

Strategic Characteristics of Supply Chain Management among Thai Manufacturers

Titinan Nakornsri

Sang M. Lee^{*}

ABSTRACT

Effective supply chain management (SCM) has become an emergent strategy for Thai manufacturers to secure competitive advantage and improve organizational performance in today's highly volatile global market. This research identifies eight strategic characteristics of SCM (inter-and intra-organizational communication, organizational flexibility, inter-organizational relationships, supply chain coordination, outsourcing, inventory management and mass customization manufacturing strategy) among Thai manufacturers and empirically tests their relationships with organizational performance.

Data for the study were collected from 294 manufacturing organizations in Thailand and the relationships proposed in the research model were tested using Person's correlation analysis. The results illustrate the significant positive relationships between the eight SCM characteristics and organizational performance. This indicates the importance of these SCM strategic characteristics which firms need to develop and implement effectively in order to maximize organizational performance. The findings reveal that organizational flexibility has the strongest relationship with performance. Therefore, it should be a top priority of management in SCM implementation. Moreover, firms need to communicate, coordinate, collaborate, and build trusting relationship among members of the supply chain network, as well as implement outsourcing, (just-in-time) inventory, and mass customization strategy in order to improve long-term performance of the individual organization and the supply chain as a whole. The study helps manufacturers in the development and implementation of effective SCM which is a key to sustaining competitiveness in today's globalizing economy.

บทคัดย่อ

การบริหารโซ่อุปทานอย่างมีประสิทธิภาพได้กลายเป็นกลยุทธ์ที่ผู้ผลิตชาวไทยเริ่มนำมาใช้เพื่อรักษาความได้เปรียบในการแข่งขัน และปรับปรุงผลประกอบการขององค์กรภายใต้ภาวะตลาดโลกปัจจุบันที่เต็มไปด้วยความไม่แน่นอน ผลงานวิจัยฉบับนี้บ่งชี้ถึงกลยุทธ์ 8 ประการในการบริหารโซ่อุปทานของผู้ผลิตไทย ซึ่งประกอบด้วย การสื่อสารระหว่างองค์กร การสื่อสารภายในองค์กร ความยืดหยุ่นขององค์กร ความสัมพันธ์ระหว่างองค์กร การประสานงานภายในโซ่อุปทาน การจ้างบุคคลภายนอก (outsourcing) การบริหารสินค้าคงคลัง และการผลิตจำนวนมากตามความต้องการของลูกค้า (mass customization) รวมทั้งทำการทดสอบหาความสัมพันธ์ระหว่างกลยุทธ์ทั้ง 8 ประการดังกล่าวกับผลประกอบการขององค์กร

การศึกษานี้ได้ทำการเก็บรวบรวมข้อมูลจากผู้ผลิตในประเทศไทยจำนวน 294 ราย และได้ใช้การวิเคราะห์ความสัมพันธ์แบบ Pearson เพื่อทดสอบหาความสัมพันธ์ที่นำเสนอในแบบจำลองของงานวิจัย (research model) ผลการทดสอบชี้ให้เห็นว่า กลยุทธ์การบริหารโซ่อุปทานทั้ง 8 มีความสัมพันธ์เชิงบวกกับผลประกอบการขององค์กรอย่างมีนัยสำคัญ ซึ่งแสดงว่ากลยุทธ์การบริหารโซ่อุปทานดังกล่าวเป็นสิ่งจำเป็นที่องค์กรจะต้องพัฒนาขึ้นและนำไปใช้อย่างมีประสิทธิภาพ เพื่อให้องค์กรมีผลประกอบการสูงที่สุด ผลงานวิจัยนี้ยังชี้ให้เห็นว่าความยืดหยุ่นขององค์กรมีความสัมพันธ์อย่างใกล้ชิดที่สุดกับผลประกอบการขององค์กร ดังนั้น ในการนำกลยุทธ์โซ่อุปทานไปใช้ ผู้บริหารจึงควรให้ความสำคัญสูงสุดกับความยืดหยุ่นขององค์กร นอกจากนี้ การติดต่อสื่อสาร การประสานงาน การให้ความร่วมมือ และการสร้างความไว้วางใจระหว่างสมาชิกทั้งหมดในเครือข่ายของโซ่อุปทานก็นับเป็นสิ่งจำเป็นสำหรับ

