

# INFORMATION SHARING, BUYER-SUPPLIER RELATIONSHIPS, AND FIRM PERFORMANCE: A MULTI-REGION ANALYSIS

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## ABSTRACT

**Purpose** - This article examines the effects of information sharing capability on buyer-supplier relationships and firm performance. We propose that information sharing capability, the integration of a firm's information/decision systems and business processes with those of supply chain partners, is an antecedent of collaborative buyer-supplier relationships, defined in terms of supply chain and relationship architecture. We further propose that these relationships positively impact a firm's market and financial performance.

**Design/Methodology/Approach** - This research uses multiple linear regression to analyze a set of survey data from the U.S., Europe and New Zealand.

**Findings** - Results demonstrate positive relationships between information sharing capability and buyer-supplier relationships, and between relationships and performance.

**Research limitations/Implications** - Information sharing capability and buyer-supplier relationships are complex, multi dimensional constructs. While this research highlights their role in driving performance, further study is required to more fully capture their impact and to understand the implications for situational factors such as industry sector and transaction type.

**Practical Implications** - Results from the study provide academics and policymakers with insights into key information sharing constructs related to the development of buyer-supplier relationships. These provide guidance in developing the infrastructure to support such relationships.

**Originality/Value** - This study adds to the extant literature by examining the dimensions of information sharing related to buyer-supplier relationships and performance.

**Keywords** - Information sharing, buyer-supplier relationship, firm performance.

**Article Type** - Research paper.

## **INTRODUCTION**

During the past decade, the business community has recognized the need to manage the supply chain as part of broader business strategies, and in particular to build and exploit collaborative relationships with supply chain partners. Despite recognition of the role of inter-firm relationships in creating sustainable value, many firms have failed to realize the anticipated benefits of such relationships (Muckstadt et al., 2001). One reason for this is the failure to leverage information flows within the supply chain, whether due to an inability or unwillingness to do so, or a lack of knowledge about how to do so. In markets with rapidly shrinking product life cycles, firms must continuously find new ways to design and deliver high-quality products and services in a timely manner. Inadequate or insufficient information sharing limits a firm's ability to leverage otherwise supportive relationships to accomplish this. Moreover, rapid advances in technology and global information infrastructure mean that firms and their supply chain partners must possess appropriate, competitive inter-organizational information systems if they are to maintain the ability to respond quickly and effectively to changing customer needs and expectations.

Several propositions exist regarding the antecedents of successful buyer–supplier relationships, and in particular the role of information technology. However, fundamental issues of what information sharing means, and what constitutes the necessary components of productive information sharing, remain unexplored (Wu and Choi, 2005). This research examines the multidimensionality of information sharing and how this impacts buyer-supplier relationships. It also explores how linkages between information sharing and buyer-supplier relationships serve as a driver of firm performance. In doing so, the research provides a foundation for understanding

what a firm must do with regard to development of information sharing capability in order to facilitate value creation efforts.

## **CONCEPTUAL FRAMEWORK AND HYPOTHESES**

The Global Supply Chain Forum<sup>1</sup> defines supply chain management as the integration of key business processes, from original supplier to end user, to provide products, services and information. To accomplish this, firms may engage in relationships with supply chain partners to leverage the core competencies of individual partners and better manage uncertainties in exchange processes (Handfield and Bechtel, 2002). In a supply chain, relationships represent not only how a firm interfaces with a particular partner, but how it connects firms throughout the supply chain. We define the buyer-supplier relationship in terms of these two distinct but interdependent factors, referred to as the relationship architecture and supply chain architecture respectively. While the former has received considerable attention both in the supply chain and strategy literature (e.g. Kannan and Tan, 2006), less attention has been paid to the latter.

What binds firms and can drive the effectiveness of relationships is information sharing (e.g., Martin and Grbac, 2003; Narasimhan and Nair, 2005; Kim et al., 2006). Information sharing offers supply chain members three major advantages: information is distributed throughout the supply chain, information senders and receivers become closer, and supply chain members can act on new information in a timely manner (Zhou and Benton, 2007; Patnayakuni et al., 2006). Information sharing however requires supply chain members to integrate at various levels. We define information sharing within a supply chain as the integration of information systems, decision systems, and business processes used to conduct information searches, manage business operations, monitor business details and perform other business activities. As illustrated

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<sup>1</sup> <http://fisher.osu.edu/centers/scm/about-the-forum/mission>, February 22, 2008

in Figure 1, we propose that information sharing positively and directly affects the buyer-supplier relationship, which itself directly and positively affects firm performance.

