

# Why Focal Firms Share Information? A Relational Perspective

Chia-Chen Wang, Chun-Der Chen, Yu-Fen Chen, and Cheng-Kiang Farn

**Abstract**—Supply chain management has become an important issue for Taiwan's manufacturing industry due to escalating global competition. Virtual vertical integration is an important issue in supply chain management. Because organizations only have limited resources, they pursue long-term partnership with specific transaction partners. They share information to improve visibility, speed responses to markets, and reduce costs from information distortion or information asymmetry. This study empirically explores the factors affecting inter-organizational information sharing from the perspective of focal firms. 1,000 questionnaires were administered to top 1,000 manufacturing companies in Taiwan, with 139 valid responses. The results show that partner's power, trust, and relation-specific asset investments positively affect inter-organizational information sharing. On the other hand, the partner's power does not significantly affect the organization's relation-specific investments. This study further investigates the moderating role of information technology competence and trust. The result indicates that when an organization has lower information technology competence, the relationship between the partner's power and relation-specific investments is significant. In addition, when the focal firm has lower trust in the customer, there is significant relationship between relation-specific investments and information sharing. Implications and discussion are then provided.

**Keywords**—information sharing, IT competence, power, relation-specific investments, supply chain management, trust.

## I. INTRODUCTION

As the concept of supply chain management is getting more and more attention, many relationships among organizations have evolved from arm-length buy-sell relationships into tightly coupled supply chain collaborations. Organizations realize the importance of network management--the effectiveness of one element in the network does not assure the effectiveness of the whole system [1]. Taiwan's manufacturing industry is composed of clusters of high specialized companies focused in their own domain. As such, inter-organizational

transaction and collaboration is important for competition. In addition, in order to reduce uncertainties of supplies, vertical integration became a major solution [2]. However, the inflexible and inefficient structure of large enterprises forced organizations to pursue a more efficient way to operate. At the end of 1980s and 1990s, Wal-Mart and Proctor & Gamble adopted a new transaction relationship that is characterized by a high degree of information exchange [3]. The advancement of inter-organizational information technology and global logistics is the main force to realize the collaboration between organizations. On the other hand, information transparency reduces the phenomenon of information distortion that is called bullwhip effect [4]-[7]. As a result, organizations have better order fulfillments, shorter response time, and more competitive [3], [5], [8]. Such a way for inter-organizational cooperation can benefit not only one organization but also the whole system [9].

Nowadays, organizations that link their customers and suppliers in a tightly integrated network would be the most competitive [10]. Taiwan's computer industry plays a critical role in the global supply chain in desktop and notebook computers. The most common business model is OEM/ODM (Original Equipment Manufacturer/Original Design and Manufacturing). Most of them are small and medium size enterprises. They face high pressures from customers, and must integrate with dozens of suppliers to lower cost and reduce order fulfillment lead-time. Besides, maintaining long-term relationships with customers and increase information visibility are also critical issues. The IT-based supply chain management system and relationship management are thus closely related with an organization's success.

This research aims to explore why focal firms share information with their customers. Focal firms of a value chain are at the forefront of the changes by virtue of being in the middle and operating on thin margins. They are squeezed from both business customers and suppliers to add more value in the value chain [11]. Most of Taiwan's IT manufacturing companies play the role as focal firms. However, prior researches about IT-enabled integration have typically been focused on the viewpoint of business customers or network leaders, with small amounts of attentions given to the benefits accrued to focal firms (e.g., [12], [13]). We believe that understanding the determinants of focal firms' intention to share information is important; therefore this study focuses on focal firms' relationships with their customers, especially customers that have maintained relationships for a period of

Manuscript received January 30, 2009; This work was supported in part by the National Science Council of the Republic of China under Grant NSC 97-2410-H-008-032

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time.

This study empirically investigates manufacturing companies in Taiwan and attempts to answer following questions: (1) How a partner's power and trust affect the extent of information sharing? (2) Is IT competence changes the effects of the partner's power?

