Role of Supply Chain Collaboration on Organizational Performance: An Empirical Investigation of Electronics Part Businesses in Thailand

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ABSTRACT

This study analyzes supply chain collaboration construct and how it is related to creation of competitive advantage, which leads to achievement of organizational performance. A four-dimensional scale of supply chain collaboration was validated. The study confirms these influences empirically, basing the analysis on a sample of 165 firms from electronics part businesses in Thailand. The results reveal that (1) the three dimensions of SCC (Information sharing, resource sharing, and joint knowledge creation) positively impact on organizational performance through supply chain responsiveness and competitive advantage; (2) supply chain responsiveness influences organizational performance positively both directly and indirectly through competitive advantage; (3) competitive advantage positively impact on organizational performance ;(4) long-term relationship orientation positively affects resource sharing; and (5) information technology orientation positively affects all four dimensions of supply chain collaboration. Companies that are interested in supply chain collaborations can consider engaging in long-term collaboration depending on the construct of current collaborations. This will help SC partners to make investment decisions particular to collaboration. The value of the paper is that it offers a different perspective on SCC.

Keywords: Supply Chain Collaboration (SCC), Competitive Advantage (CA), Supply Chain Responsiveness (SCR), Organizational Performance (OP)

1. INTRODUCTION

Leading companies increasingly view supply chain excellence as more than just a source of cost reduction – rather, they see it as a source of competitive advantage, with the potential to drive performance improvement in customer service, profit generation, asset utilization, and cost reduction. Supply chain collaboration is an exciting discipline in the field of supply chain management (SCM), as it involves the interplay and coordination of different stakeholders of the supply chain (Cooper and Ellram, 1993; McLaren et al., 2002). Supply Chain Management (SCM) is the contemporary way to fulfill customer satisfaction and corporate objectives. It's brilliant at creating company value with the minimum cost to the world-class manufacture and service provider. The phenomenon of SCM is not just about short-term partnership. But it involves supply chain collaboration, which is founded on long-term and trustworthy relationships (Mentzer et al., 2001; Chin et al., 2004). There are many stakeholders in the supply chain such as the customers, suppliers, and the firm collaborates, they will make joint

decisions and share benefits in information and resources which lead firm to minimize costs from their business decisions (Simatupang and Sridharan, 2005).

How supply chain collaboration determines the importance of stakeholder-organization relationships still absent from much of the stakeholder management literature. The notion of these relationships is a major theme in the marketing relationship literature. In fact, superior stakeholder satisfaction is critical for successful companies in a hypercompetitive environment (D'Aveni, 1994). Empirical research has begun to investigate what determines the success or failure of relationships between exchange partners. This has been accomplished by examining both the characteristics of the organization as well as the specific stakeholder groups and the nature of the interaction between them (Pfeffer, 1981; Jensen & Meckling, 1976; Morgan & Hunt, 1994; Parsons, 2001). This research then makes a discussion of how these relationships should be correlated. The proposed model aims to consider the relevant whole chain of supply chain collaboration (SCC) including its antecedents and consequences. This relationship has been under – researched in the literature. Transaction cost economics perspectives was suggested to back up these relationship. Nine hypotheses were then developed for assessing the relationships of this concept.

This research attempts to empirically test a model of the relationship among supply chain collaboration, its antecedence, and consequence that evidence from the electronics part businesses in Thailand. Therefore, it leads to the related objectives as follow : (1) How does supply chain collaboration have an effect on supply chain responsiveness, competitive advantage and organizational performance?, (2) How does supply chain responsiveness have an effect on competitive advantage?,(3) How do supply chain responsiveness and competitive advantage have an effect on organizational performance?, and (4) How do the two antecedents (long-term relationship orientation and information technology orientation) have an effect on supply chain collaboration?.

2. LITERATURE REVIEW

Based on a review of relevant literature and theories, this research argues that, SCC consists of four major dimensions (Chan, Huff, Barclay, and Copeland, (1977).: 1) Information sharing is an ongoing joint activity between the customer and the supplier directed at sharing information that has the potential to influence behavior. 2) Resource sharing is the willingness of an exchange partner to develop and maintain a stable, long-lasting relationship through the investment of financial, physical, or relationship-based resources. 3) Collaborative communication is activities undertaken by channel members to map out knowledge, challenge inconsistency of knowledge, and improve stock of knowledge. 4) Joint knowledge creation is an ongoing joint activity between the customer and the supplier directed at making sense of information that has the potential to influence behavior.

