin et al., 2004).

To enable partners to engage in joint decision making and problem solving and to share information with each other, a trustworthy relationship needs to be established (Chin et al., 2004). According to Williamson (1981), an understanding of transaction costs is central to the study of trust in organizations. According to this theory, transaction costs are nil when there is perfect information. However, in buyer-seller relationships, perfect information is usually not available. Parties usually incur transaction costs like search and information costs, bargaining costs, and enforcement costs. Firms are therefore expected to cooperate on a long-term basis with firms where information is more available. Beccerra and Gupta (1999), however, pointed out the inherent opportunistic behavior of people to pursue their own interests, thus when trust between parties is present, problems and issues can be readily discussed since parties have more open communication. Potential conflicting issues will likewise be discussed early on, thereby leading to lower transaction costs. Partners that allow each other information access are able to review their transactions, especially possible redundancies, thus reducing the transaction costs. Mhyr and Spekman (2005) and Ryu et al. (2009) also pointed out that a manufacturer that trusts its supplier will most likely not exercise vertical control over its supplier, leading to a reduction in transaction costs.

The stakeholder theory also has a strong disciplinal influence on trust. This theory espouses that an organizational entity has important stakeholders other than the firm, its suppliers, and its customers, and these stakeholders seek to achieve diverse and sometimes conflicting goals (Donaldson and Preston, 1995). The stakeholders have power to pursue aggressive strategies, and they have legitimate and urgent stakes in the organizations that need to be seriously addressed (Co and Barro, 2009). The association of the stakeholder theory with trust is explained by Greenwood and Van Burren (2010) who noted that stakeholders in a buyer-seller relationship have different levels of power. Because of this, they (especially those without or with a lesser degree of bargaining power) need to rely on the trustworthiness of the firm to ensure that the firm is fair to all stakeholders and shall fulfill its obligations to its stakeholders. Co and Barro (2009) further pointed out that when the level of trust is high between two parties, they are more open to adopt cooperative strategies. On the other hand, when the level of trust among stakeholders is low, the firm with a higher stake to proceed with the engagement would adopt aggressive strategies in the relationship.

From the literature, the following may be considered the important implications of trust. First, trust occurs under conditions of vulnerability, uncertainty, and dependency,

with the expectation that the outcome will be better if trust is maintained rather than not (Beccerra and Gupta, 1999; Jambulingan et al., 2011). Hosmer (1995) pointed out that the parties in an engagement have their stake and responsibility in the relationship. The trusting party makes itself vulnerable to the uncertainty in the engagement because such party believes that the other party accepts its obligation to honor their agreement. The lack of trust brought about by a party's failure to honor the agreement exposes both parties to a more difficult situation than what they had before they started the engagement and may even lead to unpleasant consequences (Deutsch, 1958; Hosmer, 1995). This observation by Hosmer (1995) is shared by Saini (2010) who noted that in the context of purchasing ethics, a partner takes risk in a relationship because of confidence in the exchange partner. In their study of the buyer-seller relationships existing in retail pharmacies, Jambulingan et al. (2011) noted that parties dependent on each other have more to lose if they will not trust each other, thus it is important for both parties to be fair and to trust each other.

Second, trust is nurtured when the parties involved have trustworthy characteristics. Several characteristics to describe the trustworthiness of the trusted party have been described in the literature. Credibility and benevolence are considered important trustworthiness characteristics (Ganesan, 1994; Doney and Cannon, 1997; Laeequddin et al., 2010). Jambulingan et al. (2011), in their analysis of the pharmaceutical supply chain, emphasized the critical role of the wholesalers in the chain and also highlighted the characteristics that suppliers must exhibit (the target of trust), which include perceived credibility and benevolence.

Different trust levels may be observed depending on the nature and stage of relationship between the buyer and the supplier. Trust in competency (to include ability, skills, business judgment, and specialization) is important during the early stage of the supply chain partnership (Ha and Park, 2011), but a long-term relationship needs a higher level of trust, one that is founded on the party's goodwill, benevolence, openness, understanding, respect, and honesty (Jones et al., 2010; Ha and Park, 2011).