## II. CONCEPTUAL BACKGROUND AND HYPOTHESES DEVELOPMENT

### A. Supply Chain Management

The supply chain is generally conceptualized as a network of companies from suppliers to end-users [14], which have with the intention of integrating supply/demand via coordinated company efforts [15]. Due to the interdisciplinary origin of SCM and the evolutionary nature of SCM concept, there is no generally accepted definition of SCM in the literature [16]. A review of the SCM literature during the late 1980s and the early 1990s reveals that the concept of SCM has been involved from two separate paths: purchasing and supply management, and transportation and logistics management [17].

According to purchasing and supply management perspective, SCM is synonymous with the integration of supply base that evolved from the traditional purchasing and materials functions [18], [19]. In the perspective of transportation and logistics management, SCM is synonymous with integrated logistics systems, and hence focuses on inventory reduction both within and across organizations in the supply chain [20] – [24]. Eventually, these two perspectives evolved into an integrated SCM that synthesizes all the activities along the whole supply chain. In an attempt to clarify confusion surrounding the term, the Council of Logistics Management (CLM) defines SCM as the systemic, strategic coordination of the traditional business functions and tactics across these businesses functions within a particular organization and across businesses within the supply chain for the purposes of improving the long-term performance of the individual firms and the supply chain as a whole [25].

As the concept of SCM was introduced in the 1980s, it continues to become increasingly market oriented, transforming the primary driver of the value chain from supply to demand. Furthermore, various forms of collaboration practices also emerged, ranging from efficient consumer response (ECR) [26], through related practices such as vendor managed inventory (VMI) [27] and continuous replenishment (CR), to collaborative planning, forecasting, and replenishment (CPFR) [3]. Therefore, the understanding and practicing of supply chain management (SCM) and the pursuit of supply chain efficiency have become essential prerequisites for staying competitive in the global race and for enhancing profitably (e.g., [13], [28] – [31]).

### B. The Relational View

The relational view proposed by Dyer and Singh. It considers the dyad/network as the unit of analysis and the rents

that are generated to be associated with the dyad/network [32]. They argued that alliances generate competitive advantages and relational rents only as they move the relationship away from the attributes of arm's-length market relationships into partnerships. Rents result from the efficient and effective development, deployment, allocation, exchange, and utilization of resources [33]. Arm's-length market relationship are incapable of generating relational rents because there is nothing idiosyncratic about the exchange relationship that enables the two parties to generate profits above and beyond what other sell-buyer combinations can generate. Such relationships are not rare or difficult to imitate, and buyers can only achieve a differential advantage if they bring greater bargaining power to the table [32]. Partnerships are especially valuable when they provide firms with an avenue for the sustained earning of rents in situations where competitive advantage requires the synergistic combination of resources which a firm is unable to purchase through a market transaction or to develop internally in a timely and cost-effective manner [34].

Relational rents can be generated through four key sources, namely, relation-specific assets, knowledge-sharing routines, complementary resource endowments, and effective governance [32]. First, productivity gains in the value chain are possible when firms are willing to make relation/transaction-specific investments. Second, through intensive information-sharing and increased sociotechnological interactions between partners, a production network with superior knowledge-transfer mechanisms among users, suppliers, and manufacturers will be able to "out innovate" production network. Third, complementary resource endowments are distinctive resources of alliance partners that collectively generate greater rents than simply the sum of those obtained from the individual endowments of each partner, which have been discussed widely as key factors driving returns from alliance. Finally, governance also plays a key role in the creation of relational rents because it influences transaction costs, as well as the willingness of alliance partners to engage in value-creation initiatives.

### C. Information Sharing

Since the 1980s, organizations attempted to build a tight integration with partners so that they could focus on strengthening their core competence. Information sharing and collaboration are the components of inter-organizational relationships. Organizations that manage information from their partners constitute another type of vertical integration--virtual vertical integration. The advancement of information technology makes "virtual vertical integration" possible. It is a way that facilitates cooperation and coordination between supply chain partners [4], [35]. It implies the substitution of ownership with partnership. Internal cost can be avoided because the growth of the organization is limited. On the other hand, transaction cost can be reduced by inter-organizational connection [36].

Virtual vertical integration is a way that enables smaller

organizations to gain competitive advantages without physically integrating upstream or downstream. This is because the high visibility reduces the transaction costs and response time so that the organizations can effectively meet the customers' requirements with lower costs. In other words, virtual vertical integration makes integration possible regardless of the size of an organization. Smaller organizations could gain the benefits of integration through cooperation.