Supply chain collaboration consists of a relationship which can be considered as in long duration and within organizations which aim to reach the same objective while working in a partnership (Mentzer et al., 2000). In order to reach collaboration, Chin et al. (2004) insisted that the control of good management among buyers and suppliers is of upmost importance. It was also stated that improving and keeping relationships built on trust, participation in making decisions jointly and solving problems, as well as the

ability to share correct information is of upmost importance in order to allow the supply chain collaboration to be workable (Chin et al., 2004). Moreover, Whipple et al., (2010) purported the definition of long term supply management is considered a long term relationship which involved cooperation between participants, the sharing of information, and the ability to work with one another in order to prepare and adjust their business practices in order to develop the performance together. Supply chain collaboration investigates to make the most of the knowledge, expertise and skill of businesses in order to provide the outcome as a whole of customers prospective. Fawcett et al. (2008) voiced their opinion that the collaboration's objective is to ensure that parties work together and to create and put into action improved approaches to rectify problems and provide the level of cost that customers anticipate.

This review of literature will specifically examine the influence of SCC on the following organizational outcomes supply chain responsiveness, competitive advantage, and organizational performance. Therefore the first four hypotheses were proposed (H1a-c through H 4a-c).

Hy 1 -4 a - c: The higher (1) the information sharing, (2) Resource sharing, (3) Collaborative communication and (4) Joint knowledge creation is, the more likely that firms will gain greater (a) supply chain responsiveness, (b) competitive advantage, and (c) organizational performance.

Supply chain responsiveness is the ability of the supply chain to rapidly speed and flexibility address changes and requests in the marketplace (Holweg, 2005). According to Swafford et al., 2006a, responsive system need to speed and flexible. Prater et al. (2001) also supported this idea that as the levels of speed and flexibility in a supply chain increase, the level of supply chain responsiveness increases too. Therefore, an effective supply chain is required to achieve speed and flexibility to achieve all competitive performance objectives.

Competitive advantage is defined as the capability of an organization to create a defensible position over its competitors (Li, L. Y., 2006, p.111). This study utilizes to a relational perspective to explain competitive advantage as relationship - based competitive advantage (RBCA). According to relational view, relational rents are jointly generated and owned by the dyad or network partnering firms. A firm in isolation, irrespective of its capabilities or resources, cannot enjoy these rents. Both parties use the inter-organizational strategy to establish an ongoing relationship that can create value that could otherwise not be created by either firm independently (Lavie, 2006).

Organizational performance refers to firm's innovative capabilities in both product and process such as product development, the deployment of new process technologies, and management practices which consist of VRIN (value, rare, inimitable, and non-substitutable) attributes of resource based view (Barney, 1991).These innovations are adopted based on customer needs and requirements to increase competitiveness and overall profitability of firm.

As review, the following 3 hypotheses (H5-H7) were proposed.
Hy 5: The higher the supply chain responsiveness is, the more likely that firms will gain greater competitive advantage. Hy 6: The higher the supply chain

responsiveness is, the more likely that firms will gain greater organizational performance. Hy 7: The higher the competitive advantage is, the more likely that firms will gain greater organizational performance.

Long-term relationship orientation refers to the degree to which the supply chain parties familiar with their respective partners. Long-term relationship is crucial for supply chain collaboration to succeed, wherein the parties rely on each other to voluntarily accept the obligations of each party in the engagement (Hosmer, 1995; Mentzer et al., 2001; Chin et al., 2004). This kind of relationship leads to better operational performance (Anbanandam et al., 2011; Hua et al., 2009).

