The Influences of Transaction and Partnership Characteristics on Interorganization System Integration in Manufacturer-Supplier Dyads

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Abstract

The inter-organizational systems (IOS) are considered to be the most important instrument that can link manufacturers and suppliers in the supply chain. When the Internet expands, the role of IOS moves from being merely an operational tool to becoming a collaborative commercial instrument, thus, to improve the integrate effectiveness of the supply chain. This study emphasizes two major dimensions: transaction and partnership, as the main factors which affect IOS integration in manufacturer-supplier dyads.

Based on a survey of Taiwanese electronics firms, the empirical results show that there are five factors positively affecting the IOS integration, including the complexity of components, component criticality, trust, supplier dependence and supplier investments. The variables of market variability have negative effects on the IOS integration. In this study, partnership characteristics are more important than transaction ones. Keeping collaborative relationship will improve the depth of IOS integration.

1. Introduction

Over the years, supply chain management has attracted significant attention, as it has become the next frontier through information systems deployment. The related terminology include: network sourcing, supply pipeline management, value chain management and value stream management [39]. Especially since the 1980s, with increased global porterage, inter-organizational system technology has improved.

Inspired by the concepts of supply chain management, many firms have made great progress in the purchase, logistics, R&D and planning processes, such as strategic purchase, supplier segmentation, early supplier involvement, supplier improvement, partnership, synchronous systems, lean and agile organizations [12], [16], [28], [30]. Innovations and improvements in the business models show that it is, in fact, difficult and complex to manage the process across firms and different organizations. Integration and coordination are indeed two core issues of the supply chain management [3]. Some firms invest on the enhancement of the cooperation among different departments and improve the coordination between two organizations [3]. Inter-organizational systems (IOS) are adopted to link two or more organizations and facilitate the exchange of products, services and information.

This research studies the integration of IOS in manufacturer-supplier dyads for the context of a transaction. It is defined as an exchange of products and services between two separate entities [44]. Past researches that concentrated on examining the transactional context brought forward contingencies such as the nature of the component to be purchased, the nature of the demand for the component, the characteristics of the market source for the component and the nature of the transactional relationship [10], [23], [29], [36]. Grover and Saeed [20] are of the opinion that the factors pertaining to the dyadic transactional context are likely to influence the choice of coordination mechanisms that the firm makes. They also held the position that IOS usage is a coordination mechanism that represents one such choice. Moreover, the partnership between manufacturers and suppliers is a critical factor which affects the IOS configuration because the interactions between firms do not depend on transactions only. Prior researches have concluded three factors of the partnership that are trust, supplier dependence and supplier investments [20], [21], [34]. This research adopts the two dimensions, transaction and partnership as the influent factors of the IOS deployment. The following section briefly reviews the literature related IOS researches. The third section of the paper introduces the adopted research model associated with the hypotheses. The fourth section is the research method description. The fifth section is the statistical results and the discussion. The final section is the research conclusions.

2. Literature review

IOS integration is different from IT adoption or use. The definition of IOS integration is the depth of IOS between the partners. The major reason for
facilitating the coordination-intensive configuration is the mutual benefit to be derived from the cooperation. From adoption to integration, one has to pass through three steps: adaptation, acceptance and routinization (Figure 1) [42]. Although setting up the hardware and developing the software may not be complicated, the IOS integration would require a lot of work to get through the alliance process, mapping data cell, investments and resource sharing. These are logistics coordination jobs. Thus, behind the integrating actions, there are the sharing of the cost of the plan and the acquisition of knowledge. It will expose the firm’s internal information to the other party. If there are no additional advantages, the firms will not proceed with this course of action.

IOS integration can be compared to the trigger mechanism of organizational reconstruction. The meaning behind IOS integration is the mutual coordination of organizations [14]. Purvis et al. [35] think that this is the main factor behind process reengineering. The post-adoption stage will move the two parties towards the adaptation of new technology and its context. Kim and Umanath [26] mention that through electronic integration information technology can facilitate the integration of business processes between organizations. However, implementing IOS between two firms is not the final purpose of any IOS project. The real purpose of IOS is to facilitate the transfer of data and information flow.

