

5-2-2012

# INTER-FIRM COOPERATION AND IOS DEPLOYMENTS IN BUYER-SUPPLIER RELATIONSHIPS: A RELATIONAL VIEW

Ying-Kuang Lu  
*TransWord University*

Eric Wang  
*National Central University*

Follow this and additional works at: <http://aisel.aisnet.org/ecis2012>

---

## Recommended Citation

Lu, Ying-Kuang and Wang, Eric, "INTER-FIRM COOPERATION AND IOS DEPLOYMENTS IN BUYER-SUPPLIER RELATIONSHIPS: A RELATIONAL VIEW" (2012). *ECIS 2012 Proceedings*. 45.  
<http://aisel.aisnet.org/ecis2012/45>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2012 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# INTER-FIRM COOPERATION AND IOS DEPLOYMENTS IN BUYER-SUPPLIER RELATIONSHIPS: A RELATIONAL VIEW

Lu, Ying-Kuang, Department of Information Management, TransWorld University, No.1221, Zhennan Rd., Douliu City, Yunlin 640, Taiwan (R.O.C.), eddy@twu.edu.tw

Wang, Eric T. G., Department of Information Management, National Central University, NO.300, Jungda Rd., Jungli City, Taoyuan 320, Taiwan (R.O.C), ewang@mgt.ncu.edu.tw

## Abstract

*Inter-firm cooperation has gained importance in the context of buyer-supplier relationships. Trading partners often build inter-firm relationships to combine valuable resources and knowledge in order to achieve superior long-term performance. Inter-firm relationships require trading partners make relation-specific investments and build initiatives that facilitate and maintain buyer-supplier cooperation. They also need inter-organizational systems (IOS) to electronically support inter-firm transactions. Drawing on the relational viewpoint, this study explores the roles of four types of relation-specific investments that facilitate buyer-supplier partnerships: relational capital, collaborative know-how, partner-specific absorptive capacity and IOS deployments. A research model is developed and empirically tested using data collected from Taiwanese manufacturing industries. With a Partial Least Square (PLS) analysis, this study finds that: 1) both partner-specific absorptive capacity and IOS deployments have direct enhancing effects on cooperative performance; 2) relational capital directly benefits partner-specific absorptive capacity as well as directly and indirectly promote cooperative performance; 3) apart from having a strong, indirect impact on cooperative performance, collaborative know-how has strong, direct effects on various factors, including relational capital, IOS deployments and partner-specific absorptive capacity.*

*Keywords: relation-specific investments, collaborative know-how, relational capital, IOS deployments, partner-specific absorptive capacity.*

# 1 Introduction

Within buyer-supplier relationships, inter-firm cooperation offers considerable opportunities for trading partners to exploit relation-specific resources to create a dyadic competitive edge and to achieve superior cooperative performance (Jap, 1999). Also, the deployment of inter-organizational systems (IOS) within buyer-supplier relationships has the potential to significantly alter the basis of competition in the marketplace. Such systems can electronically integrate a set of firms to support their inter-firm activities (Premkumar and Ramamurthy, 1995). To sustain competitive advantage and superior performance, firms are advised to deploy relation-specific investments in order to coordinate and manage their inter-firm relationships and to use IOS applications to share valuable information with their partners, thereby enhancing the performance and responsiveness of their supply chains. Various industrial practices and empirical studies also found that value-driven productivity gains are possible when trading partners are willing to invest in relation-specific assets (Hill and Jones, 2007) and to develop information technology (IT) related resources within buyer-supplier partnerships (Truman, 2000; Gallivan and Depledge, 2003).

The relational view (RV) advances the resource-based view (RBV) by arguing that a firm's critical resources may extend beyond firm boundaries (Dyer and Singh, 1998). It holds that a firm can attain competitive advantage over competitors by combining resources in a unique way across firm boundaries. Specifically, the RV idea follows the process school of RBV (Moldaschl and Fischer, 2004). Inspired by organizational behaviour and learning studies, the process-oriented approach is more interested in the processes through which rent-generating resources are created (Schultz, 1994). Within the realm of the process school, RV directs attentions toward bundles of resources (especially intangibles) and to manners in which resources deliver inter-firm competitive advantages. We adopt a RV to investigate the relationship between buyer-supplier collaborative effectiveness and relation-specific investments in developing inter-firm cooperation and IOS applications. Under this relational framework, a buyer-supplier partnership may appear to be a suitable means of building a rent-generating resource bundle (Van Weele, 2010). Identifying valuable relation-specific investments and exploring the relationships among such investments and cooperative performance are the necessary action to be completed before the development of a buyer-supplier partnership. Also, knowledge exchange facilitated through IOS enables the creation of information partnerships, thus achieving greater buyer-supplier collaboration. IOS deployments can be viewed as a key resource and a source of superior cooperative performance. It is important to clarify the role of IOS within a buyer-supplier partnership, so trading partners can appropriately combine IT and non-IT relation-specific investments in an effective manner to realize inter-firm competitive advantage. Therefore, two research questions are addressed by this research:

- What are the critical relation-specific investments in buyer-supplier relationships and what are the associations among such relation-specific investments and buyer-supplier cooperative performance?
- What is the role of IOS deployments in the relationships among non-IT relation-specific investments and buyer-supplier cooperative performance?

To answer these questions, the study develops a research model for investigating the relationships among relation-specific investments and cooperative performance. We conduct a mail survey of manufacturing industries in Taiwan to collect data and employ the statistical technique of partial least squares (PLS) to empirically test the research model.

