THE ANTECEDENTS AND CONSEQUENCE OF THE INVENTORY CAPABILITY IN SMEs

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ABSTRACT

This research focused on an examination of the inventory capabilities of supply chain logistics in SMEs in Thailand. It aimed to investigate the factors influencing the capability within logistics management in these SMEs, and to develop a model of the inventory capability of their supply chains.This research is embedded in a survey method. It included a pilot test using undergraduate business students to pre-test questionnaire items. 380 samples were randomly drawn from Thailand enterprises. Quantitative data were analyzed with statistical techniques such as exploratory factor analysis, confirmatory factor analysis and structural equation modeling. The results found that the model of inventory capability management factors consisted of warehouse, transportation, inventory, and delivery capabilities. The warehouse and transportation capabilities affected the inventory capability, which in turn influenced the delivery capability. The managerial implications are discussed.

Key Words: Inventory capability; Warehouse capability; Customer services; Transportation; SMEs

บทคัดย่อ

การวิจัยครั้งนี้เน้นที่การกำหนดขีดความสามารถของสินค้าคงคลังภายในโซ่อุปทานและโลจิสติกส์ของวิสาหกิจ โดยมีวัตถุประสงค์ของการวิจัย 2 ประการ คือ เพื่อตรวจสอบองค์ประกอบของขีดความสามารถสินค้าคงคลังสำหรับวิสาหกิจขนาดกลางและขยาดย่อม และ เพื่อพัฒนาแบบจำลองของขีดความสามารถด้านสินค้าคงคลังสำหรับวิสาหกิจขนาดกลางและขนาดย่อม การศึกษาครั้งนี้เป็นการวิจัยเชิงสำรวจ โดยทดสอบแบบสอบถามนำร่องกับนักศึกษาปริญญาตรี สาขาบริหารธุรกิจ เพื่อตรวจสอบความเชื่อมั่นของแบบสอบถามสำหรับใช้เก็บรวบรวมข้อมูลในภาคสนาม กลุ่มตัวอย่างเป็นผู้ประกอบการวิสาหกิจขนาดกลางและขนาดย่อมจำนวน 380 ตัวอย่าง เทคนิคสถิติที่ใช้วิเคราะห์ข้อมูล คือ การวิเคราะห์องค์ประกอบเชิงสำรวจ การวิเคราะห์องค์ประกอบเชิงยืนยัน และโมเดลสมการโครงสร้าง การศึกษาพบว่า การศึกษายังพบว่าแบบจำลองของขีดความสามารถด้านสินค้าคงคลังประกอบด้วยคลังสินค้า การขนส่ง สินค้าคงคลัง และการส่งมอบ นอกจากนั้นยังพบว่าขีดความสามารถด้านคลังสินค้า และการขนส่งมีอิทธิเชิงสาเหตุต่อขีดความสามารถด้านสินค้าคงคลังซึ่งมีอิทธิพลต่อการส่งมอบสินค้า

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INTRODUCTION

Supply chain logistics comprises supplier, manufacturer, wholesaler, retailer and customer. They are chains in effectively providing high levels of customer service, meanwhile maintaining minimum levels of inventory (Williams & Toker, 2008; Borade et al., 2013). Supply chain logistics management has been considered as a coordination mechanism in helping firms manage the dispersed operation (Fawcett et al., 1997; Stank et al., 1997). In recent years, therefore, industrial marketing scholars have paid a great deal of attention to the subject of supply chain logistics (Stank et al., 1999; Croxton & Zinn, 2005; Mentzer et al., 2008). It is embedded in the strategic use of a firm's capabilities and distinctive competencies for competitive advantage. A firm's capabilities are those things that a company does especially well that allow it to compete successfully and prosper in the marketplace (Morash et al., 1996).The capabilities refer to attributes, abilities, organizational processes, knowledge, and skills, that allow a firm to achieve superior performance and sustained competitive advantage over competitors. Competitive advantage may be gained from two main sources: assets and the capabilities that enable assets to be deployed advantageously (Dierickx & Cool, 1989; Barney, 1991;Untachai & Pitiphat, 2010). Capability is defined as the sophisticated bundles of accumulated knowledge and skills, exercised through organizational processes, which enable firms to coordinate activities and make use of their assets (Day, 1994). Management's task is to explore, exploit and leverage firm specific assets and capabilities (Mahoney & Pandian 1992). An inventory capability is an important construct in supply chain logistics management that balances demand with supply (De Leeuw et al., 2011; Sabath et al., 2001; Daugherty et al., 1999; Kiefer & Novack, 1998; Larson & Gammelgaar, 2002; Song & Song, 2009). It consists of ordering methods, collaborative practices and adjustments. It is more difficult to successfully manage demand because of the shorter product life cycle, and global-based competition (Fisher et al., 1994: Zin et al., 2002).