IOS integration is similar to the concept of assimilation, which is defined as that aspect of information technology that has increasingly become part of the whole organizational process. Purvis et al. [35] argue that the assimilation or usage is related to post-adoption. Organizations have to address the mutual adaptation of technology and context. IOS integration can be equated with electronic integration. Kim and Umanath [26] mention that the electronic integration has caught the IT-enabled integration of business processes between organizations in midstream. Choudhury [10] thought that electronic dyads and electronic monopolies were IOS-enabled governance mechanisms. They are high level electronic integration. Researchers also emphasized the penetration of the systems [9], [31]. The databases can provide each party with quick access to relevant information. In this study, we use the definition of Grover and Saeed [20]. IOS integration is taken to mean the extent to which systems are shared by two or more firms. The systems are integrated to facilitate access to information residing in either firm.

Information processing theory (IPT) identifies three important concepts—information processing needs, information processing capabilities, and the fit between the two to obtain optimal performance [17]. We have revised then into the following three categories; they are information needs, the depth of integration and the IOS configuration. The information needs affect the depth of integration and finally shape the configuration of IOS with suppliers. IPT deems that the best way to eliminate uncertainty is to deeply process information interchanges. The most important thing is to eliminate uncertainty and ensure a smooth information sharing system. Bensaou and Venkatraman [5] suggest that the uncertainty could arise from three aspects: the environment, organizational relationships and task uncertainties. When the level of uncertainty is low, the standard operation process needed is quite simple. When the level of uncertainty is high, more coordination mechanisms are needed to accomplish the task.

Environmental uncertainty comes from external environmental changes that cause variables in the purchasing process. Partnership uncertainty comes from one firm’s perceived uncertainty about its specific partner’s behavior. Task uncertainty comes from the characteristics of the task involved in the various procurement activities, including task analyzability, task variety and task inter-dependence. Task uncertainty was not included in this study for two reasons. First, our analysis is conducted only at the component level. This is because there are multiple tasks or procurement activities between two business partners for a single component and they could vary in their task characteristics for the same component. Thus, it will be difficult to develop a single measure as a representative activity for this particular component. Second, our initial reservations were reinforced by the feeble results reported in Bensaou and Venkatraman’s study, where two of the three task uncertainty variables were found to be not significantly different among the different clusters of inter-organizational relationships. These are the reasons why we have excluded the task uncertainty aspect.
Researches in organizational theory identify two major dimensions for uncertainty—complexity and dynamism [15], [32]. In component characteristics, component complexity and criticality determine the complexity dimension, while demand uncertainty and market variability determine the dynamic dimension.

Another uncertainty comes from the relationship between and among partners. The uncertainty factor between major trading partners can cause two risks: operational risks and opportunity risks [13]. When firms are confronted with the operational risk, the major action taken is usually to avoid having the partner reneging from the contract. When addressing opportunity risks, firms have to reinforce the relationship-specific investments in order to avoid the other partner from doing anything detrimental in the relationship. This study highlights trust, supplier dependence and supplier investments to evaluate the uncertainty level of the relationship.

3. Research model

Based on the literature review, we define IOS integration as the depth of the system on the other partner’s side. In this research model, there are two dimensions: the component and the partnership characteristics. They have positive effects on IOS integration. The research model is shown in figure 2.

Each characteristic is comprised of several variables. The component characteristics consider the aspects of component complexity, demand uncertainties, component criticality and market variability. The partnership characteristics are concerned with trust, supplier dependence and supplier investments.

3.1 Component characteristics:

3.1.1 Component complexity. We define component complexity as the amount of information the buyer has to specify to the seller for more effective order processing [29]. Component complexity relates to detailed engineering specifications that are needed to explain customized designs, sub-assemblies and intricate component inter-faces [1]. The buyers need to clarify the specifications of the components at the starting stage. Order management system can work more efficiently with this information. Sub-components interaction, engineering re-design and material defects can give rise to different levels of complexity. Rubin [38] points out the increasing pertinent possibility of emergencies, mutual adaptation processes that need to be put in place to effectively respond to emergency situations. Thus, complex components will be dealt with through a coordination-intensive structure. In response to high coordination needs, the deployment of an IOS that facilitates information processing and exchange would effectively manage the component complexity [27], [34]. The governance mechanisms support quick access to information and efficient data storage. They can help firms to manage any emergencies in the procurement process. Thus, we propose the hypothesis: Hypothesis 1: The complexity of the component is positively associated with IOS integration.