Lastly, trust is a multidimensional construct that includes the trustworthiness characteristics of the parties, their attitude toward uncertainty, and their propensity or willingness to take risk (Gullet et al. 2009; Laeequddin et al., 2010). The true test, however, of the existence of trust among parties is when both parties are ready to relinquish control, which will ultimately lead to a behavior involving sharing of private and even proprietary information (Doney and Cannon, 1997; Gullet et al., 2009).

While the literature showed abundance of researches on supply chain collaboration, trust, and their association, no similar study depicting the Philippine experience has been documented. This study presents the supply chain collaboration practices of selected Philippine manufacturing and service companies. It focuses on operational and organizational integration to include the collaboration between the firm and its suppliers and customers in two critical supply chain operations: (1) demand planning and (2) materials/resource planning. The study also provides the literature with additional perspectives on how to measure information sharing and trust. Research findings validate the claims of other authors about the significant association between supply chain collaboration and trust.

3. HYPOTHESIS DEVELOPMENT

The study investigated the extent to which supply chain collaboration is associated with trust. Supply chain collaboration was initially defined using two dimensions: (1) customer collaboration and (2) supplier collaboration. The respondent firms were asked about the extent of collaboration that they do with their customers and suppliers in the following areas of supply chain management: demand forecasting, materials planning, and resource planning. The extent by which they share information with their customers and suppliers was also asked. The factor analysis presents two new dimensions of supply chain collaboration: (1) joint planning and decision making and (2) information sharing.

For the trust construct, three perspectives of trust from the literature were studied. These perspectives include the following: (1) characteristics perspective, which refers to the qualities of the party being trusted and includes the trustee's reliability, dependability, competence, and honesty characteristics; (2) risk perspective, which refers to propensity and willingness of any of the parties to take risk under conditions of uncertainty; and (3) relational perspective, which refers to the long-term relationship among the supply chain parties and their familiarity with their respective organizations. The factor analysis resulted in two distinct groupings: (1) relational perspective and (2) risk perspective. The listing of the original items to describe the supply chain collaboration and trust constructs are found in Exhibits 1 and 2, respectively.

For supply chain collaboration to succeed, it should be founded on long-term and trustworthy relationships, wherein the parties rely on one another to voluntarily accept the obligations of each party in the engagement (Hosmer, 1995; Mentzer et al., 2001; Chin et al., 2004). This kind of relationship leads to better operational performance (Anbanandam et al., 2011; Hua et al., 2009) and is especially important for collaborative partnerships involving customized products (Myhr and Spekman, 2005). Edelenbos and Klijn (2007) emphasized that trust enables supply chain parties to solidify their commitment to their engagement and to reduce the uncertainty of actions of the supply chain parties, thereby reducing the transaction costs involved in the collaboration. When trust in supply chain collaboration is present, parties can likewise easily address problems and issues that may arise, thereby reducing the conflict between them (Beccerra and Gupta, 1999).

According to Kumar (2001), there is a need for supply chain partners to collaborate in different operations, which include planning, forecasting, purchasing, information systems, distribution, logistics, and product design. Joint planning activities are very important in achieving collaboration as these define the interorganizational processes between the collaborating parties (Lummus et al., 1998; Simatupang and Sridharan, 2005). Trust and transparency are important in joint decision making since it involves an exchange of information as well as sharing of resources and processes (Biehl et al., 2006; Potocan, 2009). With trust, firms are able to agree on the change in paradigm in relationships and division of work and responsibilities in

the partnership. When the partners perceived each other as trustworthy and reliable, they will honor this division of work and will most likely collaborate (Mhyr and Spekman, 2005; Potocan, 2009). It is hypothesized that:

H1a: *Joint planning and decision making, a measure of supply chain collaboration, is significantly correlated with trust (relational perspective).*

H1b: *Joint planning and decision making, a measure of supply chain collaboration, is significantly correlated with trust (risk perspective).*

In 2006, Sheu et al. noted that the presence of a good information structure facilitates collaboration. But aside from the infrastructure, trust in supply chain relationships is very important especially when parties need to share relevant information with each other (Chu and Fang, 2006; Zailani et al., 2008). The real test, however, whether supply chain parties have trust in their relationship, is when both parties are ready to share private and even proprietary information (Doney and Cannon, 1997; Gullet et al., 2009). A high level of trust signals a lower perception of risk thereby giving both parties the confidence to proceed with the transaction and invest in a longer-term relationship (McDowell et al., 2013). Supply chain parties, however, are not very open to sharing information because of fear of opportunistic behavior that might be present in any of the parties (Edelenbos and Klijn, 2007). Trust, therefore, is a very important prerequisite of information sharing. It is hypothesized that:

H2a: *Information sharing, a measure of supply chain collaboration, is significantly correlated with trust (relational perspective).*

H2b: *Information sharing, a measure of supply chain collaboration, is significantly correlated with trust (risk perspective).*

4. METHODOLOGY

The study involved two phases: phase 1, construct development; and phase 2, correlation analysis to determine the association of the constructs being investigated. Phase 1 consisted of the following: (1) literature review, (2) experts' review, and (3) construct validation. A thorough review of literature was conducted to determine the meaning and implications of supply chain collaboration. The underlying theories on trust and the different perspectives of defining trust were also looked into. Lastly, the literature on the importance of trust in supply chain collaboration was also researched. From the literature review, the operational definitions of the supply chain collaboration and trust constructs were identified and subjected to an experts review to determine the content validity. This aims to find out if the identified supply chain collaboration and trust components truly measure the said constructs. The experts were manufacturing managers belonging to the UP College of Engineering Industry and Government Linkage with Academe Program (UP IGLAP) and other colleagues from the UP College of Business Administration. The instrument was then revised, incorporating the experts' comments.

Since the study is exploratory in nature, the researcher limited the sampling population to the member firms of three industry associations: (1) the Philippine Institute for Supply Management (PISM),[1] (2) the UP IGLAP,[2] and (3) the Production Management Association of the Philippines (PROMAP).[3] These three associations have around 310 member firms that belonged to different industries in the manufacturing and service sectors. The researcher requested the endorsement of the board of directors of each association for the participation of their member firms in the survey. Each member firm of the UP IGLAP and the PROMAP was given the survey instrument through email. In the case of PISM, the researcher emailed the questionnaire to PISM, which in turn handled the dissemination of the questionnaire to its member firms. After several months of conducting the survey from 2011 to 2012, a total of 57 firms eventually participated in the study. The respondents in the study were the managers handling either the supply chain management, the demand management, or the procurement functions.

The study used the internal consistency method to measure the instrument's reliability. The Cronbach coefficient alphas of the supply chain collaboration and trust components were determined. The construct validity of the instrument was determined through common factor analysis (using principal axis factoring) since the objective of the study is to determine the supply chain collaboration and trust latent dimensions or constructs represented in the original variables (Hair et al., 2010). This process aims to determine the extent to which the survey instrument measures what it really intends to measure (Emory and Cooper, 1993). Several runs of factor analysis were conducted to finally arrive at an acceptable listing of validated supply chain collaboration and trust constructs. Only items with factor loadings greater than or equal to 0.5 were selected (Hair et al., 2010).

After the factor analysis, the validated items of supply chain collaboration and trust constructs were derived and were subjected again to reliability tests using Cronbach's alpha. Factor scores were then computed and used in the development of the supply chain collaboration and trust indices. According to Hair et al. (2010), the use of the factor scores is the best method for complete data reduction and is able to take into account the contribution of all the variables loading in a factor. These indices were then correlated to determine the association between supply chain collaboration and trust.

5. RESULTS AND DISCUSSION

5.1 Profile of Respondent Firms

A total of 57 firms participated in the study. About 56 percent came from the manufacturing sector, and the other 44 percent represents the service sector. The respondent firms represent different industries from both the manufacturing and service sectors. Majority (81 percent) of the respondent firms have employee size less than 500, and around 72 percent of them are 100 percent Filipino-owned companies (see Table 1).

Table 1 Profile of Respondent Firms

Category	Description	No.	% to total
Industry affiliation	Manufacturing (a)	32	56
	Service (b)	25	44
		57	**100%**
Employee size	Less than 500	46	81
	500-1,000	8	14
	More than 1,000	3	5
		57	**100%**
Ownership structure	100% local	41	72
	With foreign ownership	10	18
	100% foreign	6	10
		57	**100%**

[a] Manufacturing industry includes the production/manufacturing of food, leather, pharmaceuticals, soap, chemicals, steel, ice, industrial adhesives, cosmetics, medical devices and packaging paper, batteries, agricultural products, automobile, pest control products.