Information sharing is the activities that exchange of critical information among supply chain partners [37], [38]. Information sharing enhances the visibility of the supply chain. As a result, the bullwhip effects could be reduced or eliminated. On the other hand, the opportunistic behavior of partners due to information asymmetry could be avoided [39]. Besides, information sharing could be viewed as a sign of an organization's willingness to build a long-term relationship. It helps in strengthening the partnership.

#### *D. Trust*

Mayer et al. [40] claim that trust is "the willingness of a party to be vulnerable to the actions of another based on the expectation that the other will perform a particular action important to the trustor." As inter-organizational relationships are taken into account, it reflects the belief that the transaction partner will act as expected. As a result, trust is an important determinant of inter-organization cooperation and long-term relationship [5], [41].

Calculative-based trust, knowledge-based trust, and identification-based trust are three types of trust [42]. Calculative-based trust is grounded not only in the fear of punishment, but also in the expectation of rewards. After comparing cost with benefit, the transaction partner will prefer to sustain the relationship. Knowledge-based trust is relational based. It occurs after having enough information about the transaction partner. The information is based on past experience that makes the partner's behavior predictable. Identification-based trust is origin from common characteristics between transaction partners. In this study, we concern about the relationships between focal firms and one of their long-term partners. Therefore, this study focuses on the effect of knowledge-based trust.

Trust is even more important as inter-organizational systems are introduced. It is because that IT increases the level of information sharing [43]. The higher the degree of information sharing, the greater the damage could be caused from transaction partner's opportunistic behavior. It is believed trust can be a persuasive enabler of information exchange. As a result, the first hypothesis of this study is:

*H1: trust in a customer will enhance information sharing with its focal firm.*

#### *E. Power*

Power can be viewed as an ability that could affect the

decisions or behavior of others [43], [44]. In other words, as one can compel one's partner to do something, it reveals its power. The source of power could be coercive punishments or non-coercive rewards [43], [45], [46]. If power originates from coercive punishments, the party with weaker power would be asked to satisfy some requirements. When requirements are not satisfied, the party would be punished. On the other hand, if power is originated from non-coercive rewards, the party with weaker power would gain extra value for satisfying requirements.

As power is considered in an inter-organizational relationship, it implies that the transaction partner has the ability to affect the decisions of the other organizations [40]. For supply chain management, power is one of the influential factors that affect inter-organizational business process integration [43], [47] and enhance coordination among the organizations [48], [49].

Transaction partners might ask the organization to share information, and the organization would be forced to share it in order to build or maintain the relationship. On the other hand, focal firms might highly depend on some of their customers. Information sharing could help them to satisfy the customers' needs and provide them with a better service; this would help in enhancing and strengthening the relationship between the focal firm and its customers. Regardless of the source of power--coercive punishments or non-coercive rewards--power would enhance the level of information sharing. Hence we conduct the second hypotheses:

*H2: power of a customer will enhance information sharing with its focal firm.*

#### *F. Relation-Specific Investments*

Asset specificity is a concept that originated from transaction cost economics. It refers to nonredeployable assets that are specific to a particular relationship [50], [51]. Relation-specific investments can be divided into two broad categories: tangible specific assets and intangible specific assets [52], [53]. It is believed that relationship-specific intangible investments could generate greater causal ambiguity and lock-in effects than tangible specific assets [12].

Three types of tangible asset specificity are (1) site specificity, (2) physical asset specificity, and (3) human asset specificity [51]. Site specificity refers to the situation whereby successive production stages that are immobile in nature are located close to one another. Physical asset specificity refers to transaction-specific capital investments (e.g., customized machinery, tools, dies, and so on) that tailor processes to particular exchange partners. Human asset specificity refers to transaction-specific know-how accumulated by transactors through longstanding relationships (e.g., dedicated supplier engineers who learn the systems, procedures, and the individuals idiosyncratic to the customer).

"Know-how" and "know-what" are two components which comprised relation-specific intangible investments in

organizations [54]. Subramani et al. [53] termed the intangible relationship specificity of these two components as “business process specificity” and “domain knowledge specificity,” respectively.