3.1.2 Demand uncertainty. Demand uncertainty reflects the changes in demand for the component being procured and the inability to accurately predict these fluctuations [43]. The unpredictability of demand creates an adaptation problem between the buyer and the seller [23]. Adaptation can be managed either by incurring higher costs or by designing a mutually acceptable adjustment process. Galbraith [18] argues that a high level of uncertainty increases information processing requirements that will have to be matched by either expanding the information processing capacity or by reducing the need to process information. For example, if demand uncertainty is high, coordination requirements go up exponentially due to the possibility of excess capacity or stock outs [43]. Firms can compensate for the lack of visibility by increasing buffer and safety stocks, thus incurring higher costs. On the other hand, firms can install mutually acceptable adjustment processes by expanding their information processing capacity through the availability of real-time information on demand, capacity and schedules. Such an information system can enable firms to efficiently monitor and respond to deviations in estimates [27]. Variations in demand for the component can be effectively managed through a close coupling of information systems that

![Figure 2: Proposed research model](image-url)
3.1.4 Market variability. Choudhury [10] defines market variability as two attributes: (a) Market fragmentation: Fragmented industries with a large number of atomistic firms have great variability in products and prices than the more concentrated industries with only a few large players. (b) Market Volatility: This means that the rate of prices and players in the market changes over time. Grover and Saeed [20] examine the two attributes which affect the IOS integration. They found that market fragmentation had a negative effect on the IOS integration, while the market volatility had an insignificant effect in the electronic industry. Market variability captures the extent to which the market, through which a particular component is being sourced. They represent a large number of smaller suppliers that provide a diverse set of products and prices. Market variability provides a good opportunity for buyers to do comparable shopping [10]. An electronic market enables the buyers to search for related information with minimal search-related costs, consequently, decreasing the potential for opportunistic bargaining. In a changing market, the value of the electronic brokerage effect goes up and the decision to have IOS integration would depend on a trade-off between the benefits of integration or brokerage. The extent of IOS integration reflects this choice.

Kambil et al. [25] argue that in order to gain the benefits of integration, firms will have to forego the benefits of participating in the open market. By deploying an integrated IOS, a firm may forego the opportunity to foster competition among the suppliers but get better value for their money. We consider that a variable market may be ripe for leveraging the brokerage effect. However, developing an integrated IOS may not be in the best interest of the buyers. Therefore, we propose the hypothesis:

Hypothesis 5: Trust is positively associated with IOS integration.

3.2 Partnership characteristics:

3.2.1 Trust. Researchers examining sociological factors identify trust as an important variable that affects inter-organizational relationships [22]. Trust refers to the level of confidence that the behavior of the other party conforms to one’s own expectations, and reduces the parties’ need to monitor each other [6]. Greater trust may also symbolize a shared set of sentiments of belongingness [41]. Thus, trust in the suppliers reduces the perception of risks associated with opportunistic behavior [19], and therefore encourages greater information sharing between the two firms. On the other hand, firms with low levels of mutual trust restrict themselves to transmitting only those pieces of information that are operationally necessary [5]. In the presence of greater trust, a reduced information exchange may be adequate due to the lesser need for monitoring each side. Thus, we propose the hypothesis:

Hypothesis 5: Trust is positively associated with IOS integration.

3.2.2 Supplier dependence. Dependence relates to the extent to which one firm is dependent on another for resources and services. Hart and Saunders [22] argue that a supplier is considered to be dependent on the
Although the hardware and software can be put into establishing a coordination-intensive configuration, governance, wherein both organizations invest in thus constitutes a mechanism to support bilateral between trading partners that are enabled through IT. It reflects tighter linkages of the transaction [40]. IOS integration is a specific technology (IT) has to offer is dependent on the nature regarding the usage of the advantages that information transactions with its trading partners. The choice investments not only have the long-term cooperation relationship [33]. Supplier investment is a strong indicator of the level of willingness to cooperate and the capability to coordinate. Firms can invest in systems to match the coordinate needs, and the systems can be improved to become integrated. Thus, supplier investments not only have the long-term cooperation intention, but also reflect the inclination to coordinate. Therefore, we propose the hypothesis:

Hypothesis 6: Supplier dependence is positively associated with IOS integration.

3.2.3 Supplier investment. Investments by the firm and the supplier that are specific to the relationship for a particular product provide a strong signal to the other partner about their desire for a long-term relationship [19]. A tight inter-organizational relationship requires a significant information exchange system to support that relationship [33]. Supplier investment is a strong indicator of the level of willingness to cooperate and the capability to coordinate. Firms can invest in systems to match the coordinate needs, and the systems can be improved to become integrated. Thus, supplier investments not only have the long-term cooperation intention, but also reflect the inclination to coordinate. Therefore, we propose the hypothesis:

Hypothesis 7: Supplier investment is positively associated with IOS integration.