## 2 Theory and Hypothesis

Dyer and Singh (1998) extend the concept of RBV to develop the relational view, and argue that a firm's critical resources may extend beyond firm boundaries. To collaborate and coordinate across

organizational boundaries, two or more firms must become involved in an inter-firm learning process through which they work together and make significant investments in terms of time and effort. The relational view, which considers the dyad or network as the unit of analysis, offers different strategies for firms to achieve higher performance. The relational view holds the primary sources of extraordinary advantage are relational resources. Relational resources include market exchange and specialized inter-firm relationships that make possible relation-specific investments, knowledge-sharing routines, complementary capabilities and effective governance (Dyer and Sign, 1998). Increasing cooperation within a supply chain encourages firms to identify the best suppliers and work exclusively or largely with them, thus eventually reducing the number of suppliers used (Van Weele, 2010). Cooperation with the selective suppliers enables firms to streamline their purchasing and supply chain management activities and, consequently, to speed the response time to supply and demand needs (Van Weele, 2010). In accordance with the relational view, a cooperative buyer-supplier relationship can be looked upon as an idiosyncratic inter-firm linkage that generates competitive advantage in the form of relational rents. Therefore, the buyer-supplier relationship is a unit of analysis that is consistent with the relational view.

We adopt the relational view to explore dyadic behaviours that enable a dyad to enhance inter-firm performance. Relation-specific investments support buyer-supplier relationships. These investments may be tangible (such as manufacturing facilities, specific tools or particular machines) or intangible (such as tacit knowledge, technology or capabilities) (Jap, 1999). With the relational view, we identify four kinds of relation-specific investments that promote cooperative buyer-supplier performance: collaborative know-how, relational capital, partner-specific absorptive capacity, and IOS deployments. These four relation-specific investments in turn represent four types of dyadic behaviours that involve continuous investment in expertise (collaborative know-how), socialization (relational capital), capability (partner-specific absorptive capacity) and IS/IT (IOS deployments) (Figure 1).

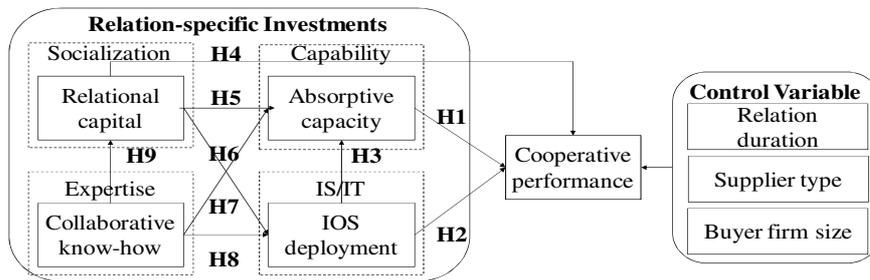


Figure 1 Research model

We assess tangible cooperative benefits to gauge cooperative performance. Tangible cooperative benefits, which are both strategic and financial, consist of generating additional profits, improving market share, and sustaining competitive advantage (Simonin, 1997). Cannon and Perreault (1999) suggested using buying-firm evaluations of supplier performance and relationship satisfaction to represent cooperative performance, because supplier performance and customer satisfaction represent important outcomes of such business exchanges. Consequently, this paper adopts realized competitive advantage, supplier performance, and customer satisfaction to measure cooperative performance.

According to Dyer and Singh (1998), we consequently conceptualize partner-specific absorptive capacity as a capacity that a buyer-supplier dyad has developed for acquiring and assimilating valuable knowledge from trading partners in both directions. Valuable knowledge includes both information and know-how (Kogut and Zander, 1992). Information is codified knowledge, which can be shared and transferred through effective communication between partners. In contrast, know-how is tacit or “sticky” and difficult to codify. Cooperating partners require considerable mutual coordination efforts to absorb tacit knowledge. The need for partner-specific absorptive capacity in buyer-supplier relationships arises from reciprocal dependencies in business exchanges consistent with the constraints imposed by the need for mutual adjustments. Partner-specific absorptive capacity makes trading partners receptive to the effective exchange of information and the negotiation and design of activities

and roles. Trading partners can strive to produce mutually beneficial strategic outcomes through regular patterns of coordinated actions and activities (Heide, 1994), and by sharing information, opportunities and processes (Jap, 1999). As partner-specific absorptive capacity increases, trading partners should be able to track changes in their industries effectively, thereby facilitating the assignment and deployment of necessary capabilities and resources at the appropriate moments (Dyer and Singh, 1998). Thus, this study hypothesizes that:

H1: The partner-specific absorptive capacity of a dyad of trading partners positively affects cooperative performance.