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Insert Figure 1

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Understanding linkages within a buyer–supplier relationship, its antecedents (information sharing) and its consequences (firm performance), is critical to managers wishing to manage their organization’s information sharing capabilities to promote productive relationships with suppliers. Within a supply chain, the value of information sharing comes largely from contributing to better relationships and from facilitating improved coordination and responsiveness. Information sharing improves relationships via the integration of partners’ information systems, decision systems and business processes and thus prompts superior performance (Truman, 2000).

### **Information Sharing Capability Antecedents to Buyer-Supplier Relationship**

Information sharing in a supply chain context refers to the extent to which crucial and/or proprietary information are available to members of the supply chain. Shared information can be tactical (e.g., purchasing, operations scheduling, logistics) or strategic (e.g., long-term corporate objectives, marketing and customer information). Prior research on the importance of formal and informal information sharing between trading partners has shown that effective information sharing enhances visibility and reduces uncertainty (Brennan and Turnbull, 1999; Handfield and Bechtel, 2002). It allows firms to access data across their supply chains, allowing them to collaborate in activities such as sales, production, and logistics. The extent to which information is shared can create opportunities for firms to work collaboratively to remove supply chain inefficiencies, and thus has a significant direct impact on the relationship between buyer and the

supplier. The ability to access important information across the supply chain can also provide other opportunities. For example, when additional supply chain information becomes available, firms can take advantage of this increased visibility to modify existing actions or plan future operations.

As depicted in Figure 1, information sharing can be measured by three components: information system integration, decision system integration, and business process integration. Information system integration enhances the exchange of knowledge with supply chain members and increases the ability to serve downstream customers efficiently and effectively. This information includes changes in market demand/customer preferences, and helps coordinate transaction-related activities. Five specific dimensions of information sharing have been identified: timeliness, accuracy, adequacy, completeness, and information credibility (Mohr and Sohi, 1995). Sharing can be facilitated by the use of integrated information systems that enable firms to obtain better, more timely information, and thereby maintain close, mutually beneficial relationships (Lewis and Talalayevsky, 1997). Having such systems also sends a signal to supply chain partners about a firm's willingness and commitment to working together towards common goals, a key element of effective relationships. Information system integration thus provides the 'glue' that not only binds individual pairs of firms, but firms across the supply chain. We posit

H<sub>1</sub>: Information system integration is positively related to the buyer-supplier relationship in terms of (a) supply chain architecture, and (b) relationship architecture.

Decision system integration provides visibility and reduces uncertainty along the supply chain (Gao et al., 2005). Suppliers need to understand buyers' needs and their decision-making processes to effectively respond to changes in the marketplace. For example, a retailer's sharing of point-of-sale data with manufacturers and other partners, or using collaborative planning,

forecasting and replenishment (CPFR) systems, provides a context within which upstream partners can interpret market behavior. This allows firms to reduce differences in firm derived demand forecasts, inventory levels, and costs associated with the ‘bullwhip effect’. The result is to improve responsiveness and supply chain performance, which can in turn positively influence the buyer-supplier relationship (Chopra and Meindl, 2001). Prior research suggests that not only does a supplier’s understanding of a buyer’s decision-making processes affect the success of buyer–supplier relationships (Brennan and Turnbull, 1999; Da Silva et al., 2002), so does shared decision-related information, particularly when underlying demand is significantly correlated over time or highly variable, or when replenishment lead times are long (Lee and Whang, 2000).

We posit

H<sub>2</sub>: Decision system integration is positively related to the buyer-supplier relationship in terms of (a) supply chain architecture, and (b) relationship architecture.