^{*} Prof. Dr. Sang M. Lee
Dissertation Advisor

องค์กร อีกทั้งองค์กรควรจัดให้มีการจ้างบุคคลภายนอกเข้ามาดำเนินการแทน (outsourcing) รวมทั้งมีการบริหารสินค้าคงคลังโดยใช้ระบบ just-in-time และดำเนินการผลิตจำนวนมากตามความต้องการของลูกค้า (mass customization) เพื่อปรับปรุงผลประกอบการขององค์กรในระยะยาว รวมถึงผลประกอบการของโซ่อุปทานโดยรวม การศึกษานี้มีส่วนช่วยผู้ผลิตในการพัฒนากลยุทธ์การบริหารโซ่อุปทานและนำกลยุทธ์ไปใช้อย่างมีประสิทธิภาพ ซึ่งเป็นปัจจัยหนึ่งในการรักษาความได้เปรียบในการแข่งขันภายใต้ภาวะเศรษฐกิจโลกาภิวัตน์ในปัจจุบัน

INTRODUCTION

Supply chain management (SCM) is an important issue facing many organizations worldwide. SCM is an important area that helps maximize competitiveness and profitability for the company as well as other supply chain members which integrate and coordinate across their whole extended network (Lambert and Cooper, 1998). Managing the supply chain has become a way of improving competitiveness by reducing uncertainty and enhancing customer service.

Not all firms are successful in achieving a higher level of performance even if they have implemented the SCM concepts. In order for firms to succeed, survive, and sustain their competitive positions, certain characteristics of SCM have to exist. This research tries to identify the characteristics that bring or create strategic advantages to Thai manufacturers as well as help them sustain their competitive advantages and maximize performance. In the long run, these SCM characteristics add value to the firms, their stakeholders, and their supply chain partners.

LITERATURE REVIEW

The rapidly changing environments, coupled with the move of competition from “among organizations” to “between supply chains”, have resulted in a great challenge in managing an effective SCM practice in the hope of reducing supply chain costs, securing competitive advantage and improving organizational performance. Kuei, Madu, and Lin (2001) present an empirical study of the relationship between supply chain management and operational performance. Li et al. (2006) supported the belief that SCM practices have direct impacts on competitive advantage and organizational performance. Their findings indicated that SCM practices produce competitive advantage to the organization which will, in turn, lead to improved organizational performance.

Drawing from previous literature, this research proposes that the following intra-and inter-organizational

strategic characteristics of SCM will have an impact on organizational performance:

Organizational Performance

In line with previous research in the field of SCM, this study measures organizational performance using the respondent's perception of performance in relation to competitors. The performance measures employed in this study, which are treated as one composite construct (Sanders and Premus, 2005), include market share, profit margin on sales, return on investment (ROI), growth in market share, growth in sales per employee, and overall competitive position.

Strategic Characteristics of Supply Chain Management

Intra-and Inter-organizational Communication

Chu (2006) found that communication is one of the factors that directly and positively affects trust in supply chain partnership. Simatupang, Wright, and Sridharan (2002) found that information technology (IT) such as the Internet, intranet, software application packages and decision support system can be applied to facilitate information sharing with customers and partners, and optimization of supply chain performance. They added that information sharing provides necessary visibility of a global scope to enable better decisions to be made in order to maximize the total profit. SCM is a business approach grounded in cooperation not only across all functional areas within the firm, but also across the organizational boundaries in the supply chain. Thus, based on the above literature, the first set of hypotheses for this study is as follows:

H1. There is a positive relationship between maintaining effective communication within an organization and organizational performance.

H5. There is a positive relationship between maintaining effective communication channels across supply chain partner organizations and organizational performance.