In general, the focus of IOS deployments is mainly on the degree to which both trading partners use IT-based resources to connect and support inter-firm activities (Premkumar and Ramamurthy, 1995). To capture the benefits of IOS usage, trading partners must focus on IOS integration (Truman, 2000). Apart from IOS integration, Massetti and Zmud (1996) proposed four dimensions to measure IOS usage: volume, breadth, diversity, and depth. From a dyadic perspective, we adapt these suggestions and develop four measures to indicate IOS deployments: IOS intensity, IOS diversity, IOS integration and IOS connectivity. IOS intensity refers to the extent to which documents are electronically exchanged between two trading partners. IOS diversity represents the richness of the documents that are electronically exchanged between two trading partners. IOS integration refers to the integration between IOS and the internal systems of the two trading partners. Finally, IOS connectivity involves the degree to which electronic conjunction has been established between the business processes of the two trading partners. In terms of supplier performance, trading partners can achieve a number of significant benefits through IOS, such as reductions in paperwork, clerical costs, inventories and order lead-cycle times (Mukhopadhyay et al., 1995). However, a partner firm may be able to transact a greater share of their business with trading partners that are linked by IOS applications, thereby improving market performance (O'Callaghan et al., 1992). Obviously, the adoption of IOS not only allows the electronic exchange of standardized documents between trading partners; in addition, it can help integrate and redefine fundamental management processes across organizational boundaries (Truman, 2000). Well-defined IOS applications not only help dyadic partners achieve a number of substantive benefits, but such applications also have the potential to improve the competitiveness of trading partners. Therefore, it is reasonable to hypothesize that:

H2: IOS deployments between trading partners positively affect cooperative performance.

Another key role of IOS deployment is to encourage mutual communication and coordination, thereby increasing the information processing capabilities within a relationship (Premkumar and Ramamurthy, 1995). For example, Angeles and Nath (2000) suggest that IOS can help linked partners manage their logistical, financial, technical, and design interdependencies to allow them to behave as one effective unit, thus simplifying complex communication and coordination tasks. Further, Malhotra et al. (2005) point out that partner-interfaced IS, such as IOS, can enhance a firm's ability to absorb and digest information from supply chains to create new knowledge. The adoption of IOS has the potential to enhance trading partner capabilities for acquiring and assimilating valuable knowledge across organizational boundaries. Consequently, we hypothesize:

H3: IOS deployments between trading partners positively impact partner-specific absorptive capacity.

In a buyer-supplier relationship, trust is an effective governance mechanism that substitutes for formal control (Dwyer et al., 1987). Kale et al. (2000) defined mutual trust and friendship between transacting partners as relational capital. There are four interrelated dimensions of relational capital between partners at the personal level: close personal interactions, mutual respect, mutual trust, and friendship (Dyer and Singh, 1998; Kale et al., 2000). To be consistent with our unit of analysis, the relationship capital is defined at the firm level. Mutual trust and friendship between partners can help to shape shared beliefs and mutual concerns and to reduce the motivation toward opportunistic behaviours (Heide, 1994). These arguments suggest that relational capital has the efficient implication of decreasing monitoring costs and increasing relational value (Sarkar et al., 2001). That is, relational

capital can lower exchange-related hazards to encourage an efficient exchange relationship, thereby leading to greater cooperative buyer-supplier benefits. Therefore, we posit:

H4: Relational capital between trading partners positively influences cooperative performance.

Close interactions, rooted in mutual trust, allow cooperative partners to understand who possesses critical knowledge and where it resides (Dyer and Singh, 1998). The development of this understanding is a prerequisite for firms wishing to exchange knowledge with their corresponding partners (Kale et al., 2001). Also, the openness within a buyer-supplier partnership, accompanied with trust-based relational capital, makes partners willing to share, rather than withhold, information (Hart and Saunder, 1997), thus increasing the likelihood of the exchange of private information as well as inter-organizational learning (Poppo and Zenger, 2002). Such prior understandings and openness between partners contribute to a free exchange environment, which not only effectively reduces inter-firm conflict and incompatibility in knowledge-sharing routines (Dyer and Singh, 1998) but also makes knowledge-sharing frequent and rich in content (Hamel, 1991). We thus speculate:

H5: Relational capital between trading partners positively affects partner-specific absorptive capacity.

The role of trust has received increasing attention in research on IOS deployments (Hard and Sander, 1997). A disregard for trust between cooperative partners is a main reason for IOS failure (Ramanath et al., 1998). Generally, the benefits of IOS deployment in a buyer-supplier relationship are not always equally distributed between partners. A supplier will not make IOS investments that benefit only its buyer, unless this supplier is confident that the buyer will reciprocate with other IOS deployments that directly benefit the supply side (Hart and Sauder, 1997). Mutual trust and friendship within a collaborating partnership, which in turn generates mutual understanding and openness between trading partners (Kale et al., 2000), makes a partner believe the other partner will not act opportunistically, thus creating a climate of reciprocal exchange for both partners to develop IOS applications. We posit:

H6: Relational capital between trading partners positively affects IOS deployments.

The development of a buyer-supplier relationship evolves through five general phases: awareness, exploration, expansion, commitment, and dissolution (Dwyer et al., 1987). The successful management of these cross-boundary activities requires essential managerial skills to cope with political, cultural, organizational and human issues (Kanter, 1994). Kanter (1994) literally equates these managerial skills with the know-how to nurture inter-firm relationships. Simonin (1997) further defines the know-how in managing inter-firm collaboration as collaborative know-how. Collaborative know-how includes negotiation know-how, technological assessment know-how, knowledge related to legal aspects, cross-culture training skills, renegotiation skills, and conflict resolution skills (Simonin, 1997). It is crucial to employ an appropriate level of knowledge to assist firms in negotiating inter-firm agreements and conducting coordination activities (Simonin, 1997). In a competitive marketplace, the development of a buyer-supplier relationship is not simply a question of maintaining daily business transactions. In order to develop effective communication and coordination across firm boundaries (i.e., partner-specific absorptive capacity), trading partners must become experts in managing inter-organizational relationships (Powell et al., 1996). Such a capability requires trading partners to have collaborative expertise that cuts across all aspects of the buyer-supplier relationship. Within a buyer-supplier relationship, it is difficult for dyadic partners to devise contracts to share valuable knowledge and attain intangible benefits, such as reciprocal coordination and interaction. Especially when transactions are complex or product specifications are difficult to codify, the proper level of expertise in negotiating agreements and resolving conflicts is important. We thus hypothesize that:

H7: The collaborative know-how of trading partners positively affects partner-specific absorptive capacity.