Business process specificity refers to the degree to which critical business processes of a focal firm are specific to the requirements of the customer in an inter-organizational relationship. Specialized business processes include context-specific processes for new product introduction, customer service, inventory management, and quality control. Specialized routines or standard operating procedures evolve over time in organizations through the codification and institutionalization of successful partners derived from repeated execution of activities [55]. Domain knowledge specificity refers to the degree to which critical assets of knowledge of a focal firm are specific to the requirements of a customer. It refers to an organization’s ability to access and deploy a specific body of prior knowledge in an inter-organizational relationship [56], [57]. For example, important domains of organizational expertise in the retail distribution channel that are specific to a particular relationship include competitive analysis, strategy formulation, and new product conception. Specialized knowledge is created through social processes that encourage the validation, refinement, and enrichment of knowledge in the context of action [56]. This study focuses on the role of intangible specific assets and uses the definition from Subramani et al. [53].

In order to satisfy the requirements of customers, a focal firm might have investments that are specific to a particular customer. For focal firms, specific investments imply the expectation of maintaining a long-term relationship with the customer. On the other hand, relation-specific investments are important sources of the added value of transactional relationships [58] and competitive advantage [32]. In addition, such investments might accelerate information sharing and enhance the degree of supply chain integration [59]. The following is the third hypothesis:

*H3: relation-specific investments will enhance information sharing between a focal firm and its customer.*

Knowledge-based trust results from past experiences. Familiarity with the transaction partners would affect the depth of relationship [60]. Although a focal firm had invested resources to satisfy a specific customer, it does not necessarily trust in the customer. The trusting behavior, information sharing, might not occur. Hence, we viewed trust a moderator between “relation-specific investments” and “information sharing.” When the focal firm believes a customer is trustworthy, it would be willing to share information. The degree of relation-specific investments is irrelevant. However, if trust between transaction partners is relative low, information sharing would be forced. The higher degree of relation-specific investments would result in the higher degree of information sharing. Accordingly, the fourth hypothesis is as follows:

*H4: trust in a customer moderates the relationship between the degree of relation-specific investments and information sharing.*

As the trend of supply chain management is integration and specialization, organizations tend to maintain fewer partners for a long period of time. When there are fewer partners, the dependency of partners would increase. The level of dependency determines the strength of power [43], [61]. In the case of Taiwan’s manufacturing industry, most of the organizations obtain orders from a small number of international customers. In addition, most of them are major customers of the focal firms and hold greater power [46]. In order to survive the rigorous competition, they ask focal firms to lower the inventory cost and time to market. For focal firms, satisfying the requirements of the customers is a critical issue. Solutions include asking for suppliers’ cooperation and setting up specialized processes.

When a transaction partner has greater power than the focal firm, the focal firm might be forced to invest specific assets in order to satisfy the partner’s requirements, such as EDI adoption [43]. On the other hand, the focal firm might actively invest specific assets to improve the service quality and “lock” the customer. Irrespective of whether relation-specific investments are passive or active decisions, the customer’s power is an important trigger. Thus the fifth hypothesis is:

*H5: power of a customer will increase the relation-specific investments of the focal firm.*

### *G. Information Technology Competence (IT Competence)*

Information technology in any form has its own inherent tendencies and influences the nature and direction of organizations. It has changed the way in which organizations manage the process of supply chain and improved competitiveness [62]. According to the resource-based view (RBV), IT alone may not generate a sustainable advantage because most ITs are readily available to all firms - competitors, buyers, suppliers, and potential new entrants - in competitive factor markets [63]. If ITs per se do not provide distinctive advantages for firms, then IT-based advantages can only be achieved and protected through resource complementarity and cospecialization [64] by leveraging or exploiting firm-specific or intangible resources such as organizational leadership, culture, and business processes because it is more difficult for competitors to replicate an entire system than individual IT components [65].

McGrath et al. [66] defined that competence as a purposive combination of firm-specific assets (or resources) that enables the firm to accomplish a given task. Hence, IT competence refers to the extent to which a firm is knowledgeable about and effectively utilizes IT to manage information within the firm [67]. It could be viewed as the organization’s capability and could be used to implement virtual vertical integration.