3.3 Control variable:

Firm size is included in the model as a control variable. We expect that larger firms will have greater resources, capabilities and a stronger inclination to deploy integrated IOS.

3.4 IOS integration

Organizations deploy IOS applications to support transactions with its trading partners. The choice regarding the usage of the advantages that information technology (IT) has to offer is dependent on the nature of the transaction [40]. IOS integration is a specific configuration of IOS use that reflects tighter linkages between trading partners that are enabled through IT. It thus constitutes a mechanism to support bilateral governance, wherein both organizations invest in establishing a coordination-intensive configuration. Although the hardware and software can be put into other uses quickly, deploying an integrated IOS requires an extensive commitment from the trading parties in terms of aligning processes, mapping data elements and investing in shared resources. The shared IOS infrastructure is configured to accommodate the idiosyncrasies of inter-facing processes within each organization, thereby enabling a seamless sharing of information and applications among the trading parties. Despite increasingly open and modular structures, there are switching costs involved for both parties. These include set-up costs in terms of understanding inter-firm processes and translating this knowledge into an appropriately configured IOS. Implementing one requires mutual commitment from the transacting parties that is visible in the joint allocation of resources to the configuration of IOS. IOS integration has similarities with the concept of assimilation, which is defined as the extent to which IT becomes an integral part of the organizational processes [14]. Purvis et al. [35] highlight the fact that the assimilation or usage stage is related to post-adoption, wherein organizations often had to contend with the mutual adaptation of technology and its context. The assimilation of IOS in the context of this study can thus be equated to the idea of electronic integration. Kim and Umanath [26] propose that electronic integration can capture the IT-enabled integration of business processes between organizations. Choudhury [10] proposes electronic dyads and electronic monopolies as IOS-enabled governance mechanisms that embody a high level of electronic integration. Researchers also emphasize the inter-penetration of the systems and the concept of integrated databases that can provide each party with quick access to relevant information as features that connote electronic integration [9]. IOS integration is the extent to which the systems shared by two or more firms are integrated to facilitate access to information residing in either firm.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Component complexity</td>
<td>The description of component complexity</td>
<td>[20], [24], [27]</td>
</tr>
<tr>
<td>Demand uncertainty</td>
<td>The unpredictability of the volume and time of demand</td>
<td>[7], [27], [34]</td>
</tr>
<tr>
<td>Component criticality</td>
<td>The importance of the component in the end product</td>
<td>[8], [34]</td>
</tr>
<tr>
<td>Market variability</td>
<td>The variability of a single component market</td>
<td>[10], [20]</td>
</tr>
<tr>
<td>Trust</td>
<td>Level of trust with supplier</td>
<td>[19], [21], [34]</td>
</tr>
</tbody>
</table>
Supplier dependence | Level of partner’s dependence on the manufacturer | [20], [22]
Supplier investment | Level of partner’s investments on manufacturing capacity, facilities and staff | [6], [7], [34]
IOS integration | Depth of information system reach to supplier’s side | [20]

4. Research methodology

575 questionnaires were sent to respondents. A total of 181 responses were received after two rounds of solicitations. Out of these 181 respondents, 20 questionnaires were not included due to missing values. There were 161 valid questionnaires with a 31.5% response rate. Because the samples came from the website (size is 86) and from hard copy (size is 95), we compared them using statistical analysis. There were no significant differences for the capital amounts and the number of employees.

4.1 Discriminant validity

In judging the discriminant validity, the square roots of AVE must be bigger than the correlation coefficients of each variable [4]. The correlation coefficient of mutual variables must be lower than 0.9, which means that the two variables have discriminant identifications [2].

Therefore, in the test of discriminant validity, the theoretical suggestion is for the AVE to be bigger than 0.5. The correlation coefficients of mutual variables are smaller than the square roots of AVE. Compared with the largest coefficient 0.75; it is still smaller than the lowest score 0.84 of the diagonal numbers. Based on the rules above, this research has good discriminant validity (Table 2).