Therefore, this study aimed to investigate the role of the inventory management capability in the supply chain logistics in Thai SMEs. Particularly, this research has drawn attention to examining the antecedents and consequence of the SMEs' inventory capability in the upper northeastern area of Thailand.

Following this introduction, the literature regarding logistics capability, inventory management capability and firm performance are reviewed. Next, the objective and hypothesis are presented and the research methodology is described. Then, the results of the data analysis are presented, followed by a discussion of implications and future research avenues.

REVIEW OF RELEVANT LITERATURE

Supply chain and logistics management have been defined as the planning and management of all activities involved in sourcing and procurement, conversion, and logistics management activities, which include coordination and collaboration with suppliers, intermediaries, third-party service providers, and customers, to facilitate integration of supply and demand management within and across companies (Council of Logistics Management, 2004). Likewise, Mentzer et al. (2001), for example, consider SCM to be the systemic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole. Also, Lambert (2004) emphasized SCM as the integration of key business processes across the supply chain for the purpose of adding value for customers and

stakeholders. The emphasis of each of these definitions is that the objective of SCM is the creation of strategic differential advantage obtained from the total value delivered to end-customers. Moreover, Mentzer et al. (2008) aimed to refine the SCM definition dialogue by highlighting the functional spaces, relationships and conceptual overlaps between marketing, logistics, production, operations management, and supply chain management phenomena. Furthermore, Novack et al. (1992) defined logistics as managing facilities, transportation, inventory, materials, order fulfillment, communications, third party providers and information within the firm in a way that contributes to customer value. They also developed a model of integrated logistics foundations drawn from theories of economics (e.g. cost minimization, value added), marketing (e.g. channels of distribution, market transactions), finance and accounting (e.g. capital assets), and management (e.g. information flows, operations processes, operations integration). In their model, they identified constructs that comprised logistics, including strategy, structure, capacity, movement, facilities, people, and financial elements.

Daugherty et al. (2009) defined capabilities as an organization's ability to assemble, integrate, and deploy resources (Bharadwaj, 2000). In other words, capabilities are what firms do with assets; how they make use of their assets. They classified logistics capabilities into information capability and firm-wide integration capability. Moreover, the capabilities are sets of processes or dynamic routines that reflect the way resources have been coordinated, deployed, and applied to the environment. Competencies are aggregates of numerous specific capabilities potentially spanning lines of business, organizational boundaries, groups, or individuals that a firm performs better than other firms within a similar environment (Stank et al., 2005). Specifically, from reviewing the logistics literature, five categories of logistics capabilities were identified as customer focus, time management, integration, information exchange, and evaluation. In addition, these capabilities represent resource expertise in other functional areas such as manufacturing, marketing, and purchasing. Furthermore, they argue that the capabilities become key logistics capabilities when they are generated through movement and storage processes activities across the supply chain.

Most research studied the link between logistics capability and performance. For example, Daugherty et al. (1998) suggested that a positive relationship between logistics capability and market share growth, relative to sales growth (Fawcett et al., 1997). Also, Lu and Yang (2006) investigated key logistics capabilities for international distribution center operators. They argued that four key logistics capabilities were identified: customer response, innovation, economies of scale, and flexible operation and logistics knowledge. The findings suggest that customer response capability is perceived as the most important logistics capability, followed by flexible operation and logistics knowledge, innovation, then economic scale capability.