IT competence consists of three co-specialized resources: IT

objects, IT knowledge, and IT operations [67]. IT objects (also called IT infrastructure) refer to computer-based hardware, software, and support personnel [68]. They act as “enablers” and provide a foundation for information production and dissemination across the entire organization. IT objects also help in developing and implementing the present and future business applications. As reference [69] argued, combining hardware and software assets to create a flexible and sophisticated IT infrastructure can be inimitable because it requires carefully melding technology components to fit firm needs and priorities.

IT knowledge is conceptualized as the extent to which a firm possesses a body of technical expertise about objects such as computer-based systems [67]. Intangible resources such as knowledge are more likely to produce a competitive advantage than tangible resources. A firm’s knowledge and its ability to generate specific knowledge are at the core of the theory of the firm. Likewise, this suggests that IT knowledge can also provide a source of sustainable competitive advantage [70].

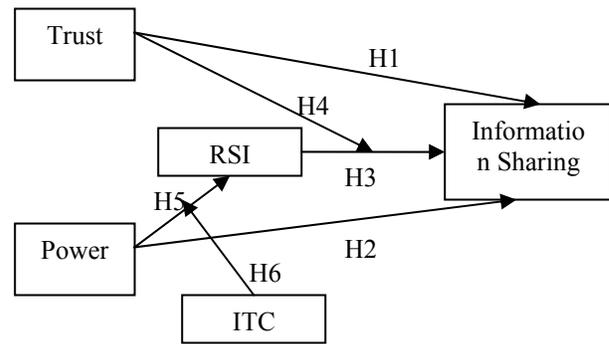
IT operations reflect the extent to which a firm utilizes IT to manage the market and customer information [67]. They enable firms to manage the technical and market risks [71]. This conceptualization corresponds with Dehning and Stratopoulos’s [71] idea of managerial IT skills, which are management’s ability to conceive, develop, and exploit IT applications. As they indicated, IT operations enable firms to manage the technical and market risks. They are tacit, causally ambiguous, and the result of socially complex processes; moreover, they need to be developed over time and with considerable experience. Consequently, IT operations are believed to be a source of a sustainable competitive advantage for firms.

Although an organization might invest resources to satisfy the customers with greater power, these investments are not necessarily specific to the customers. We believe that when an organization has higher IT competence, it would have higher capabilities of integrating related resources to maximize utility. In addition, the organization could utilize resources that are initially specific to a customer in other relationships. As a result, these investments are no longer relation-specific. In this study, IT competence is viewed as a moderator that affects the influence of the customer’s power. The sixth hypothesis is as follows:

*H6: an organization’s IT competence moderates the relationship between the power of a customer and the degree of relation-specific investments.*

### III. METHODOLOGY

According to the discussion in section 2, the conceptual framework is shown as Fig. 1.



**RSI:** Relation-Specific Investments;  
**ITC:** IT Competence

Fig. 1 Research Model

#### A. Research Design and Sample

A cross-sectional mail survey was administered for the empirical investigation of the antecedents of information sharing between the focal firm and one of its major customers. The sample firms for this study were drawn from “2006 Taiwan Top 1000 Listing” issued by Common Wealth Magazine, a leading magazine in Taiwan. Since this study focuses on the relationship between the focal firm and its customers, informants are required to have some knowledge of the degree of system and activity integration with their companies’ business customers. As such, the sales managers of these firms are the target informants for the survey, since we believe that they should be the most knowledgeable and reliable informants within a company to answer our questionnaire. In addition, informants were asked to select one of the company’s important customers while responding to the questions on our research constructs.

We mailed 1,000 questionnaires, of which 143 were returned. Four responses were incomplete and hence, were dropped. The effective rate is 13.9%. The samples for this study consist of manufacturers in a variety of areas. The majority of the respondents are from the fields of electronics (27.22%), semiconductor/optoelectronics (15.65%), metal (12.52%) and electromechanical industry (6.00%). Respondents that represented less than 4% of the sample come from the plastic and rubber products, cars and related parts, nonmetal minerals, communication networks, pharmaceuticals and biotechnology, food/beverages, and paper industries, among others. Compare to the “2006 Taiwan Top 1000” list, the sampling frame, we find that the distribution of our sampled firms is a good representation of the sampling frame. In addition, as indicated in Table 1, the majority of the respondents are managers (61.15%), followed by executives (20.14%) and others (18.71%). The average work experience of the respondents is 10.29 years, and the average number of years that the respondents held the current position is 4.20 years. We believe that the respondents have sufficient knowledge to answer the survey. Most of the respondents (76.98%) are associated with the target customer for more than five years, thus implying a

long-term relationship.