Among the motivations for business process integration are the potential benefits associated with enhanced business data processing. For example, information technology that facilitates data processing and transfer among supply chain members ranges from low technology applications such as telephones and fax machines, to sophisticated technologies such as the Web. Among these technologies, electronic data interchange (EDI) is a key tool because of its ability to transmit large amounts of data more rapidly and accurately than traditional paper-based methods. Its open standards have motivated some firms to move their EDI systems to the internet and to develop internet protocol-based EDI systems. Several studies have shown that business process integration systems like EDI can facilitate supply chain coordination and promote relationship building (e.g., Hill and Scudder, 2002; Kim, et al., 2006). We posit

H<sub>3</sub>: Business process integration is positively related to the buyer-supplier relationship in terms of (a) supply chain architecture, and (b) relationship architecture.

## **Consequences of Buyer-Supplier Relationships**

The supply management literature acknowledges that sophisticated purchasing managers have, where appropriate, exchanged adversarial, transaction-based buyer–supplier relationships with long-term, mutually beneficial relationships. The relational capital that results from relationships comes in the form of a firm’s ability to engage buyers, suppliers and other partners in mutually beneficial value exchanges. Indeed Hunt (2000) considered relationships to be a resource and therefore part of a firm’s capital. Martin and Grbac (2003) reported that relational capital positively impacts profitability and customer loyalty from an industrial marketing perspective.

Firms that value relationships with suppliers and work proactively with them to respond to changes in the marketplace, can provide better service to their own customers and perform at higher levels than those that do not. Buyer-supplier relationships can also play a crucial role in reducing uncertainties in the business exchange process (Patterson et al., 1999). This allows firms to reduce their supplier base, improve demand forecasts and delivery performance, and achieve superior performance. Technologically advanced suppliers are also more likely to participate in early supplier involvement if good relationships exist with their customers. This in turn facilitates improvements in quality, and other measures of performance (Aviv, 2001; Skarmeas et al., 2002). The literature on buyer-supplier relationships provides extensive evidence of the positive effect of relationships on performance (e.g., Duffy and Fearne, 2004; Johnston et al., 2004; Kannan and Tan, 2006).

While the evidence is largely consistent in suggesting that relationships positively impact performance, ambiguity exists regarding whether the impact is direct or indirect. Defining

relationships in terms of relationship and supply chain architecture enables us to address some of this ambiguity. We therefore posit

H<sub>4</sub>: Supply chain architecture is positively related to (a) market performance, and (b) financial performance.

H<sub>5</sub>: Relationship architecture is positively related to (a) market performance, and (b) financial performance.

## **RESEARCH METHODOLOGY**

### **Survey Data**

A survey instrument was used to collect data. Survey items were based on the literature and discussions with industry professionals. Multiple items were used to represent the six constructs of interest (Table 1). Data were collected in three regions, the U.S., Europe, and New Zealand. Regional culture has been shown in past studies to affect supply chain practices such as buyer behavior (Money et al., 1998), supplier selection (Park and Krishnan, 2001), and supplier management in international joint ventures (Zhang and Goffin, 2001). The information systems literature also offers evidence of the effects of culture on information systems practice as it relates to the supply chain, such as the effect of inter-firm cooperation using EDI (Harrison and Cheng, 1990; Chatfield and Yetton, 2000). Much of the evidence on cultural effects is based on comparisons of Western and Eastern business practices. Less clear is the influence of cultural difference when dealing with firms that, while geographically separated, share similar cultural characteristics. The U.S, Europe and New Zealand, are not only considered to be Western in their business orientation, their cultural orientations are similar. Comparing responses from firms in these locations makes it possible to evaluate whether study conclusions can be generalized in a 'western' context.



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Insert Table 1

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The sampling frame for the U.S. and Europe was the membership lists of the Institute for Supply Management (ISM) and Association for Operations Management (APICS). The sampling frame for New Zealand was the KOMPASS commercial database<sup>2</sup>. A third party firm was used to administer parts of the survey and to pre-screen for individuals with expertise pertinent to the study. Using standard survey procedures (Dillman, 1978) a total of 6,000 respondents were contacted, yielding 625 returned surveys, a response rate of 10.5%. Twenty-nine surveys were discarded due to large numbers of missing responses. To test for non-response bias, a series of t-tests were carried out to compare early with late respondents on a random set of the constructs and firm characteristics (Armstrong and Overton, 1977). Results suggested an absence of non-response bias. Table 2 reports the respondent profile.