[b] Service industry includes the following industries: power, utility, quick service restaurant/fast food, logistics, construction services, agricultural products distribution, broadcasting.

5.2 Measures of Supply Chain Collaboration

Supply chain collaboration was initially analyzed by looking into the points of collaboration from the perspectives of the customer and the supplier. Respondent firms were asked to rate the extent of collaboration in the areas of demand forecasting, materials planning, and production planning as well as the extent by which they share information with their customers and suppliers (see Exhibit 1). Table 2 shows that collaborative decisions related to demand forecasting are done mostly in coordination with the customers (mean of 2.70) while those related to materials and production planning is coordinated with suppliers (mean of 2.19). The collaboration espoused by the sales and operations planning (SOP) process, wherein customers, suppliers, and other stakeholders are consulted for the sales and operations plans, is implemented to a limited extent. Results also show the very low adoption rates of sharing databases with customers and suppliers (mean of 1.77 and 1.26, respectively), an important determinant of trust in a partnership.

According to Ha and Park (2011), information sharing could mean frequent contacts, use of compatible computer systems, willingness to share operational data, and willingness to share strategic data. In the case of the Philippine respondent firms, results revealed the openness of the respondent firms to share tactical and operational data like production planning information (mean of 3.21) and product development road maps (mean of 3.49) but not strategic and proprietary information (that which will require also sharing of or access to databases).

After several runs of factor analysis, the supply chain collaboration items loaded into two main factors: (1) joint planning and decision making and (2) information sharing (refer to **Table 2**). Those items involving joint planning and decision making for decisions like demand forecasting and materials and production planning loaded in one factor with a Cronbach alpha of 0.851. On the other hand, items relating to information sharing, particularly on sharing databases with suppliers and with customers, loaded in another factor with a Cronbach alpha of 0.807. For social researches, Cronbach alphas that fall between 0.80 and 0.90 show high internal consistency (DeVellis, 1991; Davis, 2000).

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Table 2 Validated Supply Chain Collaboration Constructs

New Factor Name	Description	Mean	Std Dev	Item Loading	Cronbach Alpha
Joint planning and decision making	Materials and production planning is done in collaboration with suppliers.	2.19	1.894	.790	.851
	Materials and production planning is done in collaboration with customers.	1.81	1.885	.786	
	Demand forecast is done in collaboration with customers.	2.70	1.742	.627	
	Demand forecast is done in collaboration with suppliers.	1.68	1.764	.591	
	Average Mean Score	2.10			
Information sharing	The firm has shared databases with its customers.	1.77	1.909	.953	.807
	The firm has shared databases with its suppliers.	1.26	1.598	.623	
	Average Mean Score	1.52			

Notes:

1. Kaiser-Meyer-Olkin measure of sampling adequacy = 0.789 (indicates that the variables were grouped satisfactorily into a smaller set of underlying factors).
2. Cumulative percentage of variation = 75 percent (75 percent of the variation is accounted for by the two validated supply chain collaboration factors.
3. Production planning, as applied in the service industry, refers also to "resource planning."

5.3 Measures of Trust

For the trust constructs, the original items were identified by the researcher from the literature and were validated by the industry experts during the construct development phase. Originally, there were 16 items representing the three perspectives identified in the literature: (1) characteristics' perspective, (2) risk perspective, and (3) relational perspective. The initial runs of factor analyses of the 16 items revealed low measure of sampling adequacy (MSA) of the instrument. The researcher thus identified the specific items with low MSA and deleted the items. The communalities of the remaining items were also checked. Items loading on two factors were investigated and eventually deleted. Prior to deletion of any item, the researcher carefully determined whether the deletion of the said item(s) will not significantly alter the theoretical significance of the resulting trust factors.

The original number of trust components, 16, was reduced to 7 items, which in turn were tested for internal consistency or reliability, the extent to which consistent responses exist even if questions were replaced with other similar questions. Results show that the Cronbach alphas of these two trust factors, relational perspective and the risk perspective, were 0.820 and 0.756, respectively.