The typology of logistics strategies are three distinct organizational orientations: process-based, market-based, and information-based strategic logistics orientations (Autry et al., 2008; Zhao et al., 2001; Bowersox & Daugherty, 1987, 1999; McGinnis et al., 2002; Kohn et al. (1997). Having classified the logistics strategies, it was found that the first strategy cluster places significantly more emphasis on four general types of activities - inventory and order management, order processing, procurement, and storage. Additionally, firms operating the second of the two logistics strategies place significantly more importance on four other general logistics activity types - coordination and collaboration activities, logistics social responsibility, strategic distribution planning, and technology and information systems. In addition, no significant differences were

discovered between the two strategies for customer service, operational controls, and transportation management. The logistics operations encompassed purchasing, distribution, the managing of inventories, packaging, manufacturing, and customer services (Bowersox & Closs, 1996). Therefore, logistics service providers typically perform transportation, warehousing, inventory management, order processing, information systems, and packaging (Gunasekaran & Ngai, 2003).

Still, Tracey et al. (2005) investigate the effect of supply-chain management (SCM) capabilities of business performance so as to determine to what degree customer-oriented SCM issues influence competitive position and organizational performance. The results indicate that significant positive relationships exist among three types of SCM capabilities (outside-in, inside-out, and spanning) (Pohlen & Goldsby, 2003), and business performance (perceived customer value, customer loyalty, market performance, and financial performance). They also suggest that strategically developing SCM capabilities such as efficient inbound and outbound transportation, warehousing, and inventory control, production support, packaging, purchasing, order processing, and information dissemination enabled a manufacturing firm to identify and take advantage of opportunities in the global marketplace (Untachai & Pitiphat, 2010). The logistics capability consists of five components, namely delivery, quality, flexibility, cost, and innovation (Facett et al., 1997).

There was research regarding transportation, warehouse and inventory management. For instance, Williams and Tokar (2008) pointed out that the logistics research which focused on inventory management could be classified into two streams including a traditional inventory control model and a collaborative model. Firstly, the traditional inventory control model has traded off among transportation, warehouse and inventory management through analytical and simulation models (Williams & Tokar, 2008). For the collaborative model, the program of inventory management which was designed to improve efficiency across the supply chain, was Automatics Replenishment Programs (ARPs), including, for example, Continuous Replenishment Planning (CRP), Efficient consumer response (ECR), Quick Response (QR), and Vendor-Managed Inventory (VMI) (Angulo et al., 2004). They shared information between supply chain members. Types of information sharing consist of inventory levels and position, sales data and forecasts, order status, production and delivery schedules and capacity, and performance metrics (Waller et al., 1999). The benefits of the VMI consisted of reduced costs by better resource utilization for production and transportation, improved service levels by better coordination of replenishment orders, reduced lead times and increased inventory turns, higher selling space productivity, improvement of overall information system capability (Daugherty et al., 1999; Sabath et al., 2001). ARP is used to identify the exchange relationship between seller replenishment based on actual product usage and stock level information provided by the buyer (Daugherty et al., 1999). Rabinovich et al. (2003) suggested that MRP and JIT adoption have improved the inventory performance.