Information technology orientation is defined as technological capability of firm which used to acquire, process, and transmit information for more effective decision making, relative to competitive standards (Grover and Malhotra 1999). A firm's information technology capability is defined as its ability to mobilize and deploy IT – based resources in combination or copresent with other resources and capabilities (Bharadwaj, 2000). A firm's IT capability is created as a combination of IT infrastructure, its human IT skills, and its ability to leverage IT for intangible benefits which all serve as firm-specific resources (Bharadwaj, 2000) and lead to a higher level of collaboration with the firm's partners. Sanders and Premus (2005) found a positive impact of a firm's IT capability on both internal and external collaboration. Other researchers have demonstrated that IT can decrease coordination costs (Clemons, Reddi, and Row 1993; Clemons and Row 1992), and is expected to bring about increased coordination (Vickery et al. 2003).

These arguments lead to posit the following 2 hypotheses (H8-H9) as below.

Hy 8-9 : The higher (1) long-term relationship orientation, (2) information technology orientation is, the more likely that firms will gain greater (a) information sharing, (b) resource sharing,(c) collaborative communication, and (d) joint knowledge creation.

3. RESEARCH METHODODOLOGY

A population of 790 Thai electronics part firms was investigated in this study, of which 165 were fully completed and usable, effectively a response rate of 22.14. According to Aaker and Day, 2001, the response rate for a mail survey is considered acceptable. The chief executive officers (CEOs) including managing director or managing partners or top executive director are our key informant. A statistical test was conducted to verify if the sample was representative enough. Following Armstrong and Overton, 1977, two samples of early respondents and late respondents were compared with t tests on the key variables in terms of firm size and firm age. Using t-tests, we found no significant difference at the .05 level in these comparisons. Overall, nonresponse bias does not seem to be a serious concern. A statistical test was used to determine whether the methodological nuisance of common method variance was an issue because all the variables were collected with the same instrument and there is some correlation between the variables. The results indicate that method variance is not a serious concern.

The development of the questionnaire was guided by the literature review, consultation with experts. Most measures used in the survey were adapted from established studies, but some were developed especially for this study. We measured the questionnaire items using a five-point scale anchored by '5 = strongly agree' and '1 = strongly disagree'. As noted earlier, information for different variables was obtained from CEOs who are most knowledgeable. The measurement items and the results of reliability and validity analyses are reported in table 1. Then, the ordinary least squares (OLS) regression analysis is used to explicitly test and examine the influences of supply chain collaboration on its consequence which are shown in table 2.

Table 1: Variables in the model, Descriptive Statistics, Cronbach's alpha, Factor loadings, and Correlations among all variables

Constructs	IS	RS	CC	JK	SCR	CA	OP	LRO	ITO
Mean	4.215	4.233	4.123	4.167	4.240	4.142	4.129	4.016	3.959
S.D.	0.425	0.431	0.499	0.500	0.485	0.893	1.182	0.543	0.564
Cronbach's Alpha	0.852	0.877	0.872	0.676	0.761	0.756	0.717	0.686	0.719
Factor Loadings	0.819-0.846	0.834-0.890	0.755-0.712	0.734-0.757	0.551-0.878	0.751-0.841	0.452-0.702	0.458-0.662	0.650-0.730
IS	1.000								
RS	.540**	1.000							
CC	.278**	.373**	1.000						
JK	.347**	.430**	.364**	1.000					
SCR	.309**	.452**	.322**	.715**	1.000				
CA	.228**	.310**	.294	.247**	.337**	1.000			
OP	.162*	.254**	.145	.202**	.182*	.069	1.000		
LRO	.162*	.322**	.217 **	.237**	.286**	.118	.208**	1.000	
ITO	.214**	.329**	.395**	.382**	.316**	.201**	.226**	.533.*	1.000

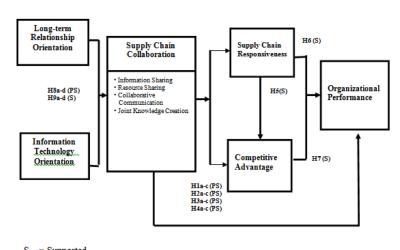Note: n = 165   *p<.05, **p<.01

4. RESULTS

Results presented in Table 1 include descriptive statistics, scale reliabilities, factor loadings, and zero – order correlations for all variables. All of the reliability estimates for all constructs (Cronbach alpha coefficients) were above 0.70 (Nunnally and Bernstein, 1994). Factor analysis conducted were done separately to investigate the underlying relationships of a large number of items and to determine whether they can be reduced to a smaller set of factors. All factor loadings are greater than the 0.40 cutoff and are statistically significant (Nunnally and Bernstein, 1994). Variance inflation factors (VIFs) were examined for all of the variables included in the study to assess the potential problems with multicollinearity (VIF, calculated as $1 / 1 - r^2$). The VIFs range from 1.06 – 1.64, well below the rule-of-thumb cut off of ten suggested by Neter, et al., 1985. It was concluded that multicollinearity was not a serious issue here.