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Insert Table 2

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Factor scores for the measured variables in each construct were used to test the hypotheses (Table 3). Values of Cronbach's  $\alpha$  in excess of 0.60 suggest that the measurement scales are sufficiently reliable (Cronbach, 1951). Dummy variables were used to control for regional effects in the multiple linear regression analysis. Since the sample from the U.S. was the largest, it was chosen as the base region. The estimated coefficients attributable to the U.S. main effect can thus be interpreted as residuals from the regression model. Two dummy variables were

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<sup>2</sup> The authors wish to thank Dr. Chuda Basnet and Dr. Jim Corner from the University of Waikato for providing the New Zealand survey data.

added to the multiple linear regression models to control for the effects of the macro-economic environment in Europe and New Zealand.

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Insert Table 3

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## RESULTS

Regression coefficients for the control variables (Table 4) were statistically insignificant for Models 1 and 4, suggesting that in this study, region affects neither the impact of information sharing capability on supply chain architecture (Model 1) nor the impact of buyer-supplier relationship on financial performance (Model 4). Although the magnitude of the negative regression coefficient ( $\beta = -.013$ ) for the Europe control variable in Model 2 was small, it was statistically significant. It can be inferred that the effect of information sharing capability on relationship architecture is weaker for European firms than for U.S. firms. Similarly, the statistically significant negative coefficient ( $\beta = -.089$ ) for the Europe control variable in Model 3 suggests that the effect of buyer-supplier relationship on a firm's market-based performance is weaker for European firms than for U.S. firms. Since the New Zealand sample was not statistically different from the baseline U.S. sample, it can be inferred that the effect of the independent variables on the dependent variables is similar in the two regions.

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Insert Table 4

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Regression model 1 was statistically significant ( $p < 0.001$ ) and the data explained 48.8% of model variance. This provides support for hypotheses  $H_{1a}$  and  $H_{2a}$  that information system integration ( $\beta = .618$ ) and decision system integration ( $\beta = .116$ ) respectively are positively

related to supply chain architecture ( $\alpha = 0.01$ ). Additionally, hypothesis H<sub>3a</sub>, that business process integration is positively related to supply chain architecture, is supported ( $\beta = .069$ ,  $\alpha = 0.05$ ). Model 2 was again statistically significant ( $p < 0.001$ ), the data explaining 54.4% of model variance. Hypotheses H<sub>2b</sub> and H<sub>2c</sub>, that decision system integration ( $\beta = .663$ ) and business process integration ( $\beta = .092$ ) are related to relationship architecture, were supported ( $\alpha = 0.01$ ) as was hypothesis H<sub>2a</sub> regarding information system integration ( $\beta = .055$ ,  $\alpha = 0.10$ ).

Model 3 was statistically significant ( $p < 0.001$ ) and provides support for hypothesis H<sub>5a</sub>, that relationship architecture is positively related to market performance ( $\beta = .269$ ,  $\alpha = 0.01$ ). However, it does not provide support for hypothesis H<sub>4a</sub> that supply chain architecture is positively related to market performance. The significance of Model 4 ( $p < 0.001$ ) provides support for hypotheses H<sub>4b</sub> and H<sub>5b</sub>, that supply chain architecture ( $\beta = .097$ ,  $\alpha = 0.10$ ) and relationship architecture ( $\beta = .130$ ,  $\alpha = 0.05$ ) respectively, positively affect financial performance. It should be noted that while both models 3 and 4 were significant, the variance explained in each case was low. Given that the models attempt to explain performance only in terms of buyer-supplier relationships yet there are numerous drivers of performance, this is not unexpected (Hsu and Boggs, 2003).

## **MANAGERIAL IMPLICATIONS**

The results provide empirical support for the central thesis of the study, that buyer-supplier relationships mediate the impact of information sharing capability on firm performance. Moreover, they illustrate that the relationships between information sharing capability, buyer-supplier relationships, and performance, apply across business environments that can be loosely characterized as western in culture. Collaborative buyer-supplier relationships represent one medium through which information sharing within the supply chain can be used to improve the