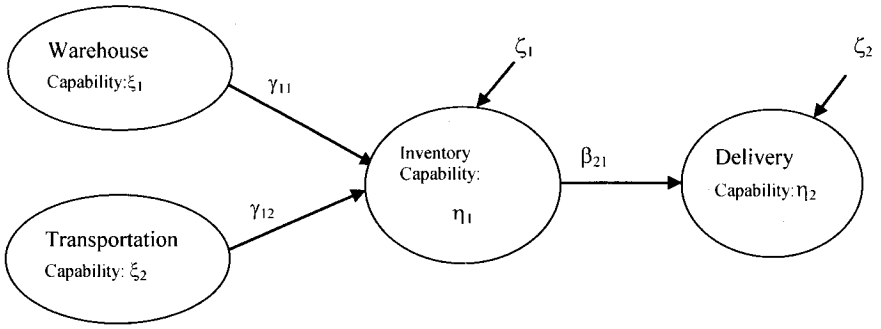
Inventory has impacted both service level and operational efficiency for an organization. It has become the most important factor for supply chain management. Inventory economies are raised from activities of procurement, production, and transportation. The inventory functions included four boundaries, such as geographic specialization, decoupling, supply or demand balance, and buffering uncertainty (Bowersox et al., 2007; 131-134). De Leeuw et al. (2008) suggested that the determinants of inventory management for distribution outlets and dealers regarding lead-time, product margin, target service level, product variety, volume discount, demand variability, and seasonality. Svensson (2003) indicated that inbound and outbound logistics flows were

related to the organizational inventories, which impacted on financial benefit. This work also suggested that the inventory in outbound logistic flows encompassed four factors: outbound inventory turnover, outbound lead times, outbound turnover or lead-time, and outbound inventory level trends.

Furthermore, Faber et al. (2011) stated that task complexity and market dynamics were related to warehouse management, as measured by planning extensiveness, design rules complexity, and control sophistication. Gu et al. (2010) pointed out that warehouse design and operations were related to performance. The components of warehouse design included overall structure, sizing and dimensioning, department layout, equipment selection, and operation strategy. The warehouse operations consisted of four components such as receiving and shipping, storage, and order picking (Gu et al., 2007).

Morash and Clinton (1997) suggested important roles of transportation capabilities in international supply chain management, as reliability of transportation logistics, customer service, low logistics costs, information system support, and just-in-time delivery. Larson and Gammelgaard (2002) determined factors that facilitate the development of logistics, including just-in-time, information technology, and close relationship between buyer and sellers. The logistics performance measures comprised flexibility, on-time delivery, failure costs, customer service, order cycle time, transportation costs, inventory levels, and loss and damage.

Figure 1: The Inventory Capability Model



Source: Authors

Based on the review of the literature relating to inventory capability, nineteen related - inventory capability attributes were selected for inclusion in the survey questionnaire used to gather information for this research. Also, the authors proposed the following inventory capability model, as shown in Figure 1 which illustrates a visual presentation of the inventory capability model.

This inventory capability model can be expressed as:

$$\eta_j = B\eta_j + \Gamma\xi_i + \zeta_j$$

Where ξ_i is a vector of warehouse and transportation capabilities, η_j is a vector of inventory, delivery capabilities, ζ_j is a vector of 2 errors in equations, Γ is a 2×2 matrix of pattern coefficients relating exogeneous constructs to endogeneous constructs, and B is a 2×2 matrix of pattern coefficients relating indigenous constructs to indigenous constructs.

OBJECTIVES AND HYPOTHESES

The purpose of this study is to investigate the role of the inventory capability construct in supply chain logistics. Specifically, the objective is to examine the antecedents and consequence of the inventory capability for SMEs in the upper northeast of Thailand. Given the literature review, the following hypotheses are postulated:

$H_{1a,b}$: The warehouse and transportation capabilities have affected the inventory capability for SMEs in Thailand (see Figure 1).

H_2: The inventory capability has affected delivery capability for SMEs in Thailand (see Figure 1).

METHODOLOGY

The sample and data collection

The research mainly involves a survey. It includes a pilot test using undergraduate business students at UdonThani Rajabhat University, for pre-testing questionnaire items. In addition, this investigation into attributes of the delivery, inventory, transportation, and warehouse capabilities, necessitate uncovering variables of interest and this involves a large-scale field study. The sample was drawn from a list of all small and medium enterprises provided by the Department of Industrial Promotion, Thailand. From the initial list of 89,797 firms, a sample of 390 was chosaen as a simple random sample. The data were collected by personal - interview questionnaires. Respondents were asked to rate, on a five-point Likert scale, their agreement or disagreement with the inventory capability dimensions. In November 2013, 390 questionnaires were distributed to SMEs enterprises in three provinces (NongBuaLamphu, UdonThani, and Nongkhai). There were 380 completed questionnaires. The response rate of 97% was relatively high.