The successful implementation of IOS applications depends largely on the proper integration of IOS with the business systems of both partners rather than merely upon technology (Truman, 2000). The IOS implementation process involves many complex relational factors, such as working through

procedural, cultural, and technological differences (Kumar and van Dissel, 1996). Management of the relationship is a key issue for partners to harness IOS benefits. Central to the successful management of an inter-firm relationship is equipping trading partners with the proper level of collaborative know-how (Simonin, 1997). Such collaborative expertise not only increases the ability of trading partners to conduct inter-firm activities, but it is also helpful for both buyers and suppliers in overcoming any cultural, organizational and technological differences that hinder the IOS adoption. Therefore, it is reasonable to expect that:

H8: The collaborative know-how of trading partners positively influences their IOS deployments.

Relational capital accumulates through close and meaningful interactions within buyer-supplier exchange processes. As with personal relationships, buyer-supplier interactions can be complex and may require trading partners to be competent in areas such as negotiation skills, conflict management, the anticipation of problems and joint problem-solving (Fynes et al., 2006). Some empirical evidence has demonstrated that skills in negotiation and conflict management are helpful to cooperative partners in nurturing mutual trust and friendship (Bradford, 1999; Kale et al., 2000). Skills that are useful in managing buyer-supplier relationships are referred to as collaborative know-how. The proper level of collaborative know-how can assist firms in negotiating agreements and resolving conflicts during buyer-supplier interacting processes, thus allowing a higher accumulation of relational capital. Therefore, we expect that:

H9: The collaborative know-how of trading partners positively affects relational capital.

We also included three control variables to avoid possible confounding effects: relationship duration, supplier type, and buyer firm size.

### 3 Research Methodology

Prior to conducting the survey, we chose six managers of a procurement division and sixteen MBA graduate students to pilot-test the survey instruments. After verifying the appropriateness and answerability of the questions, the questionnaire was then mailed to a senior procurement manager of every manufacturing firm on CommonWealth Magazine's top 1000 manufactures list. The response to the survey was adequate, with 121 usable completed questionnaires (44 of the original 1000 were returned as undeliverable). This yielded an overall response rate of 12.7%. To test for sample representativeness, we used the  $\chi^2$ -statistic to compare the sample characteristics of the responding firms with those of the sampling frame population. The results show no significant differences between the responding firms and the sampling frame population. A non-response bias test was also used to compare the early and late respondents. The t-test shows no significant difference between these two groups on key constructs. Therefore, there were no apparent problems that might skew responses.

Characteristics	Freq. (%)	Characteristics	Freq. (%)	Characteristics	Freq. (%)
No. of Employees		Capital (NT\$ Million)		Relation Duration	
<100	7 ( 5.8%)	<\$100	1 ( 0.8%)	<2	6 ( 5.0%)
101-500	61 (50.4%)	\$101-\$500	20 (16.5%)	2-5	20 (16.5%)
501-1000	24 (19.8%)	\$501-\$1000	24 (19.8%)	5-10	39 (32.2%)
1001-3000	18 (14.9%)	\$1001-\$5000	55 (45.4%)	10-20	44 (36.4%)
>3001	11 ( 9.0%)	\$5001-\$10000	12 ( 9.9%)	>20	12 ( 9.9%)
Industry		>\$10001	9 ( 7.4%)	Supplier Type	
Household	19 (15.7%)			Sole	43 (35.5%)
Petrochemical	23 (19.0%)			Major	59 (48.8%)
Metalwork/machinery	33 (27.3%)			Secondary	19 (15.7%)
IT/electronic goods	46 (38.0%)				

Table 1 Sample characteristics (n=121)

Table 1 presents the sample characteristics. With regard to the respondent characteristics, most respondents were from procurement departments and held an upper-management position. On average, they had 6.48 years of experience in their current positions and 13.81 years with the same company. These data show that the respondents had sufficient expertise and experience in answering our survey items.

The constructs used in this study were adapted from previously-developed measures (see the appendix for details). Five-point Likert scales were used for the measures of research variables:

- *Relational Capital* (RC) is framed at the firm level and was measured based on the items developed by Kale et al (2000) (1=strongly disagree; 5=strongly agree).
- *Collaborative Know-How* (CK) was measured with a scale developed by Simonin (1997), adapted to a buyer-supplier dyadic relationship (1=very poor; 5=very extensive).
- *Partner-specific Absorptive Capacity* (AC) was measured based on the scale developed by Sivadas and Dwyer (2000). It consists two sub-constructs, i.e. *Communication Bases* (CB) and *Coordination Efforts* (CE) (1=strongly disagree; 5=strongly agree).
- *IOS Deployment* (ID) includes four dimensions—IOS intensity, IOS diversity, IOS integration and IOS connectivity—and were adapted from the scales developed by Massetti and Zmud (1996) and Truman (2000) (1=very low; 5=very high).
- *Cooperative Performance* (CP) was assessed using *Realized Competitive Advantage* (CA), *Supplier Performance* (SP) and *Customer Satisfaction* (CS) with the scales developed by Jap (1999), Cannon and Perreault (1999), and Kotabe (2003), adapted to the buyer-supplier relationship context (1=strongly disagree; 5=strongly agree).
- Control Variable: *Relationship Duration* (RD) was measured by the natural logarithm of the number of years since the partners began their relation (Heide and Miner, 1992). Our respondents were asked to identify a familiar supplier and to choose the appropriate *Type of the Focal Supplier* from three options (sole supplier; major supplier; or secondary/minor supplier). *Buyer Firm Size* (FS) was measured by the number of employees and capital of the responding firm.