Organizational Flexibility

As diversity and uncertainty in the environment increases, companies are responding by adding flexibility as a dimension to their operation strategies (Sanchez and Perez, 2005). In addition, firms need to be able to adapt their supply chain, as a whole, to meet emergent customer needs (Schmitz and Platts, 2004). Matchette and Lewinski (2006) added that an organization must ensure that it builds sufficient flexibility into its supply chain practices, technologies and organization structures so that it can fully meet customer expectations and quickly capitalize on new revenue opportunities which results in higher organizational performance. It is therefore hypothesized that:

H2: There is a positive relationship between organizational flexibility and organizational performance.

Mass Customization Manufacturing Strategy

According to Li et al. (2006), postponement, which is one of the central features of mass customization, needs to match the type of products, market demand of a company, and structure or constraints within the manufacturing and logistics system. The adoption of postponement may be appropriate under the following conditions: innovative products; products with high monetary density, high specialization and wide range; markets characterized by long delivery time, low delivery frequency and high demand uncertainty; and manufacturing or logistics systems with small economies of scales and no need for special knowledge.

Therefore, this dissertation hypothesizes that

H3: There is a positive relationship between a strategy for mass customization and organizational performance.

Inventory Management

SCM can benefit from applying a JIT perspective. Claycomb, Germain, and Droge (1999) found that total-system-JIT is positively related to financial results. Many studies also point to the positive impact of JIT implementation on performance (Gunasekaran, 1999; Kristensen, Dahlgaard, Kanj, and Juhl, 1999; White, Pearson, and Wilson, 1999; Nakamura, Sakakibara, and Schroeder, 1998). In line with previous studies, the following hypothesis is tested in this dissertation:

H4: There is a positive relationship between effective JIT inventory management and organizational performance.

Inter-organizational Relationships

Effective SCM can be achieved through selecting the right partners and then establishing the right relationship with them. Trust and commitment are essential for long-term cooperation. McAllister (1995) suggested that trust enables members of supply chain network to rely on each other. Doney, Cannon, and Mullen (1998) added that trust promotes collaboration, flexibility, risk taking, shared information and shared resources. Lack of trust is the greatest obstacle to the advancement of supply chain collaboration (Polrier, 1999). Many researchers have suggested that effective inter-organizational relationships help lower transactional costs (Hiede and John, 1990; Gulati, 1995), thus results in improved organizational performance. This study proposes that:

H6: There is a positive relationship between good relationship management among supply chain partner organizations and organizational performance.

Supply Chain Coordination

Rudberg and Olhager (2003) indicated that the network becomes more complex as more organizations are involved in the supply chain. In this

multi-organization environment, focus is given to collaboration and feasible ways to coordinate the network. Strategic partnership, which emphasizes long-term association and encourages mutual planning and problem solving, promotes significant ongoing benefits and is critical to supply chain success (Li et al., 2006). Tight integration with customers and suppliers including process and information integration are found to enable organizations in achieving profitable growth and high performance (Matchette and Lewinski, 2006). Therefore, this study hypothesizes that:

H7: There is a positive relationship between strategic coordination among supply chain partner organizations and organizational performance.

Outsourcing

Wu, Li, Chu and Sculli (2005) contended that effective use of outsourcing enables an organization to focus on a limited set of strategically important tasks and will in turn lead to continuous enhancement of its core competencies. Outsourcing of a company's non-core competencies should result in cost reduction and shorter lead-times. To so achieve, a company needs to concentrate on its own capabilities and core competencies and use outsourcing as a means for efficient exploitation of available resources (Dekkers, 2000). The extensive use of outsourcing strategy has enabled companies to achieve outstanding performance (McIvor, 2003). Therefore, this study hypothesizes that:

H8: There is a positive relationship between outsourcing arrangement and organizational performance.

RESEARCH METHODOLOGY

In developing measures, this study adapted existing scales from previous literature. In addition, in-depth interviews were conducted with SCM academicians and executives of some manufacturers to gather information on current SCM in Thailand and other information helpful in the questionnaire design. Multiple items were used for each construct in an effort to increase construct reliability (Kim, 2003).

