

6. Discussion

In this chapter, we first discuss the item and structure refinements after a series of measurement assessments and the confirmatory factor analysis. Then we discuss the managerial implications of the refined construct by applying some descriptive statistical analysis.

6.1 Discussion of Supply Chain Capability Construct

6.1.1 Items of the Construct

It is notable that all items of TC were either dropped or moved, eliminating the dimension from the construct. The possible reason is that technology capability is not a performance differentiator for both suppliers and original equipment manufacturers (OEMs) in Taiwan PC industry. Most of the suppliers in Taiwan PC industry are small and medium-sized enterprises (SMEs); therefore the trading means of the interorganizational collaboration may greatly depend on the requests of their customers. The customers choose the suppliers with a long-term relationship so that the quality, cost, and the price of the offerings are trustworthy, rather than choose those simply having better technology abilities. Thus, from the SMEs' perspective; suppliers do not consider the technology capability as a major ability for supply chain collaboration. On the other hand, from the perspective of OEMs, they are big and powerful in the Taiwan PC market. Due to the government support and similar customer pool, most of them have developed high but similar technology capability to conduct the inter-firm coordination. Technology capability can not generate competitive advantage for them.

The statistical analysis also suggests us to move the items that measure the IT investment to the transaction level, indicating that the investment of IT infrastructure is an important factor to reduce transaction related risks. This change represents that the firms' IT infrastructure can not directly influence the supply chain capability by itself, but it indirectly affect by reducing the transaction risks. This finding is basically consistent with previous IT research (Bakos 1991, Clemons and Row 1992, 1993, Kumar and van Dissel 1996). For example, Kumar and van Dissel (1996) propose a framework that considers the IT as a supporting role in reducing transaction costs and transaction risks. In order to reduce the transaction risks such as overgrazing of the common, fouling or contaminating, and poaching the commons, Kumar and van Dissel (1996) suggest that IT may be used effectively as the village constable to guard against these risks. According to the results of Clemons and Row (1992), IT is both creating the opportunity for cooperation and providing the monitoring capability to reduce the transaction risk associated with cooperation. Their research shows that the IT increases the amount or timeliness of information transferred across firm

boundaries as well as reduces the information asymmetries which result in transaction risks. Therefore, instead of being treated as an independent supply chain capability, IT should be viewed as one of the transaction enablers.

In summary, our research points out the IT capability is not a significant supply chain capability for good supply chain collaboration. This result is contrast with most of past related studies as they treat technology as one of the important factor for inter-firm collaboration. Though this finding may need further justification in the future, it reflects the fact that more and more companies view IT as a foundation for inter-firm transaction, but not a weapon for creating competitive advantage. In our interview, most companies agree that technology is not a major concern while considering supply chain collaboration, other factors like trust or the power of partners play more important role.

6.1.2 Structure of the Construct

Another interesting aspect of this study is the discovery of a second-order confirmatory model. The three dimensions are modeled as baseline latent variables, determined by two second-order latent variables. The first label presents the firm capability which can effectively help company handle the transaction related risk with the technical and managerial abilities. The second label expresses the inter-firm capabilities that include the abilities to promote good supply chain relationship and capacity to handle the uncertainties in the dynamic environment. The dimensions of our final model are described as follows.

Firm capability: The dimension consists of a transaction level describing abilities of reducing transaction risks: degree of technology investment in IOS (TC6), establishment of IT infrastructure (TC7), establishment of applications to support tasks (TC8), successful implementation experience (TR1), following the industrial standard (TR3), and pre-established security mechanisms (TR4). The first three items are from the technical perspective to reduce the transaction risks and the other three items are from the managerial perspective to prevent the transaction risks.