Developing a better measure

The development of measurement items followed the recommended by Churchill (1979); Gerbing and Anderson (1988); Garver and Mentzer (1999); Min and Mentzer (2004). First, to generate items, sample items and dimensions were taken from previously developed scales (Lu & Yang, 2006; Lynch et al., 2000; Stank et al., 2001; Fawcett, 1997; Keller, 2002). A subset of items was selected from the item pool, based on the criteria of uniqueness and the ability to convey different meanings to respondents through content and face validity tests. Second, selected items were submitted to the review of three academic experts in the field of logistics management. They were asked to review the survey for domain representativeness, item specificity, clarity of construct, and readability (i.e. content and face validity). Drawn from their inputs, some measurement items were eliminated or reworded, and others were added. Third, the resultant survey instrument was pre-tested with 30 undergraduate students in Thailand. They were asked to complete a survey and indicate any ambiguity or other difficulties they experienced in responding to the items. Their feedback and suggestions were used to modify the questionnaire. These completed responses were also analyzed with SPSS. An exploratory factor analysis using Varimax Rotation and Principal Component Extraction indicated that all items load on expected factors (loadings range from 0.761 to 0.898). Construct reliability tests with Cronbach's Alpha also yielded satisfactory results (range from 0.558 to 0.897). Finally, item purification was done with confirmatory factor analysis using LISREL 8.30. After the iterative process of item refinement and purification, a battery of items was reduced to the final set of 19 items to measure the four proposed integration-

related constructs (inventory, service, warehouse and carrier capabilities). Also, the 19 structured items (measured on a five-point scale) were anchored strongly. This study utilized parts of the instruments to test inventory capability in Thailand SMEs.

Confirmatory factor analysis was employed to evaluate the model fit of the measurement model. The model is a close fit to the data at χ^2 (142) value of 336.47 (P<0.000). The ratio of Chi-square and degree of freedom is 2.37 (336.47/142), GFI of 0.85, AGFI of 0.80, CFI of 0.96, SRMR of 0.06 and RMSEA of 0.08. Therefore, the four-factor model is acceptable Bagozzi & Yi, 1988; Bentler, 1990; Untachai, 2015).

Cronbach's coefficient alpha was used to assess the internal reliability of the exacted factors. The cutoff value adopted was 0.7 (see Table 1 below). Besides the reliability test, the convergent validity was demonstrated when different instruments were used to measure the same construct, and scores from these different instruments are strongly correlated. The convergent validity can be assessed by reviewing the *t*-test for the factor loadings (greater than twice their standard error) (Anderson & Gerbing, 1988; Untachai, 2015). The *t*-test for each indicator loading is shown in Table 1. The result was that the construct demonstrates a high convergent validity because all t-values (e.g. between 6.73 to 14.28) are significant at the .01 levels. As indicated by the statistics presented in Table 1, the scales illustrate sound internal consistency and reliability.

Table1: Properties of the CFA for the Inventory Capabilities

Construct indicators	Standardized loadings	t-value	CR	AVE	Cronbach's Alpha
Inventory capability			0.79	0.39	0.78
Information Exchange with Carriers	.56	8.20**			
Level of Inventory	.65	10.00**			
Site Selection	.66	10.51**			
Stocking Methods	.60	9.21**			
A Number of inventory Keepers	.56	7.82**			
Order Frequency	.71	11.18**			
Transportation capability			0.82	0.58	0.81
Frequency of material procurement	.47	6.73**			
Transportation Specialization	.57	8.30**			
Transportation planning	.80	13.10**			
Vehicles of Transportation	.85	14.28**			
Maintenance of Transportation tools	.75	11.86**			
Warehouse capability			0.81	0.59	0.80
Layout of Warehouse	.79	12.79**			
Size of Warehouse	.81	13.38**			
Equipments and Tools for Warehousing	.69	10.63**			

Table1: Properties of the CFA for the Inventory Capabilities (Cont.)