A preliminary survey was conducted in person with 20 executives responsible for SCM in their organizations. The Cronbach's Alpha for each construct was checked to ensure that the reliability values were all greater than 0.70, which is considered to be the acceptable level (Nunnally, 1978).

The final version of the questionnaire was distributed by mail to randomly selected 1,119 manufacturers in Thailand.

ASSESSING VALIDITY

Before conducting data analyses to test the hypotheses and answer the research questions, a

factor analysis was conducted to investigate the validity of each construct. Through a measurement purification process, items with factor loadings less than 0.5 were omitted from the analyses to increase construct validity (Kim et al., 2005).

ASSESSING RELIABILITY

The reliabilities of each SCM characteristic and organizational performance were assessed with Cronbach's Alpha. It appears that the reliability values for all constructs ranged from 0.88 to 0.93, which are far above the generally acceptable level of 0.70 (Nunnally, 1978).

RESULTS OF THE HYPOTHESIS TESTING

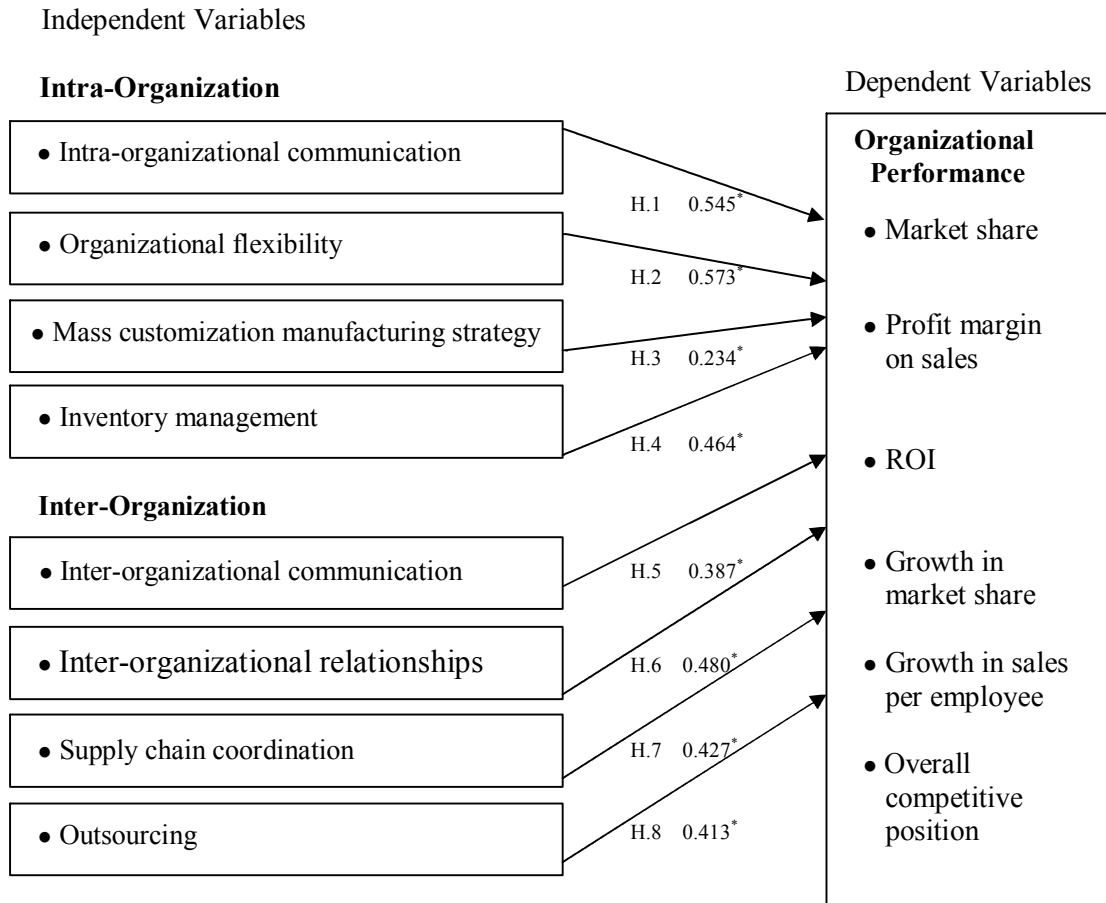


Figure1: Hypothesis test results

In order to test the research hypotheses, Pearson's correlation coefficients were calculated between each SCM characteristic and organizational performance. These coefficients measure the strength of a linear relationship between two quantifiable variables (Theodorakioglou, Gotzamani, and Tsiolvas, 2006). Correlation results of Pearson's coefficient are presented in Table 4.10. The findings and tests of hypotheses related to these relationships are summarized below:

1) Hypothesis 1 which states that there is a positive relationship between maintaining effective communication within an organization and organiza-

tional performance is supported with a correlation coefficient of 0.545 ($p < 0.01$).

2) The results reveal that organizational flexibility is positively related to organizational performance as stated in Hypothesis 2. Therefore, Hypothesis 2 is strongly supported with a correlation coefficient of 0.573 ($p < 0.01$).

3) Hypothesis 3 is also supported with a correlation coefficient of 0.234 ($p < 0.01$). This indicates that mass customization manufacturing strategy is positively correlated with organizational performance.

4) Hypothesis 4, which claims that there is a

positive relationship between effective JIT inventory management and organizational performance, is supported; the correlation coefficient is 0.464 ($p < 0.01$).

5) Hypothesis 5 which postulates that there is a positive relationship between maintaining effective communication channels across supply chain partner organizations and organizational performance is also supported with a correlation coefficient of 0.387 ($p < 0.01$).