Inter-firm capability: the dimension includes two levels – (1) promote good relationships and (2) manage environment change. The relationship level measures how to well maintain the supply chain relationships with trading partners, including the items of existed undergoing supply chain collaboration projects (GR1), establishment of clear norms for business behavior (GR2), sharing confidential or proprietary information (GR3), similar IT infrastructure (GR5), compatible company culture (GR6), providing similar support of cooperative firms by top management (GR8), technology support or cost premiums (GR9), and education seminars or system implementation expertise (GR10). The environment level comprises of the capabilities of handling the environment uncertainties: related technologies and systems to help gather information (EC1), explicit regulations to measure trading performance (EC2), sending the timely, accurate, and complete information (EC3), and

clearly known practices and procedures in doing inter-firm tasks (EC4).

Thus, to understand firms' supply chain capability, this study suggests the companies have to consider two dimensions: firm capability and inter-firm capability. The firm capability presents the abilities to reduce the transaction related risks, and the inter-firm capability indicates the abilities to handle the relationships and environment issues. It is interesting to notice that past research seldom considers the ability to handle environment uncertainty as an important supply chain capability. However our study indicates that such capability becomes more and more important in the current e-business environment where customer requests frequently change, product obsoletes quickly, and customization becomes a norm.

6.2 Managerial Implications

Despite this research does not investigate the relationship between the capability and the performance in the supply chain network, we conduct the descriptive statistical analysis to initially understand the relationship between the supply chain capability and the IOS types as well as the supply chain roles. Further managerial implications can be derived from the analysis.

6.2.1 The Impact on IOS Adoption

According to our survey, there are more than half respondents mostly use web browser systems for their inter-firm businesses in their company. The EDI/EOI (EDI on the Internet) and RosettaNet adopters are in the minority, which accounts for 14.5% and 11% respectively. Twenty percent of respondents use other ways for inter-organizational transactions, such as traditional fax, e-mail, or other trading platforms.

According to Figure 6-1, it is interesting to note that different systems require different supply chain capabilities. For example, the EDI/EOI adopters have higher capability to promote good relationship than other types of IOS adopters (5.36 for EDI/EOI versus 4.72 for average of other types). It maybe because the EDI/EOI requires heavy asset-specific investment, companies need to ensure the relationship with their trading partners are trustworthy before the investment. To encourage their suppliers to adopt, the companies also need to continue facilitating the relationships and stop viewing suppliers as adversaries. On the other hand, the web browsers as well as the RosettaNet are the IOSs based on the open IT standards, and therefore their adopters do not need the partnerships as tight as those of EDI/EOI.

While the focal firms require suppliers to adopt the EDI technology, the companies must develop closer relationships with suppliers and stop viewing suppliers as foes. Similar as the case of the Boeing Company (Riggins and Mukhopadhyay 1994), these firms consider

suppliers that adopt EDI have committed to building a long-term trading partner relationship.

We also find that adopting different systems can help firms build different capabilities. For instance, the RosettaNet adopters are more able to foster capabilities to reduce the transaction related risk and manage environment change than other IOS adopters. The reason may be that Rosettanet standard is an industry-wise one and therefore its adoption allows firms to reuse the expertise in similar cooperation projects and build the security mechanisms to protect data on the Internet. In addition, its process standards requires firms to have sufficient technologies and business procedures to handle the exception and gather information from the surrounding supply chain environment, and therefore its adopters have higher capability to manage the environment change.