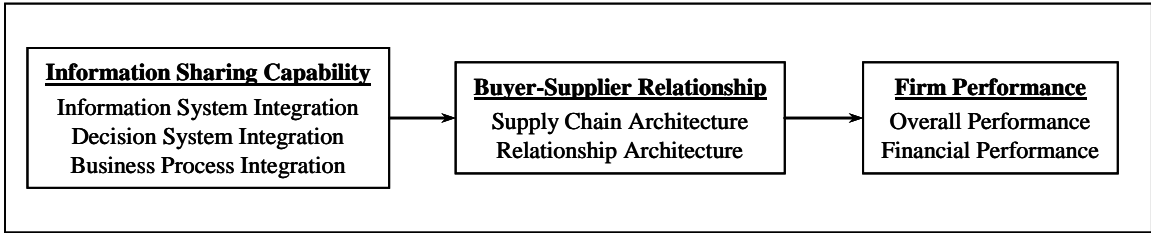
performance of the buying firm. While this study does not specifically explore the sources of performance improvement, the inference is that alignment on the dimensions of information sharing improves the responsiveness of firms, allows them to reduce and more effectively manage uncertainty, and thereby focus more closely on sources of value. The bullwhip effect for example is largely the result of information distortions and time lags. Enhanced information sharing can reduce or eliminate these effects, thereby enabling reductions in inventory and improvements in service.

The results also highlight the need to understand the multi-dimensionality of the relationship construct. While the term 'supply chain management' is widely used, the reality is that managing boundary spanning linkages is fraught with challenges that increase with distance from the focal firm (Jayaram et al., 2004). The result is that firms are more likely to manage relationships with individual partners, and that they are not managing their supply chain per se, but individual supply processes. As the results suggest, not only are there differences in the relationships between individual dimensions of information sharing capability and buyer-supplier relationships, there are differences in the impact of dimensions of buyer-supplier relationships on firm performance. In other words, there exist distinct firm-firm and firm-supply chain dimensions to the relationship construct. This suggests that firms should pay close attention not only to individual inter-firm relationships, but to how they can engage firms more broadly within the supply chain.

A third contribution of the results is that they provide fresh insight into the multiple dimensions of information sharing. Supply chain managers must critically examine not only the information system dimension of information sharing within the firm, but also the decision system and business process dimensions both within and outside the firm. Before adopting

specific technologies to facilitate inter-firm communication, firms should understand that data flows alone are insufficient to fully leverage bi-directional information exchange and relationship synergy. The various information technologies available merely represent available tools. It is incumbent on firms to understand how they wish to leverage information sharing capability and what their objectives are in doing so prior to making investments in information technology that may impact future collaborative efforts.

The results presented here represent a starting point in understanding the complexity of the relationships between information sharing capability, buyer-supplier relationships, and firm performance. Further study is needed to examine issues such as firm motives in developing relationships and the implications for technology adoption and use, how specifically information capability/relationships can create value and drive out waste, and what factors facilitate and impede the use of technology as a driver of value creation. While information is widely seen as a key element in managing supply chains and inter-firm relationships, understanding of what this means and how it can be leveraged remains incomplete.