Construct indicators	Standardized loadings	t-value	CR	AVE	Cronbach's Alpha
Delivery capability			0.74	0.50	0.72
Methods of Selection the Carriers	.67	9.73**			
Conditions of Selection the Carriers	.69	10.12**			
Payment Methods to Carriers	.75	11.24**			
Delivery speed	.61	8.10**			
Conditions of delivery	.61	8.06**			

** Indicates significance at p<.01 level

RESULTS

The structural model was estimated to test the H_1 and H_2. For evaluating the structural model, we examined $\chi^2 = 242.93$; significance 0.0000; df = 136; SRMR = 0.04; NFI = 0.96; NNFI = 0.98; CFI = 0.98; GFI = 0.90; AGFI = 0.86; RMSEA = 0.05. Therefore, the inventory capability model can be accepted (Hu and Bentler, 1999; Bentler, 1990; Bentler and Bonett, 1980).

$H_{1a, b}$: The warehouse and transportation capabilities have affected the inventory capability of SMEs in Thailand.
H_2: The inventory capability has affected delivery capability of SMEs in Thailand.

The results of the hypothesis testing are provided in Table 2, along with parameter estimates, their corresponding t values, and the fit statistics. As shown in Table 2, the H_{1a}, H_{1b} and H_2 are supported. Specifically, H_{1a} and H_{1b} suggested that the effects of the transportation and warehouse capabilities have affected the inventory capability in the supply chain logistics for SMEs ($\gamma_{11} = 0.33$, $p<0.05$; $\gamma_{21} = 0.65$, $p<0.01$). Additionally, H_2 suggested that there is an effect of the inventory capability on delivery capability in the supply chain logistics for SMEs ($\beta_{21} = 0.75$, $p<0.01$).

On the basis of these findings, we concluded that the inventory capability plays significant mediating roles in logistics management of the SME sector.

Table 2: Hypotheses Testing for Inventory Capability

Hypothesized Paths	Standardized Coefficients	t	A/R
H_{1a}: warehouse capability→the inventory capability	0.33**	7.38	✓
H_{1b}: transportation capability→the inventory capability	0.65**	4.19	✓
H_2: inventory capability →delivery capability	0.75**	5.13	✓

Notes: A/R, acceptance or rejection of hypothesis. *p<0.05 and t>1.96; **p<0.01 and t>2.58

Source: Authors

DISCUSSION

Our aim is to examine the causes and effect of inventory capability in SMEs in Thailand. The result was that hypothesis 1 is more likely supported. It is shown that warehouse and transportation capabilities have affected the inventory capability in the SMEs (Untachai & Pitiphat, 2010). This finding would be consistent with the research by Autry et al (2008); Fawcett et al. (1997).

This finding would also be consistent with the research by Autry et al (2005), Gu et al. (2010), Kale et al. (2009), and Williams, and Toker (2008). For instance, Autryet al. (2005) indicated that transportation management system (TMS) and warehouse management system (WMS) are imported elements of a logistics information system (LIS). The indicators of WMS-related internal capabilities included reducing inventory, better receiving counts, cost containment, and improving space utilization, while the WMS-related customer capabilities consisted of reducing stockouts, reducing back orders, improving cycle time, reducing partial shipments, improving reliability of delivery, and improving order accuracy (Stank et al., 2001). Faber et al. (2011) stated that task complexity and market dynamics are related to warehouse management, as measured by planning extensiveness, design rules complexity, and control sophistication. Gu et al. (2010; 2007) pointed out that warehouse design and operations were related to performance. The components of warehouse design included overall structure, sizing and dimensioning, department layout, equipment selection, and operation strategy. The warehouse operations consisted of receiving and shipping, storage, and order picking. Rouwenhorst et al. (2000) characterized the warehouse as as having three dimensions. They were warehouse processes (e.g. receiving, storage, order picking, and shipping processes), warehouse resource (e.g. a storage unit, a storage system, pick equipment, order pick auxiliaries, a computer system, sorter systems, pallets and truck loaders, personnel), and warehouse organization (e.g. an assignment policy, a storage policy, a zoning policy, a sorter lane assignment policy, a dock assignment policy, and operational and equipment assignment policies).