Table 1. Demographic Profile of the Respondents (N=139)

| Demographic Variables                                     | Frequency | Percentage |
|---|-----------|------------|
| <b>Respondent Position</b>                                |           |            |
| Executive   | 28        | 20.14%     |
| Manager   | 85        | 61.15%     |
| Others  | 26        | 18.71%     |
| <b>Respondent's Service Year</b><br>(Mean=10.29)          |           |            |
| 0-10  | 81        | 58.27%     |
| 10-20   | 37        | 26.62%     |
| 20-30   | 19        | 13.67%     |
| 30-40   | 2         | 1.44%      |
| <b>Years in Current Position</b><br>(Mean = 4.20)         |           |            |
| 0-5   | 89        | 64.03%     |
| 5-10  | 38        | 27.34%     |
| 10-15   | 10        | 7.19%      |
| 15-20   | 2         | 1.44%      |
| <b>Years of the relationship with the target customer</b> |           |            |
| 0-5   | 32        | 23.02%     |
| 5-10  | 49        | 35.25%     |
| 10-15   | 30        | 21.58%     |
| Over 15   | 28        | 20.14%     |

### B. Measurement Reliability and Validity

All constructs are measured by using multiple-item scales, and wherever possible, measurement items were adapted from the literature. In addition, items associated with these constructs employ a seven-point Likert-type scale ranged from “strongly disagree” to “strongly agree.”

Several domain experts were asked to assist the translation and modification of the instrument in order to ensure content validity. After compiling the questionnaire, to ensure that the wording of the instrument is consistent with the original version of the questionnaire, semantic differences were checked. Moreover, a pilot test was conducted by using several business executives enrolled in the EMBA program of a school of management in order to ensure the face validity of our questionnaire. Thus, the wordings could be understood by the target audience.

The data analysis was conducted in two steps. At first, the results of the CFA were used to ensure the reliability and validity of the constructs. After excluding four items with high cross-loadings, all other items were found to have factor loadings higher than 0.5. Further, we computed the average variance extracted (AVE) for each variable. All the values that were obtained were higher than 0.5, indicating that the measurement had sufficient convergent validity [72]. Discriminant validity was assessed by the root of AVE. The result revealed that the correlation coefficients of all the variables were smaller than the root of AVE, which indicates sufficiently good discriminant validity.

The reliability of the scales was assessed using Cronbach's alpha and composite reliability. In our study, all indicators satisfied the standards that Nunnally [73] suggested. The result implied that our measurement had good reliability and highly internal consistency. Table 2 and Table 3 show the related indicators in this study.

Table 2. Composite reliabilities, AVE and Cronbach's  $\alpha$ .

|                               | AVE   | CR    | Cronbach's $\alpha$ |
|-------------------------------|-------|-------|---------------------|
| Power                         | 0.704 | 0.877 | 0.776               |
| Trust                         | 0.856 | 0.960 | 0.942               |
| Relation-Specific Investments | 0.648 | 0.936 | 0.923               |
| IT Competence                 | 0.530 | 0.930 | 0.922               |
| Information Sharing           | 0.627 | 0.938 | 0.923               |

Table 3. Correlations between constructs.

|       | Power | Trust | RSI   | ITC   | IS    |
|-------|-------|-------|-------|-------|-------|
| Power | 0.839 |       |       |       |       |
| Trust | 0.314 | 0.925 |       |       |       |
| RSI   | 0.126 | 0.049 | 0.805 |       |       |
| ITC   | 0.385 | 0.292 | 0.149 | 0.728 |       |
| IS    | 0.482 | 0.445 | 0.262 | 0.502 | 0.792 |