## 4 Data Analysis

Item reliability, convergent validity and discriminant validity are used to assess the measurement model. Item reliability is measured using factor loading for each item. We applied two criteria to examine item reliability. The first is for a minimum loading of 0.7, which explains almost 50% variance in constructs. Second, factor loading should be statistically significant. All item loadings exceeded 0.7 on their specific constructs, and were statistically significant (Table 2). Discriminant validity is also assured, since the squared correlation between two constructs is lower than the AVE of these items (Table 3). Reliability of constructs, composite reliability (CR) and average extracted variance (AVE) by constructs are usually recommended to examine convergent validity. Composite reliabilities were all above 0.8 and the AVE always exceeds 0.5, thus meeting the criterion of prior research. The Cronbach's  $\alpha$  for each construct was used to examine construct reliability. The results show that all constructs were reliable, thus indicating convergent validity.

The explained variance (R-square value) and the sign and significance of the path coefficients were used to assess nomological validity. The R-Square value represents the predictive power of the model and can be interpreted the same as in multiple regression. A bootstrap method was used to produce parameter estimates, standard errors, and t-values.

Direct effects. For a satisfactory and substantive model, the percentage of variance explained should be at least 10% (Falk and Miller, 1992). All R<sup>2</sup> values exceed 10%, meeting the criteria of prior research. All nine hypotheses were assessed based on the sign, strength and significance of the path coefficients (Figure 2). The PLS analysis provided reasonable support for all hypotheses except H6.

Indirect effects. We assessed the mediation by examining the size and significance of the indirect effects. Sobel tests were used to examine the significance of all indirect effects (Cohen, 1988). We found that relational capital and collaborative know-how had significant indirect effects on cooperative performance, but IOS deployments did not. Moreover, collaborative know-how had a significant indirect impact on partner-specific absorptive capacity. Cohen (1988) suggested .10, .30 and .50 as the criteria for determining the extent of small, medium, or large effects, respectively. The indirect effects were small to medium, ranging from .14 to .35 (see Table 4).

Construct (item)	Loading	Construct (item)	Loading	Construct (item)	Loading	Construct (item)	Loading
<b>RC</b>		<b>ID</b>		<b>AC: CB</b>	<b>0.90*</b>	<b>CP: CA</b>	<b>0.92*</b>
(RC1)	0.86*	(ID1)	0.90*	(CB1)	0.75*	(CA1)	0.78*
(RC2)	0.82*	(ID2)	0.94*	(CB2)	0.84*	(CA2)	0.85*
(RC3)	0.82*	(ID3)	0.95*	(CB3)	0.87*	(CA3)	0.88*
(RC4)	0.76*	(ID4)	0.94*	(CB4)	0.89*	(CA4)	0.87*
<b>CK</b>		<b>FS</b>		<b>AC: CE</b>	<b>0.95*</b>	<b>CP: SP</b>	<b>0.91*</b>
(CK1)	0.81*	(FS1)	0.95*	(CE1)	0.82*	(CA1)	0.88*
(CK2)	0.76*	(FS2)	0.87*	(CE2)	0.87*	(CA2)	0.92*
(CK3)	0.75*			(CE3)	0.89*	(CA3)	0.93*
(CK4)	0.83*			(CE4)	0.87*	(CA4)	0.79*
(CK5)	0.71*			(CE5)	0.85*	<b>CP: CS</b>	<b>0.81*</b>
(CK6)	0.79*					(CS1)	0.91*
						(CS2)	0.92*
						(CS3)	0.91*

Note: Both absorptive capacity (AC) and cooperative performance (CP) are reflective, second order constructs.

Table 2 Factor loading

	Alpha (CR)	RC	CK	CB	CE	ID	CA	SP	CS	RD	dS	dM	FS
RC	0.83 (0.89)	<b>0.66</b>											
CK	0.89 (0.90)	0.14	<b>0.60</b>										
CB	0.85 (0.90)	0.26	0.14	<b>0.70</b>									
CE	0.91 (0.93)	0.36	0.26	0.50	<b>0.74</b>								
ID	0.95 (0.96)	0.08	0.25	0.13	0.19	<b>0.87</b>							
CA	0.87 (0.91)	0.26	0.19	0.16	0.29	0.23	<b>0.72</b>						
SP	0.90 (0.93)	0.25	0.14	0.26	0.25	0.19	0.59	<b>0.78</b>					
CS	0.90 (0.94)	0.29	0.14	0.23	0.28	0.11	0.39	0.35	<b>0.83</b>				
RD	1.00 (1.00)	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.03	<b>1.00</b>			
dS	1.00 (1.00)	0.02	0.02	0.03	0.00	0.00	0.00	0.01	0.00	0.04	<b>1.00</b>		
dM	1.00 (1.00)	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.01	0.10	<b>1.00</b>	
FS	0.81 (0.94)	0.00	0.06	0.01	0.01	0.01	0.03	0.02	0.05	0.02	0.02	0.01	<b>0.87</b>

Note: CR: composite reliability; the numbers in bold type denote AVE, and other entries represent the squared correlations.