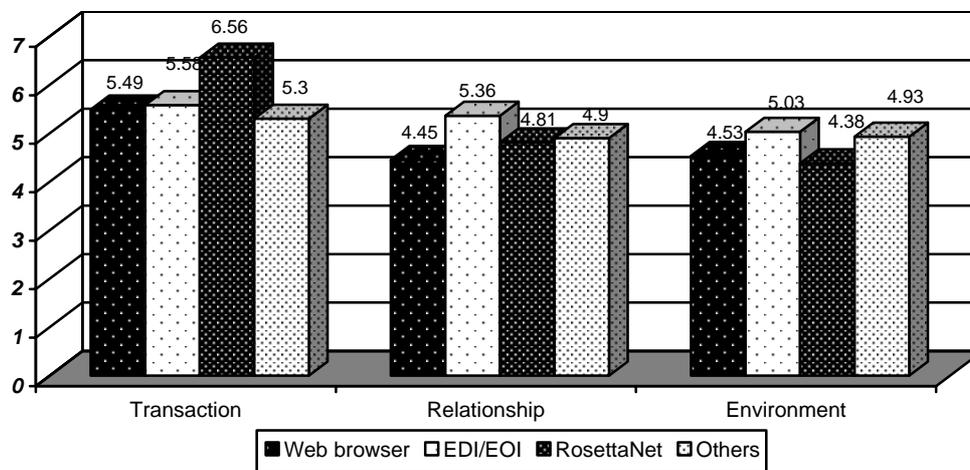


Figure 6-1. Results of Measurement – IOS Type

6.2.2 The Impact of Supply Chain Role

Our survey includes respondents from different supply chain sectors. Most respondents are raw material or component suppliers (49% of those are the raw material supplier and 36.4% are the component suppliers). 5.5% of them are the service provider and 9.1% are original equipment manufacturers (OEMs). We investigate the capabilities owned by different supply chain roles and interestingly find that different supply chain roles put their focus on different capabilities.

Based on Figure 6-2, the service providers own the highest capabilities in terms of reducing transaction risks, promoting good relationships, and managing environment uncertainty of all the other roles. The reason could be that service providers build the connection between suppliers and customers in the PC industry. They collect and handle customers' needs to aid suppliers to produce and promote products, and therefore their core competence relies on how they can foster and maintain each capability that satisfies their industrial partners. In contrast, the raw material suppliers have the lowest capabilities of all

the others because most of them are relatively small and have less capital and scale to foster supply chain collaboration. We also find that system OEMs have less interest to promote good relationship than other roles (4.33 for system OEMs versus 5.03 for average of other roles), indicating that system OEMs do not put as much effort as other roles on improving complementary business practice, culture, and support between trading partners, as well as to develop regulations to manage dependencies. The possible reason is that systems OEMs have enough purchasing power to force the suppliers to follow their own business rule, and therefore they would not put the issues of promoting good relationship in high priority.

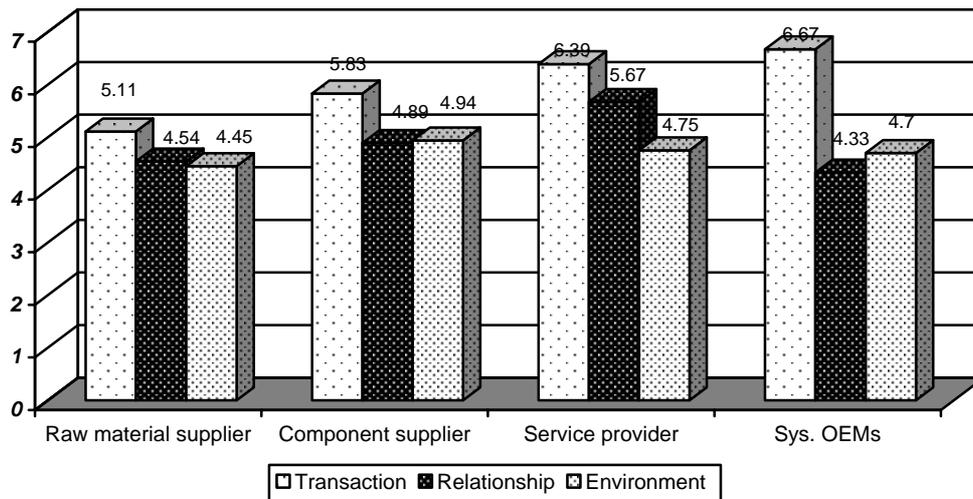


Figure 6-2. Results of Measurement – Supply Chain Role