<table>
<thead>
<tr>
<th></th>
<th>CC</th>
<th>DU</th>
<th>CCR</th>
<th>MV</th>
<th>TR</th>
<th>SD</th>
<th>SI</th>
<th>VI</th>
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<tbody>
<tr>
<td>CC</td>
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<tr>
<td>DU</td>
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<td>0.91</td>
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<tr>
<td>CCR</td>
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<td>0.06</td>
<td>0.89</td>
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<tr>
<td>MV</td>
<td>0.31</td>
<td>0.20</td>
<td>0.42</td>
<td>0.97</td>
<td></td>
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<tr>
<td>TR</td>
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<td>-0.08</td>
<td>0.31</td>
<td>0.17</td>
<td>0.88</td>
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<td>-0.11</td>
<td>0</td>
<td>0.97</td>
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<tr>
<td>SI</td>
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<td>0.15</td>
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<td>0.44</td>
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<tr>
<td>VI</td>
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<td>-0.13</td>
<td>0.50</td>
<td>0.52</td>
<td>0.60</td>
<td>0.94</td>
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Notes: Square roots of average variance are shown on the diagonal.

4.2 Model test

The PLS software (Smart PLS) was used to examine the hypothesis. The variance of the dependent variable can be explained by using the independent variable and the result is quite significant (p<0.001). The hypotheses were tested using path coefficients whether they were significant or not. The method used to estimate the path coefficients is the bootstrapping process to randomly draw out 100 samples from the original data. The results are shown in Figure 3. After going through the model test, only one out of all the hypotheses is shown to be insignificant. The results indicate that “demand uncertainty → IOS integration” is insignificant (T-value=0.228<1.96). The control variable “supplier firm size → IOS integration” is insignificant (T-value=0.493<1.96).

In all the factors which affect IOS integration, the path coefficient of supplier dependence is greatest (β=0.411), it shows that supplier dependence will seriously influence the level of IOS integration. The second important factor is trust (β=0.34), indicating that a manufacturer’s trust of its suppliers will influence the depth of IOS integration. The third higher coefficient is component complexity (β=0.292). It shows that when the component is complex; they need to transfer more information through IOS. The information needs will facilitate the IOS integration. The fourth higher coefficient is component criticality (β=0.256), which implies that more control and monitor actions are necessary to reduce the inventory and extent of real-time reaction. Finally, supplier investment has an impact on IOS integration (β=0.206), which shows that a particular supplier has the willingness to maintain a long-term relationship with the manufacturers. In the overall hypotheses, there is a
negative effect which is market variability. The results show that when the market is more variable, the level of IOS integration is lower. The manufacturer has to deal with different suppliers in every transaction, making the IOS integration more difficult.

5. Discussion

The integration through IOS is the best condition that can be arrived at for manufacturers and suppliers; that is, the integration between them that involves cooperation and compromise between the two parties. This integration is affected by transaction and partnership factors. With regards to IOS integration, this research has focused on the three levels just like Grover and Saeed’s [20]: file exchange, share of application software and share of a database. The data exchange which includes quotations, product specifications, and consignment of goods, can be conveyed by e-mails or group software. The sharing of a database deals with some further information about database systems and offers the latest information about stock levels and new product development processing. This can lead to further collaboration for the development of new products.

This research made use of previous researches that emphasize the importance of transactions and partnership contexts and their impact on IOS integration. It was found that firms tend to implement an IOS when the component complexity is high, the market variability is low and the component criticality is high. As to the mutual relations, when the trust is high, supplier dependence is high and the supplier investment is also high. Thus, the IOS integration will be at the most beneficial level. This research offers a useful standardization model to indicate the IOS integration and its proper configuration.

Manufacturers and suppliers have actual needs of IOS sharing because of component complexity. For the manufacturers, suppliers have to share the compatibility and performance testing reports of components. As to the suppliers, manufacturers have to provide the information of complicated components, such as special techniques and engineering configurations. Thus, there is the complex component process trade work with its intensive-coordination resulting in more integrated IOS and collaborative members. In order to match the higher coordinative needs, deploying IOS to facilitate the processing and exchanging of information will effectively manage component complexity [27], [34].

We expect demand uncertainty and IOS integration to have a positive relationship, but IOS integration is not necessary in detecting demand uncertainty. The distribution safety can solve the problem of demand uncertainty. This theory is explained clearly in the Theory of Constrains (TOC) [37]. In the production line, level of stocks is calculated into the producing process to ensure that the production is successful. This factor can also help solve the problem of demand uncertainty. In this research, it was shown that demand
uncertainty did not have a great impact on IOS integration which is consistent with the findings of Grover and Saeed [20] who indicated that stoppages in the production line have resulted in the valid information. According to this research, the electronic industry in Taiwan run a lesser risk of having shortage problems by purchasing buffer stocks from back-up suppliers. However, IOS integration is not an efficient way to solve the problem of demand uncertainty.