Novack et al. (1994) suggested that logistics functions which include inbound logistics, operation, outbound logistics, and logistics support are related to logistics service performance. The logistics service performance consisted of product availability, order cycle time, logistics system flexibility, malfunction and recovery, logistics system information, and post product support. Kale et al. (2009) indicated that partner-involved demand management, just-in-time practices, carrier selection, carrier management, internal integration, and supply partner integration were related to distribution performance. The items of carrier selection comprised selected carriers based on their delivery performance and their preparedness to handle. The indicators of carrier management dimension consisted of cooperation with carriers to develop sequencing and routing of delivery, developing a long-term partnership with the carriers, used standard performance metrics to measure the delivery performance of the carriers. The items of internal integration factor included sharing information with other functions, frequent communication with other functions, and sharing resources effectively. The items of distribution performance factor included decreasing the distribution cost, distribution efficiency, distribution effectiveness, on-time delivery, forecast accuracy, inventory turnover, and order fulfillment rate. Kiefer and Novack (1998) identified the measurement of the warehouse as order fulfillment, storage, receiving, customer satisfaction, and cost and earnings. Morash and Clinton (1997) suggested that the important roles of transportation capabilities in international supply chain management consist of reliability of transportation logistics, customer services, low logistics costs,

information system support, and just-in-time delivery. The reliability of transportation logistics and customer services are the most important factor for the carrier attribute. Lynagh (1971) determined 37 measures of distribution center effectiveness. They were grouped into three categories such as order processing, warehouse handling, and transportation. Naim et al. (2006) identified 14 components of transportation flexibility of the carrier. They were mode, fleet, vehicle, node, link, temporal, capacity, routing, communication, product, mix, volume, delivery and access (Williams & Tokar, 2008). Esper and Williams (2003) have developed the conceptual framework of Collaborative Transportation Management (CTM) for improving the cost, service, and efficiencies linked to transportation and delivery through collaborative relationships among buyers, sellers, carriers, and third-party logistics providers. Additionally, the logistics performance was improved by enhanced electronic carrier-shipper communication, and by matching inbound and outbound freight shipments to reduce empty backhauls (Williams & Tokar, 2008). Liao and Rittscher (2007) formulated a combination of the three factors for selection of suppliers: procurement lot sizing, supplier selection, and carrier factors, to minimized cost and late deliveries subject to demand satisfaction and capacity constraints(Williams & Tokar, 2008).

The result was that hypothesis 2 is more likely supported. It is shown in the effect of the inventory capability on delivery capability in the SMEs. This hypothesis also has confirmed the results of Daugherty et al. (2009; 1999), Autry et al. (2005), and Lu and Yang (2006). For examples, Lu, and Yang (2006) suggested that logistics capabilities for international distribution center operators in Taiwan consisted of customer response, innovation, economic scale, and flexible operation space and employee knowledge of warehousing and logistics. The items of logistics capabilities comprised of on-time delivery, prompt response to customers, low cargo damage or loss rate, good after sales service, good service management system, continuous improve operational systems, service flexibility, providing cargo tracing service, good protection for cargo safety and risk, modern machinery equipment and pick-up system, modern information control system, good techniques in cargo movement and distribution, using new technology and innovation, implementing total quality management, high utility rate of equipment, high cargo volume, flexible operational space, flexible operational procedures and systems, and employee knowledge of warehousing and logistics.

Additionally, on-time delivery of goods, prompt response to customer requirements, low cargo damage, good customer service management system, and service flexibility to meet customers' needs formed the customer response. Moreover, modern machinery, equipment and pick-up system, modern information control system, good techniques in cargo movement and distribution formed the innovation.