Table 3 Reliability, variance extracted and squared correlation

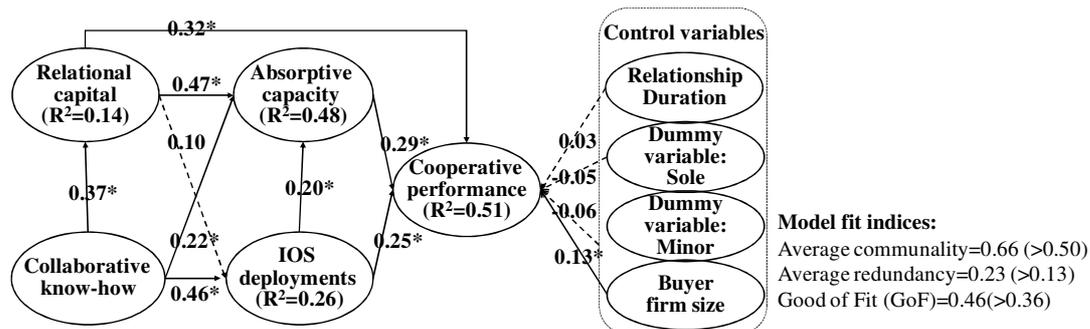


Figure 2 Results of the PLS estimation

DV	IV	Path coefficient			DV	IV	Path coefficient		
		Direct	Indirect	Total			Direct	Indirect	Total
CP	AC	0.29*	N/A	0.29	AC	ID	0.20*	N/A	0.20
	ID	0.25*	0.06	0.25		RC	0.47*	—	0.47
	RC	0.32*	0.14*	0.46		CK	0.22*	0.26*	0.48
	CK	N/A	0.35*	0.35	ID	RC	0.10	N/A	—
					CK	0.46*	—	0.46	
				RC	CK	0.37*	N/A	0.37	

Table 4 Direct, indirect, and total effects (DV: dependent variable; IV: independent variable)

## 5 Conclusion, Discussion and Implications

Drawing upon the relational view, this research identifies four relation-specific investments that are all significantly associated with greater buyer-supplier cooperation: partner-specific absorptive capacity, IOS deployments, relational capital, and collaborative know-how. We conclude and discuss our research findings in response to our two research questions.

### 5.1 Relation-specific investments and Cooperative Performance

Our results support the importance of partner-specific absorptive capacity in the context of cooperative buyer-supplier achievement. Unlike most empirical works conducted in the context of alliances (such as, Sivadas and Dwyer, 2000; Lane and Lubatkin, 1998), we adopt partner-specific absorptive capacity to gauge the potential absorptive capacity that assists trading partners in acquiring and assimilating valuable partner-specific knowledge within a buyer-supplier partnership. Examining this aspect of absorptive capacity contributes to the literature in helping us better understand the nature of relational capabilities in the context of buyer-supplier cooperation.

IOS deployments are found significantly associated with both cooperative performance and partner-specific absorptive capacity. These findings corroborate that deploying IOS not only could improve joint benefits in a buyer-supplier partnership, but also would enhance partners' ability to acquire and assimilate knowledge from each other.

We find that strong relational capital tends to strengthen not only tangible cooperative benefits but also intangible partner-specific absorptive capacity. Moreover, the total impact of relational capital on cooperative performance is larger than the other three performance-enhancing effects. In other words, the enhancement of cooperative performance is possibly more visible when buyers and suppliers are willing to devote their efforts to nurturing strong mutual trust and friendship between partners than to making investments in other areas, such as collaborative know-how, IOS deployments or partner-specific absorptive capacity. However, relational capital can be augmented by collaborate know-how and its enhancing effects can partly reflect on cooperative performance indirectly through partner-specific absorptive capacity. That is, relational capital cannot contribute substantively to cooperative excellence in a vacuum.

With respect to the effects of collaborative know-how, we find a positive indirect effect on cooperative performance, positive direct and indirect effects on partner-specific absorptive capacity, together with direct effects on IOS deployments and relational capital. Our results indicate that the benefits of collaborative know-how for a buyer-supplier partnership are largely intangible, but substantive. Despite the lack of a direct association with cooperative performance, collaborative know-how may serve as a foundation for facilitating relation-specific investments with regard to relational capital, IOS deployments, and partner-specific absorptive capacity, all of which eventually result in

superior cooperative performance. On the other hand, without other three relation-specific investments, collaborative know-how would hardly exert any effects on cooperative performance.

## 5.2 The Role of IOS Deployments

We find that IOS deployments have direct effects on both cooperative performance and partner-specific absorptive capacity, but do not significantly increase cooperative performance indirectly through partner-specific absorptive capacity. Such results corroborate our hypotheses that IOS deployments could promote tangible cooperative excellence and intangible bi-directional knowledge sharing capability in buyer-supplier relationships. However, the enhancing effect of IOS on knowledge sharing capability does not sufficiently reflect on tangible cooperative benefits. Practically, there are two distinct reasons to deploy IOS applications, namely, to monitor a partner's performance and to support two-way information sharing (Gallivan and Depledge, 2003). We conjecture that buyer-supplier partnerships may become accustomed to deploying IOS more for the purpose of monitoring partners' performance than facilitating knowledge-sharing, especially the knowledge that is tacit and sticky. Consequentially, IOS deployments potentially generate tangible cooperative benefits, such as improved delivery, fewer quality problems, and reduced lead-time, but they may offer limited improvements in terms of knowledge-sharing between partners.