6) Inter-organizational relationships which is expected to have a positive relationship with organizational performance, according to Hypothesis 6, is supported with a correlation coefficient of 0.480 ($p < 0.01$).

7) Hypothesis 7 is also supported with a correlation coefficient of 0.427 ($p < 0.01$). This indicates that strategic coordination among supply chain partner organizations is positively correlated with organizational performance.

8) Hypothesis 8, which claims that there is a positive relationship between outsourcing arrangement and organizational performance, is supported; the correlation coefficient is 0.413 ($p < 0.01$).

According to the results, all SCM characteristics proved to be substantially and positively correlated with organizational performance.

Table 1: Proposed hypotheses and test results

Hypothesis There is a positive relationship between:	Pearson Correlation Coefficient	Results
H1: maintaining effective communication within an organization and organizational performance.	0.545**	Supported
H2: organizational flexibility and organizational performance.	0.573**	Supported
H3: a strategy for mass customization manufacturing strategy and organizational performance.	0.234**	Supported
H4: effective JIT inventory management and organizational performance.	0.464**	Supported
H5: maintaining effective communication channels across supply chain partner organizations and organizational performance.	0.387**	Supported
H6: good relationship management among supply chain partner organizations and organizational performance.	0.480**	Supported
H7: strategic coordination among supply chain partner organizations and organizational performance.	0.427**	Supported
H8: outsourcing and organizational performance.	0.413**	Supported

Notes: **Correlation is significant at the 0.01 level ($p < .01$)

The above results provide empirical support to the research hypotheses as they confirm that SCM characteristics are positively related to organizational performance. Organizational flexibility is proved to have the most significant correlation with organizational performance, followed by intra-organizational communication. The results also reveal that mass customization manufacturing strategy has the least correlation with organizational performance.

In order to examine the simultaneous relationships of SCM characteristics on organizational performance, a stepwise multiple regression analysis was performed.

The results of the regression analysis illustrate that organizational flexibility, inter-organizational relationships, outsourcing, and intra-organizational communication are positively related to organizational performance.