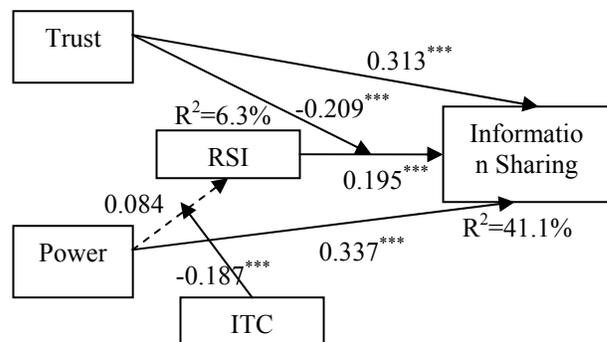
RSI: Relation-Specific Investments; ITC: IT Competence;

IS: Information Sharing.

(Diagonal with grey shading is the root of AVE)

### C. Testing of the Hypothesized Model

The partial least squares (PLS) method was then used to analyze the significance of the hypotheses with bootstrap resampling. We used VisualPLS 1.04 [74] to conduct a PLS regression. The result is presented in Fig. 2. The results of PLS revealed that H1, H2, and H3 are supported as “trust,” “power,” and “relation-specific investments” are positively and significantly related to “information sharing” (p-value < 0.05). On the other hand, H5 is not supported as the relationship between “power” and “relation-specific investments” is not significant.



**RSI:** Relation-Specific Investments;

**ITC:** IT Competence

Fig. 2 Result of Hypotheses Test

In order to test the moderating effect, product items were then included in our model. The result shows both the moderating effect of “trust” and “relation-specific investments” are significant. H4 and H6 are supported. At first, as the product items of “power” and “IT competence” were included, R-squared of “relation-specific investments” had increased from 2.7% to 6.3%. The overall effect size is 0.57. In addition, R-squared of “information sharing” had improved from 37.1% to 41.1% after adding the product items of “relation-specific investments” and “trust”. The overall effect size is 0.1. According to Cohen’s [75] suggestion, the threshold for weak, moderate, and strong moderating effects are 0.02, 0.15, and 0.35, respectively. The interaction effect of “IT competence” is strong while the moderating effect of “trust” is relatively weak. However, this does not imply that the interaction effect is not important [76]. We should be concerned about the manner in which the interaction effect affects the relationship between constructs.

In order to understand the moderating effect, an ANOVA post hoc analysis was conducted. First, the respondents were classified into four groups according to “power” and “relation-specific investments”. At the 10% significance level, the relationship between “power” and “relation-specific investments” is significantly positive when the respondent has lower IT competence. On the other hand, if an organization has higher IT competence, the customer’s power would not associate with the respondents’ relation-specific investments. The result is consistent with our hypotheses. Fig. 3 shows the moderating effect of IT competence.

In addition, we also classified the respondents according to “relation-specific investments” and “trust”. The relationship between “relation-specific investments” and “information sharing” is positive at the 10% significance level when “trust” is low. Besides, when “trust” is high, focal firms have higher level of information sharing but “relation-specific investments” does not associate with “Information Sharing.” Hypothesis 4 is supported. The moderating effect of trust is shown in Fig. 4.

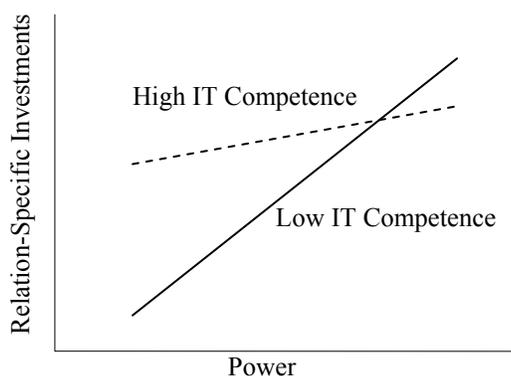


Fig. 3 Moderating Effect of IT Competence.