Relational capital is found to exhibit a positive but insignificant effect on IOS deployments. One explanation for this finding is that relational capital enhancements may not reflect additional IOS deployments. Relational capital can enhance the willingness of trading partners to develop IOS, but it may not suffice for the elimination of various hindrances that confront IOS deployments (Kumar and van Dissel, 1996) and therefore may be unable to significantly increase the number of IOS deployments. Unlike the fruitlessness of relational capital, collaborative know-how is found effective in increasing IOS deployments. Thus, improving the collaborative expertise in overcoming various differences between the partners can facilitate the effective deployment of IOS significantly.

Finally, an overview of Table 4 possibly infers that collaborative know-how and relational capital are more helpful than IOS deployments in improving both partner-specific absorptive capacity and cooperative performance. However, such an inference might fall into the trap of the structural-based RBV, which concentrates on the strategic importance of individual resources, but what often matters to achieve competitive advantage is a bundle of resources (Schultz, 1994). Practically, IOS deployments mediate the associations of collaborative know-how with both absorptive capacity and cooperative performance. That is, influences of collaborative know-how on both cooperative performance and partner-specific absorptive capacity would diminish without IOS's mediation.

In summary, trading partners might not highlight the importance of individual relation-specific investments, but should clarify associations among all of them and combine them together into a bundle of resources that achieves cooperative advantage while developing a buyer-supplier partnership.

## References

- Angeles R. and Nath, R. (2000). The importance of congruence in implementing electronic data interchange systems. *Supply Chain Management: An International Journal*, 5(4), 198-205.
- Bradford, K. D. (1999). *Conflict Management in Buyer-seller Relationships*, Unpublished Doctoral Dissertation, University of Florida, Florida, United States.
- Cannon, J. P. and Perreault, W. D. (1999). Buyer-supplier relationship in business markets. *Journal of Marketing Research*, 36, 439-460.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*, Hillsdale New Jersey, Lawrence Erlbaum.
- Dwyer, F. R., Schurr, P. H., and Oh, S. (1987). Developing buyer-seller relationships. *Journal of Marketing*, 51, 11-27.

- Dyer, J. H., and Singh, H. (1998). The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23(4), 660-679.
- Falk R. F., and Miller, N. B. (1992). *A Primer for Soft Modeling*, The University of Akron Press, USA, Akron.
- Fynes, B., Voss, C., and Burca, S. (2006). The impact of the supply chain relationship dynamics on manufacturing performance. *International Journal of Operations & Production Management*, 25(1), 6-19.
- Gallivan, M. J. and Depledge, G. (2003). Trust, control and the role of interorganizational systems in electronic partnerships. *Information Systems Journal*, 13, 159-190.
- Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal*, 12, 83-103.
- Hart, P. and Saunders, C. (1997). Power and trust: critical factors in the adoption and use of electronic data interchange. *Organization Science*, 8(1), 23-41.
- Heide, J. B. (1994). Interorganizational governance in marketing channels. *Journal of Marketing*, 58, 71-85.
- Heide, J. B. and Miner, A. S. (1992). The shadow of the future: effects of anticipated interaction and frequency of contact on buyer-seller cooperation. *Academy of Management Journal*, 35, 265-291.
- Hill, C. W. L., and Jones, G. R. (2007). *Strategic Management Theory: An Integrated Approach*, Seven Edition, Boston: Houghton Mifflin.
- Jap, S. D. (1999). Pie-expansion efforts: collaboration processes in buyer-supplier relationships. *Journal of Market Research*, 36, 461-475.
- Kale, P., Singh, H. and Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: building relational capital. *Strategic Management Journal*, 21(2), 217-237.
- Kanter, R. M. (1994). Collaborative advantage. *Harvard Business Review*, 72(4), 96-108.
- Kogut, B. and Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3, 383-397
- Kotabe, M., Martin, X. and Domoto, H. (2003). Gaining from vertical partnerships: knowledge transfer, relationship duration, and supplier performance improvement in the U.S. and Japanese automotive industries. *Strategic Management Journal*, 24(4), 293-316.
- Kumar, K. and van Dissel, G. H. (1996). Sustainable collaboration: managing conflict and cooperation in interorganizational systems. *MIS Quarterly*, 20(3), 279-300.
- Malhotra, A. and Gosain, S. and El Sawy, O. A. (2005). Absorptive capacity configurations in supply chains: gearing for partner-enabled market knowledge creation. *MIS Quarterly*, 29(1), 147-187.
- Massetti, B. and Zmud, R. W. (1996). Measuring the extent of EDI usage in complex organizations: strategies and illustrative examples. *MIS Quarterly*, 20(3), 331-345.
- Moldaschl, M. and Fischer, D. (2004). Beyond the management view: a resource-centered socio-economic perspective. *Management Revue, Special Issue*, 15(1), 122-152.
- Mukhopadhyay, T., Kekre, S., and Kalathur, S. (1995). Business value of information technology: a study of electronic data interchange. *MIS Quarterly*, 19(2), 137-156.
- O'Callaghan, R., Kaufmann, P.J. and Konsynski, B.R. (1992). Adoption correlates and share effects of electronic data interchange systems in marketing channels. *Journal of Marketing*, 56(2), 45-56.
- Poppo, L. and Zenger, T. (2002). Do formal contracts and relational governance function as substitutes or complements? *Strategic Management Journal*, 23, 707-729.
- Powell, W., Koput, K. and Smith-Doerr, L. (1996). Technological change and the locus of innovation: networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1), 116-45.
- Premkumar, G., and Ramamurthy, K. (1995). The role of interorganizational and organizational factors on the decision mode for adoption of interorganizational systems. *Decision Science*, 26(3), 303-336.
- Ramanath, A. M., Paul, R. J. and Macredie, R. (1998). Understanding IOS development. In *Proceedings of the Sixth European Conference on Information Systems*, 1427-1442, Euro-Arab Management School, Aix-en-Provence, France.