After the final run of the factor analyses, results show the emergence of two trust perspectives: (1) the long-term relationship of the supply chain partners and their familiarity with their respective organizations (relational perspective), and (2) the propensity and willingness to take risks under conditions of uncertainty (risk perspective) (see **Table 3**).

Table 3 Validated Trust Constructs

Factors	Description	Mean	Std. Dev.	Item Loading	Cronbach Alpha
Relational perspective *(Familiarity, transparency, and openness)*	We know well about the other customers of our suppliers.	3.72	.996	.855	0.820
	In times of rush orders, we can rely on our suppliers.	4.02	.876	.765	
	We exchange visits and have regular business meetings with our key suppliers.	3.81	1.060	.662	
	We discuss with our suppliers our needs, directions, and problems.	4.28	.796	.572	
	Average Mean Score	3.96			
Risk perspective *(propensity and willingness to take risk under conditions of uncertainty)*	We share production planning information with our suppliers for their materials planning.	3.21	1.264	.785	0.756
	We share product and materials development road maps with our key suppliers.	3.49	1.269	.759	
	We know well about the major products of our suppliers	4.05	1.007	.539	
	Average Mean Score	3.58			

Notes:

1. Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.784 (indicates that the variables were grouped satisfactorily into a smaller set of underlying factors).
2. Cumulative percentage of variation = 67 percent (67 percent of the variation is accounted for by the two validated trust constructs).

Table 3 shows the validated trust items consisting of trust definitions related to the relational and risk perspectives. For the relational perspective, the Philippine respondent firms reported relatively higher score on the item related to communication with suppliers about their problems and issues (mean of 4.28). The other items included under this perspective reflect the respondent firms' familiarity and constant communication with the suppliers and the suppliers' reliability, especially, in times of rush order. This supports the findings of Jones et al. (2010) about goodwill and competence as trustworthiness dimensions in long-term relationships reflecting the relational view of the firm. The study also supports the findings of Vieira et al. (2013) that supplier partnership is positively related to trust, especially that which involves sharing of problems with suppliers (openness). The findings also strengthen the assertions of McDowell et al. (2013) that communication between organizations and higher levels of the quality of information received brought about by openness between the parties results in a higher level of trust between these organizations. The study also supports the findings of Rascovic and Morec (2013) about the importance of softer (relational) benefits like trust, information sharing, cooperation, and relationship flexibility for long-term competitiveness.

Results further show that the respondent firms were moderately open to sharing information with their suppliers as shown by their adoption scores for sharing of production planning information (mean of 3.21) and product and materials development road maps (mean of 3.49).

5.4 Relationship between Supply Chain Collaboration and Trust

The study aimed to determine the association between supply chain collaboration and trust. Supply chain collaboration in the study was measured in terms of joint planning and decision making and information sharing. On the other hand, trust is manifested through the following dimensions: the relational and risk perspectives. It was hypothesized that joint planning and decision making are associated with trust as it would be easier for firms to come together and do collaborative planning if the parties involved relate well with each other and can communicate

with each other (Ha and Park, 2011) and would be ready at least to share data necessary for the collaborative demand and supply planning. The presence of trust in both parties motivates them to honor their division of work and responsibilities inherent in joint planning and decision making (Mhyr and Spekman, 2005; Biehl et al., 2006; Potocan, 2009).

The study also hypothesized that information sharing and trust are significantly associated. Trust is very important when parties need to share relevant and even proprietary information with each other (Doney and Cannon, 1997; Chu and Fang, 2006; Zailani et al., 2008; Gullet et al., 2009). Ha and Park (2011) found that affective trust (that which is founded on openness, benevolence, honesty, understanding, and respect) has a significant influence on collaboration in terms of information sharing and benefits/rewards sharing, while trust in competency (dealing with ability, skills, business judgment, and specialization) was found to be significantly associated with collaboration in joint decision making and benefits and rewards sharing. McDowell et al. (2013) explained that a high level of trust connotes a perception of low risk, motivating the supply chain partners to enter into a long-term relationship.