Table 2: The coefficient of the relationship between SCM characteristics and organizational performance.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Organizational flexibility	.257	.070	.288	3.695	.000
Inter-organizational relationships	.152	.056	.160	2.692	.008
Outsourcing	.113	.039	.151	2.857	.005
Intra-organizational communication	.148	.075	.156	1.982	.048

Adjusted R Square = 0.381

DISCUSSION

The findings from both Pearson's correlation analysis and multiple regression analysis show that organizational flexibility has the strongest significant relationship with organizational performance. It is therefore important that firms pay particular attention to all dimensions of flexibility within their organizations as they have a significant positive impact on customer satisfaction (Zhang et al., 2002). These flexibility dimensions include product development flexibility—the ability to introduce and launch new products and to modify product quickly; manufacturing flexibility—the ability of an organization to manage manufacturing resources and uncertainty to meet various customer demands; logistic flexibility—the ability of the organization to respond quickly to customer needs in delivery, support and services; and spanning flexibility—the ability of the organization to provide horizontal information and connections across supply chain (Nair, 2005).

The results have shown that inter-organizational relationships and intra-organizational communication are important predictors of organizational performance of Thai manufacturers. This indicates that collaboration and communication among supply chain members is required to effectively and efficiently satisfy the needs of customers. Firms must ensure that all members of the supply chain are able to cooperate, communicate, and use shared information that enable better decision making, lower operating cost, improved productivity and customer relationships which result in higher performance. Supply chain collaboration and information sharing is a vital contribution to cost-reduction. In order for supply chain partnerships to become truly collaborative in nature, trust is a necessary characteristic (Spekman, Kamauff and Myhr, 1998). Previous research has suggested that constant communication is essential in building trust among supply chain members (Myhr and Spekman, 2005). Moreover, effective collaboration can now be achieved through the use of digital

communication. Information technology (IT) such as the Internet, intranet, and ERP can be applied to promote both internal and external collaborative relationships by facilitating information sharing among members of the supply chain network. Myhr and Spekman (2005) contended that firms should be encouraged to continue investing in electronic solutions to achieve collaborative supply-chain partnerships, at the same time as they build trust-based foundations on which partnerships can truly flourish. This research validates the previous findings of the positive impact of supply chain collaboration and intra- and inter-organizational communication on performance (Bagchi and Larsen, 2005; Li et al., 2006; Sanders and Premus, 2005). In order to survive in today's global market, firms need to establish strategic alliances and partnerships with suppliers and customers. Zailani and Rajagopal (2005) suggested that manufacturing strategy is needed to be aligned across the supply chain network, not just inside organizations. Partnering and forming alliances benefit the vertical integration without even taking over companies. It is therefore important to emphasize on long-term strategy associated with developing the supplier and customer base. In the current globalizing environment, materials and components are sourced worldwide. Inter-organizational relationships allow firms to be more responsive to the fast changing needs of customers. They also help increase speed which becomes the highest priority in sustaining competitiveness in the marketplace.

This study also finds that outsourcing has a significant positive relationship with organizational performance. It confirms the argument that outsourcing enables firms to enhance their performance through better product quality, lower inventory level, lower production cost, elimination of production bottleneck and punctual delivery (Wu, Li, Chu, and Sculli, 2005). This suggests that firms must compete as integrated entities across suppliers and customers by taking advantage of lower cost economies. The use of just-in-time system with out-

sourcing partners has proved to help reduce lead-time, improve overall productivity and on-time delivery rate (Zailani and Rajagopal, 2005; Noori, 2004). Outsourcing allows firms to focus more fully on their core competences which can enhance their competitive position and overall performance.

The mass customization manufacturing strategy is found to have the weakest relationship with organizational performance. This is due to the fact that it is a relatively new concept to Thai manufacturers and it does not apply to all industry types.

MANAGERIAL IMPLICATIONS

The results of this study reveal that SCM should be a high priority interest for top management of firms striving for excellence. This study provides guidelines for firms in the adoption and implementation of SCM in their organizations. The results reveal that not every SCM characteristics is equally related to organizational performance. Some of these characteristics including organizational flexibility, inter-organizational relationships, intra-organizational communication, and outsourcing are found to be significant determinants of organizational performance. Thus, firms should emphasize on these characteristics in the implementation of SCM.