- Sarkar, MB, Echambadi, R., Cavusgil, S. T. and Aulakh, P. S. (2001). The influence of complementarity, compatibility, and relational capital on alliance performance. *Journal of Academy of Marketing Science*, 29(4), 358-373.
- Schulze, W.S. (1994). The two schools of thought in resource-based theory: definitions and implications for research. In Shrivastava, P., Huff, A., and Dutton, J.: *Advances in Strategic Management*, 10A, 127-158, JAI Press Inc., Connecticut, USA..
- Simonin, B. L. (1997). The importance of collaborative know-how: an empirical test of the learning organizational. *Academy of Management Journal*, 40(5), 1150-1174.
- Sivadas, E. and Dwyer, F. R. (2000). An examination of organizational factors influencing new product success in internal and alliance-based processes. *Journal of Marketing*, 64, 31-49.
- Truman, G. E. (2000). Integration in electronic exchange environment. *Journal of Management Information Systems*, 17(1), 209-244.
- Van Weele, A. J. (2010). *Purchasing and Supply Chain Management: Analysis, Planning and Practice*, Cengage, 5th edition, London.
- Zaheer, A. and Venkatraman, N., (1994). Determinants of electronic integration in the insurance industry: an empirical test. *Management Science*, 40, 549-566.

<p><b>I. Collaborative Know-How</b> While cooperating with this supplier, our firm possesses knowledge and skills in</p> <ul style="list-style-type: none"> <li>• Negotiations.</li> <li>• Legal aspects (contracts and agreement).</li> <li>• Cross-cultural training.</li> <li>• Renegotiating initial agreements with partners.</li> <li>• Technological assessment.</li> <li>• Conflict resolution.</li> </ul> <p><b>II. Relational Capital</b></p> <ul style="list-style-type: none"> <li>• There is close interactions between partners.</li> <li>• This partnership is characterized by mutual trust between the partners.</li> <li>• This partnership is characterized by mutual respect between the partners.</li> <li>• This partnership is characterized by personal friendship between partners.</li> </ul> <p><b>III. Absorptive Capacity</b></p> <ul style="list-style-type: none"> <li>• Communication bases <ul style="list-style-type: none"> <li>○ Both firms inform each other when needs have changed.</li> <li>○ Both firms share proprietary information with each other.</li> <li>○ Both firms provide each other with adequate information.</li> <li>○ Both firms provide each other with timely information.</li> </ul> </li> <li>• Coordination efforts <ul style="list-style-type: none"> <li>○ People from both firms who have to work together do their jobs properly and efficiently.</li> <li>○ The task assignments of people from both firms who work together are well-planned.</li> <li>○ The routines of both firms coordinate with each other and are well-established.</li> <li>○ Cooperative job and work activities fit together very well.</li> <li>○ Both firms are always looking for synergistic ways to do business together.</li> </ul> </li> </ul>	<p><b>IV. IOS Deployment (continue)</b></p> <ul style="list-style-type: none"> <li>• IOS diversity The extent to which our firm exchanges different document types with this supplier through IOS.</li> <li>• IOS integration: The extent to which internal systems of both firms have been integrated with IOS.</li> <li>• IOS connectivity: The degree to which business processes of our firm have been interlinked with those of the supplier through IOS.</li> </ul> <p>(These four items are measured by multiple scales, namely, marketing, purchasing, finance, production and logistics. We use aggregate item scores for the PLS analysis.)</p> <p><b>V. Cooperative Performance</b></p> <ul style="list-style-type: none"> <li>• Realized Competitive Advantage In the last 2-3 years, our firm <ul style="list-style-type: none"> <li>○ Has sped up product cycle time-to-market through this partnership.</li> <li>○ Has enhanced the quality of decision-making through this partnership.</li> <li>○ Has gained benefits that enable us to compete more effectively in the marketplace.</li> <li>○ Overall, the relationship has generated important strategic outcomes.</li> </ul> </li> <li>• Supplier performance In the least 2-3 years, this supplier <ul style="list-style-type: none"> <li>○ Has continued to improve product design performance through this partnership.</li> <li>○ Has continued to improve process design through this partnership.</li> <li>○ Has continued to improve product quality through this partnership.</li> <li>○ Has continued to reduce lead-time through this partnership.</li> </ul> </li> <li>• Relationship satisfaction <ul style="list-style-type: none"> <li>○ Our firm is pleased by the decision to do business with this supplier.</li> </ul> </li> </ul>
---	---

<p><b>IV. IOS Deployment</b></p> <ul style="list-style-type: none"> <li>• IOS intensity: The extent to which our firm exchanges documents with this supplier through IOS.</li> </ul>	<ul style="list-style-type: none"> <li>○ Overall, our firm is very satisfied with this supplier.</li> <li>○ If our firm had to do it all over again, we would still choose to use this supplier.</li> </ul>
--	---

*Table 5 Appendix: measurement items*