**Figure 1: Conceptual Framework**

**Table 1: Literature Support for Proposed Constructs**

Constructs	Indicators	Sample Literature Support
<b>Information System Integration</b>	<p>How important are the following issues in your firm's supply chain management efforts? (5 = very important, 1 = not important)</p> <ol style="list-style-type: none"> <li>1. Use of informal information sharing with suppliers and customers</li> <li>2. Use of formal information sharing agreements with suppliers and customers</li> <li>3. Communicating your firm's future strategic needs to suppliers</li> <li>4. Communicating customers' future strategic needs throughout the entire supply chain</li> <li>5. Creating a compatible information system with your suppliers and customers</li> <li>6. Contacting your end users to get feedback on performance and customer service</li> </ol>	Savitskie (2007), Kärkkäinen et al., (2007), Auramo et al., (2005), Iyer et al., (2004), Shore and Venkatachalam (2003)
<b>Decision System Integration</b>	<p>How important are the following issues in your firm's supply chain management efforts? (5 = very important, 1 = not important)</p> <ol style="list-style-type: none"> <li>1. Willingness to share sensitive information</li> <li>2. Communication skills/systems (phone, fax, email, internet)</li> <li>3. Honest and frequent communications</li> <li>4. Sharing of confidential information</li> <li>5. Determination of key factors for improving customer satisfaction</li> <li>6. Employing routine follow-up procedures for customer inquiries or complaints</li> </ol>	Koh et al., (2006), Fawcett et al., (2006), Towill (2005), Fugate et al., (2006).
<b>Business Process Integration</b>	<p>How important are the following issues in your firm's supply chain management efforts? (5 = very important, 1 = not important)</p> <ol style="list-style-type: none"> <li>1. Use of Electronic Data Interchange (EDI)</li> <li>2. Supplier's order entry and invoicing system, including EDI</li> <li>3. Use of Electronic Data Interchange (EDI) communications</li> </ol>	Karkkainen et al., (2004), Sanders (2007), Kent and Mentzer (2003).
<b>Supply Chain Architecture</b>	<p>How important are the following issues in your firm's supply chain management efforts? (5 = very important, 1 = not important)</p> <ol style="list-style-type: none"> <li>1. Improving the integration of activities across your supply chain</li> <li>2. Searching for new ways to integrate SCM activities</li> <li>3. Establishing more frequent contact with supply chain members</li> <li>4. Creating a greater level of trust among your firm's SC members</li> <li>5. Identifying additional SC where your firm can establish a presence</li> <li>6. Involving SC members in your product/service/marketing plans</li> </ol>	Lau and Lee (2000), Lowson (2003), Cheng and Grimm (2006), Kahn et al., (2006).
<b>Relationship Architecture</b>	<p>How important are the following issues in your firm's supply chain management efforts? (5 = very important, 1 = not important)</p> <ol style="list-style-type: none"> <li>1. The flexibility to respond to unexpected demand changes</li> <li>2. Cultural match between the companies</li> <li>3. Past and current relationship with supplier</li> <li>4. Being flexible to meet your customers' changing needs</li> <li>5. Employing a customer satisfaction measurement system</li> </ol>	Kannan and Tan (2006), Corsten, and Felde (2005), Svensson (2004), Golicic and Mentzer (2006)
<b>Market Performance</b>	<p>Please indicate the level of your firm's performance compared to your major industrial competitors in terms of: (5 = high, 1 = low)</p> <ol style="list-style-type: none"> <li>1. Overall product quality</li> <li>2. Overall competitive position</li> <li>3. Overall customer service levels</li> </ol>	Kannan and Tan, 2006, Narasimhan and Nair, 2005
<b>Financial Performance</b>	<p>Please indicate the level of your firm's performance compared to your major industrial competitors in terms of: (5 = high, 1 = low)</p> <ol style="list-style-type: none"> <li>1. Market share</li> <li>2. Return on assets</li> <li>3. Average selling price (high performance means higher price)</li> </ol>	Kannan and Tan, 2006, Narasimhan and Nair, 2005

**Table 2: Respondent Profile**

<b>Demographic Information</b>	<b><u>USA</u></b>		<b><u>Europe</u></b>		<b><u>New Zealand</u></b>	
	Number	Percent	Number	Percent	Number	Percent
<b><u>Sample Size (number)</u></b>	411	100	116	100	69	100
<b><u>Industry Type</u></b>						
Miner/Raw Material Extractor	0	0.0	0	0.0	0	0.0
Raw Material Manufacturer	15	3.6	4	3.4	5	7.2
Component Manufacturer	57	13.9	18	15.5	7	10.1
Final Product Manufacturer	178	43.3	49	42.2	37	53.6
Wholesaler	41	10.0	3	2.6	10	14.5
Retailer	16	3.9	1	0.9	0	0.0
Services (other than Wholesale/Retailer)	90	21.9	39	33.6	9	13.0
Others	8	1.9	2	1.7	0	0.0
Missing Response	6	1.5	0	0.0	1	1.4
<b><u>Firm Size – Number of Employees</u></b>						
1 – 50	26	6.3	8	6.9	6	8.7
51 – 200	84	20.4	13	11.2	34	49.3
201 – 500	82	20.0	21	18.1	14	20.3
501 – 1,000	39	9.5	14	12.1	7	10.1
1,001 and above	147	35.8	50	43.1	3	4.3
Missing Response	33	8.0	10	8.6	5	7.2
<b><u>Annual Gross Sales in US\$</u></b>						
\$1 – \$1,000,000	8	1.9	10	8.6	3	4.3
\$1,000,001 – \$5,000,000	17	4.1	4	3.4	1	1.4
\$5,000,001 – \$10,000,000	13	3.2	4	3.4	4	5.8
\$10,000,001 – \$50,000,000	81	19.7	11	9.5	25	36.2
50,000,001 and above	216	52.6	50	43.1	14	20.3
Missing Response	76	18.5	37	31.9	22	31.9