To ensure that flexibility exist in the organizations, firms need to identify the required flexibility types and implement flexibility strategy within the supply chain system. Strategic flexibility can be supported through the use of advanced information technologies such as the Internet, ERP and EDI.

Effective SCM in the new competition with ongoing globalization of markets and operations suggests establishment of long-term and trusting relationships among supply chain partners who work jointly together from the strategic level to the functional level and make their success interdependent (Theodorakioglou et al, 2006). Establishing effective communication channels among supply chain partners enables the entire supply chain to have quick response and flexibility to meet the changing needs of the marketplace. Information technologies (IT) can facilitate accurate, frequent, real time and seamless exchange of information, both intra- and inter-organizationally. Therefore, firms should consider investing in IT that promotes collaboration both internally and across enterprises.

Effective use of outsourcing allows firms to focus on their core competencies while taking advantage of the lower cost economies which leads to higher performance. However, management should make outsourcing decision carefully by taking into consideration the risks of disclosing core technologies or competencies to outsourcing suppliers.

It is apparent that SCM capabilities should be regarded as a proprietary resource that aids the firm in obtaining competitive advantage and higher performance. Firms that do not implement supply chain

processes will experience deterioration in their competitive positions relative to those competitors who emphasize supply chain proficiency (Tracey, Lim, and Vonderemse, 2005). Therefore, management needs to provide proper training to cultivate individuals' competence and develop proficient employees to work within a SCM philosophy.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Future research may include other SCM characteristics that were not covered in this study and should seek to utilize multiple respondents from each organization to enhance the research findings. Future research should bring competitive advantage into the research model and investigate the impact of these SCM characteristics on competitive advantage and organizational performance. In addition, it could be conducted in other countries and cross-national comparisons could provide a fruitful field of research endeavor.

CONCLUSION

This study demonstrates the importance of SCM for manufacturing firms. It provides empirical justification for a framework that identifies eight strategic characteristics of SCM and finds their positive relationships with organizational performance. The findings contribute to the knowledge in the field of SCM by providing a comprehensive set of supply chain characteristics with a different perspective compared to previous SCM literatures. A valid and reliable instrument was used and statistical analyses were performed in this study. It was found that the key to a firm's success is to develop and implement the four strategic characteristics of SCM including organizational flexibility, inter-organizational relationships, outsourcing, and intra-organizational communication. The positive relationships between these SCM characteristics and organizational performance are warranted in this study.

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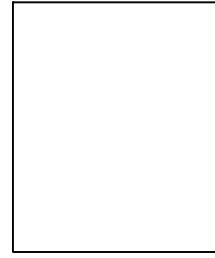
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Dr. Titinan Nakornsri received her Ph.D. in Business Administration (Strategic Management) from Bangkok University in the collaborative program with the University of Nebraska-Lincoln, U.S.A. in 2006, a M.B.A in Finance from University of San Francisco, U.S.A. in 1989, and a B.S. in Business Administration from Kasetsart University in 1986. She has been working as an Executive Director for her family business including Bangkok Cable Co., Ltd.—the second largest electric wire and cable producer in Thailand, Bangkok Polyester Co., Ltd., and Tawana Container Co., Ltd.



Professor Dr. Sang M. Lee is currently the University Eminent Scholar, Regents Distinguished Professor, Chair of the Management Department, Executive Director of the Nebraska Productivity and Entrepreneurship Center, and Director of the Center for Albanian Studies. He received his Ph.D. degree in Management from the University of Georgia in 1969. He also served as Professor at Virginia Poly-technic Institute and State University prior to coming to the University of Nebraska in 1976. Dr. Lee is an inter-nationally known expert in the fields of decision sciences, productivity management, and global business. He has authored or co-authored 50 books, mostly in the field of management. He has published more than 260 journal articles, and 750 original papers. He helped establish the Ph.D. Program in Business at Bangkok University, Thailand. He is a frequent consultant and trainer for a number of business, non-profit, and government organizations in the U.S. and abroad.