Both the supply chain collaboration (joint planning and decision making and information sharing) and trust (organizational and risk perspectives) constructs were measured using a 5-point Likert scale. The items for supply chain collaboration, however, reflected relatively lower mean scores as compared to the trust items. Table 4 shows that while the respondents reported relatively higher scores for the relational perspective and risk perspectives of trust (mean score of 3.96 and 3.58, respectively), indicating a moderately high level of trust, the findings revealed that this agreement and predisposition to collaborate did not automatically lead to a collaborative behavior in the areas of planning and information sharing (mean scores of 2.10 and 1.50, respectively).

Jones et al. (2010) observed that companies that have difficulty sharing information are not that knowledgeable about each other and could still be in a transactional level of trust (found during the initial stage of supply chain relationship). This is shared by Spens and Wisner (2009) who suggested the education of firms about collaborative planning—the need to share information, risks, rewards, and benefits. Despite the difference in the mean scores for supply chain collaboration and the trust scores, results of the correlation analyses provide interesting findings on the association of these two variables (refer to **Table 4**).

Table 4 Relationship between Supply Chain Collaboration and Trust

Hypothesis	Correlated Variables				Corr. Coeff.	Sig (2-tailed)	Remarks on Hypothesis
	Variable 1	Ave Mean Score	Variable 2	Ave Mean Score			
Hypothesis 1a	Joint planning and decision making	2.10	Relational perspective	3.96	.070	.603	Rejected
Hypothesis 1b	Joint planning and decision making	2.10	Risk perspective	3.58	.060	.655	Rejected
Hypothesis 2a	Information sharing	1.52	Relational perspective	3.96	.355**	.007	Supported
Hypothesis 2b	Information sharing	1.52	Risk perspective	3.58	.166	.216	Rejected

* Correlation is significant at 0.01 level of significance.

The hypothesis on joint planning and decision making and the two perspectives of trust (Hypotheses 1a and 1b) were not confirmed in the study. This finding could imply the following. First, supply chain collaboration anchored through supply chain information sharing could be affected by other variables like coordination culture and coordination structure present in the organization (Wang and Chen, 2014). This means that a high level of trust between parties in a supply chain engagement is not necessary for a collaborative planning and decision-making process, like a sales and operations planning (SOP), as this could be a process or a system initiated by management and needs to be followed by the various planning stakeholders. Second, other perspectives of trust, such as transactional trust (dependence, formalization, and control) (Mamad and Chahdi, 2013), contractual and competence trust (Jones et al., 2010), and institutional trust (the regional context where the buyer and sellers are located) (Vieira et al., 2013; Nguyen and Liem, 2013), could be associated with collaborative planning and decision making.

Doney and Cannon (1997) and Gullet et al. (2010) noted that the real test of the presence of trust in a company is the sharing of private and even proprietary information between the supply chain parties. Sharing of information like forecasts and operational data enables the supply chain parties to plan properly, reducing the level of uncertainty and supply chain variations (Jones et al., 2010; Wang and Chen, 2014). The hypothesis, however, that information sharing is significantly associated with the risk perspective of trust was rejected. The findings imply that the decision to share information (e.g., critical or strategic information found in shared databases) is not a function of transaction activities (e.g., previous experience of sharing less critical information—in this case, production planning information and product development road maps).

Results, however, show that supply chain collaboration, measured in terms of the extent of information sharing, is significantly correlated with the relational perspective of trust supporting Hypothesis 2a. According to Hosmer (1995), the presence of trust implies

an ethical obligation on the part of the partners to honor their agreements and not to abuse each other as well as gives a perception of a reduced risk that may be associated with the possible opportunistic behavior of any of the parties (Sheu et al., 2006; Ferrer et al., 2010). The decision to share information with a partner puts the trusting party in a very vulnerable situation and exposes the firm to a potential opportunistic behavior (Jones et al., 2010). One could only hope that the trusted party will protect the information shared for the greater good of the engagement. Trust, therefore, is necessary before a stakeholder in an agreement decides to share full information.

Certainly, supply chain collaboration, manifested in one's decision to share critical information, happens with a partner with whom you can relate and consult about the buyer-seller problems and struggles, and with whom you have a long-term relationship, supporting the claims of several authors (McDowell et al., 2013; Vieira et al., 2013). Development of high performance-capability trust would also depend on the track record of the supply chain parties in performing what they promised and on the development of equitable and honest professional relationship (Jones et al., 2010).