There is a high correlation coefficient between component criticality and complexity \((r=0.75)\). These important components have two characteristics at the same time. Most of the critical components belong to the major stages of production or have quality influence on the final products, or may result in a higher price. This is from the point of view of information control and monitoring. The component complexity emphasizes the amount of information needed. Although the two factors have high relativity, they are clearly represented in two different dimensions. They can have different impact on IOS integration.

Choudhury et al. [11] made a research on the airplane parts market and found out that the market system is more suitable in fragmented market. The market system is the same as in the electronics market. Many companies have made its non-strategic component purchases through the Internet. Thus, they can have more chances to compare the prices and to lower them. Such a system offers a chance to lower the cost of producing products and to expand the search space given the extreme marketing survey. In this way, shopping costs can be lowered. Choudhury called this the “brokerage benefit.” Much is attributed to market variability in order for us to understand the difference between IOS integration and the electronics market. The competition between these two affects the decision by managers about which system they will choose. In a fragmented market, the buyer does not have a fixed relationship with the suppliers. Thus, the buyer can benefit more from bargaining price. On the other hand, if the market is fixed only to some suppliers, then integration offers the best way for them to reduce the storage. The research results indicate that when a manufacturer is confronted with fragmented market variability, the IOS integration becomes negative. In other words, electronics market is more suitable than IOS integration in a variable market environment.

Many researches have shown that only when the manufacturers have trust on their suppliers can cooperation work well. This trust can result from the accumulated confidence of previous business cooperation schemes. When suppliers keep their promise for product shipping, product quality and on time deliveries, then the manufacturer will have enough trust on the suppliers [5], [6], [22]. We all believe that mutual trust is the bedrock of partnership integration. On the basis of trust, the company will understand the potential benefits and the manufacturer will be glad to improve the efficiency and capability of IOS integration.

Because IOS integration has to be built on the basis of mutual cooperation, if the suppliers take into consideration the manufacturer’s needs, it will act as the trigger motivation for integration. The results of this research indicate that when the manufacturer constitute a big proportion of a supplier’s revenues or become the major benefit source, it will be advantageous to deploy IOS integration in this context [22]. In this way, the manufacturer is the potential customer of the supplier. In order to meet the needs of the customer, the supplier has to respond to all the requirements. Thus, supplier dependence can explain the motivation for putting in place IOS integration.

Supplier investments represent the actual action of a long-term relationship [19]. In previous researches, it has been shown that asset specific investments have a positive effect on strengthening mutual relationships. Asset specific and supplier investments have high correlative connections. This research expands the scope of assets, including employee skills, product capacity and instruments. The results indicate that the supplier who is willing to invest in a long-term relationship can help facilitate the level of IOS integration. In contrast to supplier dependence, supplier investments describe the actual action of a long-term relationship. It has a positive and significant effect on IOS integration.

Supplier firm size is not found to be significant to IOS integration in this study. This is different from the research results of Grover and Saeed [20]. Early researches recognize firm size as a factor which affects the adoption of IOS. It was thought that with a bigger firm, they will have more ability to invest in IT. In this research, we found that firm size has no significant effect on IOS integration.

6. Conclusion

Most of the researches consider that IOS integration is similar to the adoption or assimilation problem, not the governance construction. Previous works provide a lot of knowledge bases, but there are only a few researches that seek to find out what are the factors which affect IOS integration. We combine transaction and partnership viewpoints to present our contributions to the body of knowledge in this regard.
Eventually, there are five findings:

1. The ordinary performance of the suppliers will reflect the trust of manufacturers. Trust is the foundation for IOS integration.

2. When the component complexity is high, IOS integration is appropriate. It increases the need for information and also extends the need for IOS integration.

3. When the market is variable, firms should consider the electronics market in place of IOS integration. Thus, companies can benefit from comparing prices.

4. The relation between demand uncertainty and IOS integration may be constrained by the production field. IOS integration can facilitate the information flow, but if firms can not benefit from the information provided, its value will be reduced.

5. Supplier dependence and supplier investments can trigger the motivation and actual behavior of the suppliers. These are the two factors that can push IOS to a deeper integration.

These findings suggest that we should not consider IOS integration as a panacea for managing all supply-chain relationships. It is not necessary to integrate all the suppliers. Firms have to consider their own strategies and contexts on how IOS can be best utilized.

The valuable contribution of this study is to adopt the “fit” concept of IPT to manage the configuration of IOS between different suppliers. Through systematic survey and investigation, we can provide a clear scope of the factors which influence IOS integration.

References