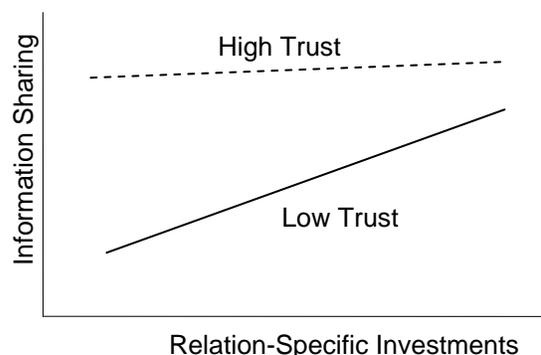


Fig. 4 Moderating Effect of Trust

#### IV. DISCUSSION AND CONCLUSION

##### A. Findings

First, both trust and power relate with information sharing positively. The result is consistent with prior researches [43], [46]. The variance explained is 41.7%. It indicates that relationship with customer is an important determinant for organizations to share information. Besides, organizations might invest specific resources in satisfying the customer’s requirements. In other words, information sharing might be a passive decision in response to a customer.

Second, the customer’s power does not significantly affect the organization’s relation-specific investments. The result contradicts with those of prior researches [32], [59]. The possible explanation is that more than three-fourths of the respondents had transaction relationships with their customers for more than five years. Based on the success of the practice with a specific customer, it might be applied to other customers as the best practice. As a result, the effect of the customer’s power on asset specificity would not be apparent.

Lastly, we contribute to verify the moderating effect of IT competence and trust. The result indicates that the relationship between the customer’s power and relation-specific investments changes when the organization’s IT competence differs. As expected, when an organization has higher IT competence, the customer’s power does not significantly affect relation-specific investments. Although the organization does not face less pressure from its customer, it has higher capabilities to integrate or transform its investments. In addition, an organization with higher IT competence might be more capable of generalizing investments to maintain relationships with other customers; thus, the degree of asset specificity would be lower. In addition, relation-specific investments could force an organization to share information though, this effect only significant when trust is low.

##### B. Implications

In this study, we investigate the antecedents of information sharing from the viewpoint of a focal firm and the role of trust

and power. First of all, we reconfirm the influence of trust and a customer's power. An organization's decision is affected by customers that have greater power. It would change the business process or acquire specific domain knowledge. In order to reduce the risk of the customer's opportunistic behavior, the selection of transaction partners is an important issue. In addition, the customer's power could have positive effects. Information sharing is a form of cooperation and is the beginning of a long-term relationship, thereby making the selection of a partner more important.

Trust would be another force to encourage focal firms share information. For retailers, try to maintain a stable and reciprocal relationship could alleviate uncertainty. Both retailers and focal firms might benefit from long-term relationships. Besides, although the higher level of relation-specific investments results in higher degree of information sharing, the extent of sharing is lower than relationships with higher trust. Enhance the mutual trust between focal firms and their customers would facilitate closer relationships.

On the other hand, the organization should understand how IT affects its operations. It would help the organization to evaluate the value of IT [77]. The effects of IT include internal operation and supply chain management. Although some researches indicated that IT does not benefit the organization's performance, other researches found that IT has indirect benefits. The development of IT brings a competitive advantage and finally, becomes the source of profit [63], [78].

In addition, IT not only reduces the transaction cost but also intensifies the relationships with transaction partners [59], [79]. More importantly, the result of this study also indicates that IT competence could shift the nature of relation-specific investments. When an organization utilizes IT as a type of infrastructure and as a means to integrate its resources, the efficiency and affectivity of transactions would be improved. Such a capability could transform the relation-specific investments into general purpose investments that could provide a greater profit to the organization to a greater extent. For focal firms, IT competence leverages their dependency to the customer. The result encourages focal firms to invest in information technology.

### C. Limitations and Future Directions

There are some limitations in our research that should be overcome in the future. First, the data for this study were obtained from a single informant in the focal firm. However, it is believed that multiple respondents could ensure the validity of results [80]. In the future, different sources of data, such as IT managers, could be involved in the survey in order to provide more robust evidence for the study. Second, the sample frame of this study is the manufacturing industry and excludes other segments that possess equivalent supply chain collaboration relationships. Thus, the generalizability of this study is limited. Including other industries such as the service industry would be helpful. Besides, conduct a comparison

analysis of different industries would be another direction for further research. Finally, the variance explained of relation-specific investments is 6.3%, which indicates that there must be other factors that affect the degree of asset specificity. It would be meaningful to understand why an organization is willing to make relation-specific investments.

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