While the study had a different set of items to measure supply chain collaboration (joint planning and decision making and information sharing) and trust, the overall results support the findings of Wang and Chen (2014) that better information sharing supports supply chain coordination and that there is a need to develop supply chain integration activities. Trust is a critical determinant of collaboration as trust based on the skills, experience, and reputation of the parties in the engagement reduces potential conflict between them (Mamad and Chahdi, 2013). The relational perspective of trust provides relevant insights as to the value and complexity of measuring and building trust for an effective buyer-supplier relationship.

6. CONCLUSION

Trust, as the relational perspective describes it, generally includes those strategies that reflect the familiarity of the supply chain parties with their respective operations, facilities, business processes, and customers; the reliability of the suppliers; and the openness of the parties in addressing together their supply chain needs, problems, and directions. Firms with multiple stakeholders (in this case, the supply chain parties) have multiple goals and legitimate and urgent stake or interests in the business. The multiple stakeholder coordination is generally achieved through specific agreements or even through a simple voluntary acceptance on the part of the stakeholders of their respective responsibilities in the engagement (Donaldson and Preston, 1995; Hosmer, 1995). Stakeholders will most likely adopt cooperative/collaborative strategies when the level of trust is high (Co and Barro, 2009). Results of the study validated that a stakeholder's voluntary decision to share information with the other parties in the supply chain depends on trust, which in turn is manifested on the stability of the relationship and the organizational openness that stakeholders share.

When trust is present in the organization, the parties have more confidence in each other and therefore would be more willing to share information with each other (Edelonbos and Klijn, 2007; Doney and Cannon, 1997; Chu and Fang, 2006; Zailani et al., 2008; Gullet et al., 2009). Trust encourages cooperation, discourages opportunistic behavior among supply chain parties, and minimizes potential conflicting issues, thereby reducing transaction costs (Beccerra and Gupta, 1999). Partners that allow each other access to information are also able to review their transactions, especially possible redundancies, leading to lower transaction costs (Mhyr and Spekman, 2005; Ryu et al., 2009).

The study also presents important insights into the reality of trust. The strategies described under the relational perspective highlight the reality that trust is not a one-time-only situation and is not developed overnight. Trust is built through time and is founded on a long-term and stable relationship. Trust is developed as a result of the frequent interactions among the parties characterized by a previous trusting relationship. Trust becomes an important precondition of any interorganizational cooperation such as supply chain collaboration, but trust is fragile and can easily develop into mistrust, thus the need to manage and nurture trust (Edelenbos and Klijn, 2007).

7. LIMITATIONS AND AREAS FOR FURTHER STUDY

Given the perceived confidentiality and sensitivity of the topic, a major limitation of the study is getting respondents to respond to issues related to trust, relationships, and collaboration. Despite efforts to get the cooperation of different industry associations for the participation of their member firms, the study still experienced a low response rate, particularly on issues related to sharing of databases. This same problem on data gathering was experienced by Kottila and Ronni (2008) in their study of two Finnish organic food chains. The limited number of respondent firms vis-à-vis the number of variables to investigate made it difficult to pursue a more rigorous statistical analysis, like structural equation modeling, to assess the impact of trust on supply chain collaboration and vice versa. Research findings cannot be generalized given the limited sample size.

Simatupang and Sridharan (2005) attempted to measure supply chain collaboration using the following measures: information sharing, incentive alignment, and joint decision or synchronization practices. This study also measured collaboration in terms of information sharing and joint planning and decision making. Future studies should also consider the incentive alignment (Simatupang and Sridharan, 2005) and risk- and reward-sharing dimensions and joint performance evaluation dimensions of collaboration (Olorunniwo and Li, 2010).

The study also measured information sharing very strictly as referring to sharing of databases between the supply chain partners. Wiengarten et al. (2010) presented different levels of information sharing as involving strategic, operation, and tactical information exchange. Future researches should describe information sharing in different levels depending on the criticality of information being shared. The scope and coverage of information sharing should not just be limited to sharing of databases since firms that are not yet in the SCM paradigm may be sharing

information in major functions such as demand forecasts, production plans, materials plans, production schedules, and logistics (Liao et al., 2011). Another set of measures may be developed to measure the sharing of critical information like product development maps and mutual access to the partners' databases, cost data, and web-enabled inventory data, among others (Olorunniwo and Li, 2010).