Results of hypotheses testing by regression as shown in table 2 and figure 1 separate into two groups; results provide evidence fully supported consist of Hypotheses 1a, 2a, 3b, 4a, 5, 6,7, 8b and Hypotheses 9a-d. Besides, the evidence provides not supported are comprise Hypotheses 1b - c, 2b-c, 3a, 3c 4 b-c, 8a and Hypotheses 8c-d.

Table 2: Results of regression analysis

IV	Dependent Variables								
	1 SCR	2 CA	3 OP	4 CA	5 OP	6 IS	7 RS	8 CC	9 JK
IS	-.014* (.054)	-.122 (.184)	.053 (.256)						
RS	.193** (.007)	.322 (.192)	.518 (.269)						
CC	.028 (.058)	.326* (.014)	.073 (.201)						
JK	.617*** (.041)	.173 (.150)	.255 (.209)						
SCR				.608** (.013)	.441** (.002)				
CA					.015* (.051)				
LRO						.050 (.071)	.165* (.059)	.009 (.079)	.039 (.079)
ITO						.132* (.069)	.165* (.056)	.347* (.036)	.316* (.046)
FS	-.006 (.026)	-.023 (.064)	-.054 (.089)	-.021 (.064)	-.047 (.090)	.027 (.032)	-.007 (.031)	-.008 (.036)	.033 (.036)
FA	-.014 (.03)	-.165 (.073)	.052 (.102)	-.167 (.074)	.043 (.106)	.114 (.037)	-.029 (.036)	.006 (.041)	.002 (.041)
Ajusted R²	0.522	.141	.044	.129	.011	.030	.121	.136	.131
Maximum VIF	1.641	1.641	1.641	1.063	1.132	1.403	1.403	1.403	1.403
Durbin - Watson	1.861	1.823	2.053	1.951	2.052	2.107	1.903	2.115	1.972

**p<.05, ***p<.01   * Beta coefficients with standard error in parenthesis

58

Figure 1: The Results of Hypotheses Testing

S   = Supported
NS = Not Supported
PS = Partial Supported

According to Table 2 and Fig 1, the results indicate that four dimensions of supply chain collaboration (information sharing, resource sharing, collaborative communication and joint knowledge creation) have a partially positive impact on its consequences including supply chain responsiveness, and competitive advantage (only sig at H1a: β_1 = -0.014*, H2a: β_2 = 0.193*, H3b: β_9 = 0.326*, and H4a: β_4 =

0.193*). Thus, Hypotheses ***1a, 2a, 3b and 4a are supported***. In sum, this research empirically showed that information sharing, resource sharing and joint knowledge creation steady influences on supply chain responsiveness, but collaborative communication influences on competitive advantage.

Earlier research demonstrates that supply chain collaboration has a positive impact on supply chain responsiveness and competitive advantage. Information sharing was suggested by prior study to enhance operational efficiency in reverse logistics and provides greater supplier relationship improvement, which can in turn lead to cost reductions, improved in-stock performance, increased sales, and improved customer satisfaction of the returns turnaround process (Olorunniwo and Li, 2010).

With resource sharing, partners will become more intrinsically tied to established goals and more willing to share through the investment of financial, physical, or relationship-based resources (Chen and Paulraj, 2004). Consequently, findings suggested that when buyers and suppliers share important resources relating to materials procurement and product design issues, they are more likely to (1) improve the quality of their products, (2) reduce customer response time, (3) reduce the costs of protecting against opportunistic behavior, and (4) increase cost savings through greater product design and operational efficiencies. Prior research indicates that if the firms has relational rents are possible when exchange partners combine or exchange idiosyncratic assets, knowledge, and resources/capabilities, and employ effective governance mechanisms that lower transaction costs or permit the realization of rents through the synergistic combination of knowledge and capabilities (Dyer and Singh,1998).