Ellram et al. (1999) indicated that retailers have improved both inventory and customer service by using logistics. The essentially customer service elements included order fulfillment, short and reliable of order cycle time, accurate and timely information, and quick correction of mistakes. Additionally, the inventory management priorities were seen as increased inventory turns, increased use of technology, improved inventory allocation techniques, and reduced lead time between vendor and distribution center. In addition, There are the effects of order placement and order receipt on customer satisfaction (Mentzer et al., 2001). Svensson (2003) found that companies' inventories were related with disturbances in inbound and outbound logistics flows.

In summary, these hypotheses have contributed to the theoretical constructs of the inventory capability in the supply chain logistics (Williams & Toker, 2008; Daugherty et

al., 2009; 1998; Autry et al., 2008; 2005; Lu & Yang, 2006; Gu et al., 2010; 2007; Dierickx & Cool, 1989).

RESEARCH AND MANAGERIAL IMPLICATIONS

For the researcher, this study has implications on the examination of the role of inventory capability in supply chain logistics. This article has provided a comprehensive evaluation for understanding the measurement of inventory capability in Thai SMEs. However, several limitations are acknowledged, leading to suggested directions for future research. First, this research was limited to validating the inventory capability based on structural equation modeling. Whereas many researchers have used the resource-based and strategy-structure-performance views to examine the associations between capabilities and firm performance, future research could apply these views to ascertain antecedent and consequent relationships among resources, capability, competitive advantage, and firm performance. Also, the analysis used in this study was static, as evaluation of the inventory capability was conducted at one point in time. Longitudinal research has to investigate how the inventory capability might change over time.

For a managerial perspective, especially entrepreneurs, this study provides some guidelines for entrepreneurs handling inventory capability across the country. For example, the result of the study demonstrates that transportation vehicles and the size of warehouses are important attributes for inventory capability. An entrepreneur in a Thai SME should have a logistics manager for continuously monitoring the transportation and warehouse system, so as to propose integrated supply chain strategies in a timely manner in the market. Subsequently, this study found that delivery capability is strongly related to inventory capability. SMEs should place emphasis on selection of carrier expertise, and increase awareness of the logistics information system. Finally, the study found a significant link among inventory, warehouse, and transportation and carrier factors. Thus, SMEs should increase collaboration, or develop information systems for integrating inventory activities. This might be coordinated among Thailand officials, such as the Department of Industrial Promotion, and the Chamber of Commerce in, Thailand.

Limitations and future research

Although this paper has provided relevant and interesting insights into an understanding of the components of inventory capability in Thai SMEs, it should be clearly recognized that there are limitations associated with this study. First, cross-sectional data were used in the paper. Subsequently, the time sequence of the inventory capability structure cannot be determined unambiguously. Therefore, the results might not be interpreted as proof of a causal relationship, but rather as lending support for a prior causal scheme. The development of a time-series database and testing of the inventory capability structure relationship with performance in a longitudinal framework would provide more insight into the probable causation.

Second, the conceptualization of inventory capability may be somewhat limited and it is arguable that inventory capability may consist of more than supply chain logistics, market information gathering, and the development and implementation of a market-oriented strategy.

Third, the LISREL methodology may be construed as a limitation, because the results presented here are based on the analysis of a causal non-experimental design.

CONCLUSIONS

This study aims to investigate the role of inventory capability in supply chain logistics for Thailand SMEs. The results imply that improvement in the delivery capability is derived from an inventory capability in the supply chain logistics. The results also show that warehouse and carrier capabilities enhance inventory capability in the supply chain logistics. These results confirm the traditional hypothesis among capabilities for the supply chain logistics that inventory capability does increase the capability of the customer services. This provides the basis for determining whether the effect of inventory capability does increase service capability, which is necessary to help advance the importance of inventory capability to SMEs' supply chain logistics in a coherent whole. In short, warehousing and transportation efficiencies can lead to low level of inventory, and higher service levels.

Acknowledgement

The authors gratefully acknowledge the financial support by the Research and Development Institute of Udonthani Rajabhat University, Thailand. They also thank Asst. Prof. Brian Lawrence for his insightful comments.

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