The study looked into the association between trust and supply chain collaboration. Future studies should identify other variables that could have an effect on trust, collaboration, and information sharing such as maturity level of the partnership (Biehl et al., 2006), environmental uncertainty and intra-organizational variables (Li and Lin, 2006), the moderating effect of trust on collaboration, and the effect of collaboration on performance. Other researches should also look into the influence of the agency theory and the resource-based view of the firm on supply chain collaboration and trust.

While the respondents were able to respond to all questions that appeared to be slanted toward manufacturing terms (e.g., production planning), future studies should use nomenclature easily understood and applicable to both manufacturing and service sectors.

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NOTES

1. The Philippine Institute for Supply Management is a nonstock, nonprofit organization that was established primarily to give supply management professionals a venue or forum wherein they could share their business practices and solutions to the problems they encounter related to supply management (purchasing, logistics, demand and replenishment, and customer service). PISM has around 180 member firms belonging to different manufacturing and service industries (cosmetics/beauty care, pharmaceutical, food and beverage, garments, textiles and leather products, agriculture, logistics, automotive, transportation, chemicals, gases, oil-based, construction, energy, mining, and utility, among others).

2. The UP College of Engineering Industry and Government Linkage with Academe Program is a linkage program established by the College of Engineering of the University of the Philippines Diliman (UPD). It was originally called the UP Manufacturing Linkage Program and was founded in 1985. The UP IGLAP has partner organizations from the manufacturing and service industries with different firm sizes and currently has a membership size of about 50. Its activities include summer internships for UPD engineering students. It also supports researchers on quality management, supply chain management, and productivity management.

3. The Production Management Association of the Philippines was established in 1977 as a nonprofit, nonstock organization. It was developed to promote industrial development in the country and is guided by these visions of being a leading entity in the professional practice of operations management in the Philippines as well as being a credible awarding body for the operations management practitioners. The association has about 80 member firms in 2012 representing different Philippine manufacturing subsectors with different firm sizes. The cross section of PROMAP includes companies from the pharmaceuticals, electronics, food, BPO units, hardware, medical supplies, and education.

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Exhibit 1
Original Supply Chain Collaboration Constructs

Instruction: Kindly indicate the extent by which you are implementing the following strategies using this this 5-point Likert scale (1 – Very limited extent, 5 – Very large extent).

Original SCC Construct		SCC Components
Customer Collaboration	1.	Demand forecast is done in collaboration with customers.
	2.	Materials and production planning is done in collaboration with customers.
	3.	The firm has shared databases with its customers.
Supplier Collaboration	4.	Demand forecast is done in collaboration with suppliers.
	5.	Materials and production planning is done in collaboration with suppliers.
	6.	The firm has shared databases with its suppliers.

Exhibit 2
Original Trust Constructs

Instruction: In connection with your relationship with your major supplier, kindly indicate your agreement with the following statements using the 5-point Likert scale (1 – Strongly disagree, 5 – Strongly agree)

Trust Perspectives		Trust Components
Characteristics perspective	1.	Our suppliers always conform to our required technical and quality specifications.
	2.	Our suppliers always conform to our delivery requirements.
	3.	In times of rush orders, we can rely on our suppliers.
	4.	In times of a tight budget, we can rely on our suppliers.
	5.	Our company's suppliers always try to inform us if problems occur.
Risk Perspective	6.	We share production planning information with our suppliers for their materials planning.
	7.	We share product and materials development road maps with our key suppliers.
	8.	We employ limited quality inspection of our suppliers' deliveries.
	9.	We have limited number of suppliers.
	10.	We have a long-term relationship with our suppliers.
Relational perspective	11.	We know well about the major products of our suppliers.
	12.	We know well about the other customers of our suppliers.
	13.	We are familiar with the operations/systems of our suppliers.
	14.	We discuss with our suppliers our needs, directions, and problems.
	15.	We maintain the confidentiality of competitive information provided by suppliers.
	16.	We exchange visits and have regular business meetings with our key suppliers.