**Table 3: Constructs, Variables, Factor Analysis and Internal Consistency**

Constructs/Measured Variables	Factor Loading	% of Variance	Internal Consistency
<b><u>Information System Integration</u></b>			
1. Use of informal information sharing with suppliers and customers	.659	45.588%	$\alpha = 0.758$
2. Use of formal information sharing agreements with suppliers and customers	.627		
3. Communicating your firm's future strategic needs to your suppliers	.670		
4. Communicating customers' future strategic needs throughout the supply chain	.723		
5. Creating a compatible information system with your suppliers and customers	.707		
6. Contacting end users to get feedback on performance and customer service	.660		
<b><u>Decision System Integration</u></b>			
1. Willingness to share sensitive information	.639	47.933%	$\alpha = 0.805$
2. Communication skills/systems (phone, fax, email, internet)	.606		
3. Honest and frequent communications	.724		
4. Sharing of confidential information	.681		
5. Determination of key factors for improving customer satisfaction	.763		
6. Employing routine follow-up procedures for customer inquiries or complaints	.729		
<b><u>Business Process Integration</u></b>			
1. Use of Electronic Data Interchange (EDI)	.868	69.796%	$\alpha = 0.782$
2. Supplier's order entry and invoicing system, including EDI	.822		
3. Use of Electronic Data Interchange (EDI) communications	.815		
<b><u>Supply Chain Architecture</u></b>			
1. Improving the integration of activities across your supply chain	.717	48.053%	$\alpha = 0.769$
2. Searching for new ways to integrate supply chain management activities	.796		
3. Establishing more frequent contact with members of your supply chain	.757		
4. Creating a greater level of trust among your firm's supply chain members	.678		
5. Identifying additional supply chains where your firm can establish a presence	.610		
6. Involving supply chain members in your product/service/marketing plans	.575		
<b><u>Relationship Architecture</u></b>			
1. The flexibility to respond to unexpected demand changes	.662	41.974%	$\alpha = 0.645$
2. Cultural match between the companies	.594		
3. Past and current relationship with supplier	.581		
4. Being flexible to meet your customers' changing needs	.672		
5. Employing a customer satisfaction measurement system	.720		
<b><u>Market Performance</u></b>			
1. Overall product quality	.794	64.299%	$\alpha = 0.720$
2. Overall competitive position	.805		
3. Overall customer service levels	.805		
<b><u>Financial Performance</u></b>			
1. Market share	.774	55.988%	$\alpha = 0.604$
2. Return on assets	.802		
3. Average selling price (high performance means higher average price)	.661		

**Table 4: Hypotheses Testing Results**

Dependent Variables	Buyer-Supplier Relationship		Firm Performance		
	Model 1 (a) Supply Chain Architecture	Model 2 (b) Relationship Architecture	Model 3 (a) Market	Model 4 (b) Financial	
<b>Region Controls</b>					
Europe	-.001	-.013 †	-.089 ‡	-.002	
New Zealand	-.010	-.044	.009	-.016	
<b>Information Sharing Capability</b>					
Information System Integration	H <sub>1</sub>	.618 ‡	.055 *		
Decision System Integration	H <sub>2</sub>	.116 ‡	.663 ‡		
Business Process Integration	H <sub>3</sub>	.069 †	.092 ‡		
<b>Buyer-Supplier Relationship</b>					
Supply Chain Architecture	H <sub>4</sub>		-.023	.097 *	
Relationship Architecture	H <sub>5</sub>		.269 ‡	.130 †	
<b>R<sup>2</sup></b>		48.8%	54.4%	18.4%	8.1%
<b>Adjusted R<sup>2</sup></b>		48.4%	54.1%	17.4%	7.0%
<b>F-Value</b>		117.842	147.911	19.833	7.728
<b>p-value</b>		< .001	< .001	< .001	< .001

- \* significant at  $\alpha = 0.10$ ;
- † significant at  $\alpha = 0.05$ ;
- ‡ significant at  $\alpha = 0.01$

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