Collaborative communication means that information is transformed into knowledge by developing a common interpretation and actions which will lead firm to achieve relationship based competitive advantage. The ability of a firm to better organize and improve their supplier relationship allows it to adapt to changes in the marketplace and become more relationship based competitive (McEvily, Das and McCabe, 2000).

The last dimension of supply chain collaboration, joint knowledge creation is learning arising from a strategic sales alliance that can be storied for future reference. The benefit of joint knowledge creation is that knowledge existing in one particular client relationship can be distributed in such a way that other and potentially new relationships can benefit from this joint knowledge creation and lead to achieve supply chain responsiveness.

Moreover, supply chain responsiveness has a positive effect on competitive advantage (H5: $\beta_{19} = .608$, $p<0.05$) and organizational performance (H6: $\beta_{22} = .441$, $p<0.05$). In addition, competitive advantage has positive effect on organizational performance (H7: $\beta_{23} = .015$, $p<0.05$). Prior research found that supply chain responsiveness contributes to relationship-based competitive advantage by enhancing operational efficiency, quality, flexibility, and customer responsiveness. Prior research also indicates that firms must be innovative to gain a competitive edge in order to survive (Rogers, 1995). Park and Luo (2001) found that firm which focuses on customer responsiveness and change and strives to compete primarily by stimulating new market opportunities and grabbing emerging trends and technologies will achieve better performance and SCA because it aligns better with the rapidly changing of

market. Especially, when it continually learn how to search the market place for new products, services and technologies. This will lead firm capability to be developed and core competence will then be embedded in firms. ***Therefore, Hypotheses 5,6,and 7 are supported***.

For the antecedents of supply chain collaboration, the findings show that both long-term relationship orientation and information technology orientation positively partial effect on supply chain collaboration.

The finding demonstrates that long-term relationship orientation has a positive effect on resource sharing (H8b: β_{30} = .165, p<0.05). In the existing literature, long-term relationship of partners will become more intrinsically tied to established goals and more willing to share information and integrate their business processes (Chen and Paulraj, 2004). Long-term relationships will then establish with each other, and learn more about their customers' wants and needs, and tailor their product development and marketing strategies accordingly (Levitt, 1986). Therefore, the result in this research confirms the long-term relationship orientation help support resource sharing. ***Thus, Hypothesis 8b is supported.*** Surprisingly, the results indicate that a long-term relationship orientation is not significantly effect on information sharing (H8a: β_{26} = .050, p>0.10), collaborative communication (H8c: β_{34} = .009, p>0.10) and joint knowledge creation and (H8d: β_{38} = .039, p>0.10). ***Therefore, Hypothesis 8a, 8c and 8d are not supported***.

Additionally, the results indicate that information technology orientation has a significant and positively influence on information sharing (H9a: β_{27} = .132, p<0.05), resource sharing (H9b: β_{31} = .165, p<0.05), collaborative communication (H9c: β_{35} = .347, p<0.05), and joint knowledge creation (H9d: β_{39} = .316, p<0.05). Prior research suggested that information technology learning in marketing channels is determined by extent of agreement among channel members on the concepts that should be developed in order to reflect joint experience in activity–outcome relationships. Studies of information technology among alliance partners (Cohen and Levinthal, 1989, 1990) also reinforce the view that when exchange partners have similarity of know-what, know-how, and know-why, inter-organizational learning is greatly enhanced because the partners tend to have the greatest ''relative absorptive capacity'' (Lane and Lubatkin, 1998). ***Consequently, Hypothesis 9 a-d are supported.***

5. CONCLUSION

This research contributes to the capability-based theory of competitive advantage by developing measures for two key sources of competitive advantage, namely, supply chain collaboration and its two antecedents, and examining their role in the innovation-based competitive strategy. Further, the model captures the critical role of key decision makers in the development of collaboration. The study also contributes to the understanding on the role of marketing in the strategy dialogue. For practitioners, the results of the study provide a guideline for developing competitive advantage.

In addition to its empirical contribution, it is hoped that this research will focus the attention of researchers and managers on the crucial role that SCC plays in developing

market-driven capabilities and shaping the firm's competitive position and its performance.

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