A RESOURCE-BASED VIEW APPROACH ON MEDIATING EFFECT OF LOGISTICS INTEGRATION CAPABILITIES ON FIRM PERFORMANCE: AN EMPIRICAL STUDY ON THE FOOD PROCESSING INDUSTRY IN THAILAND

NARONGCHAI KITRANGSIKUL

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY PROGRAM IN BUSINESS ADMINISTRATION FACULTY OF BUSINESS ADMINISTRATION RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI ACADEMIC YEAR 2017

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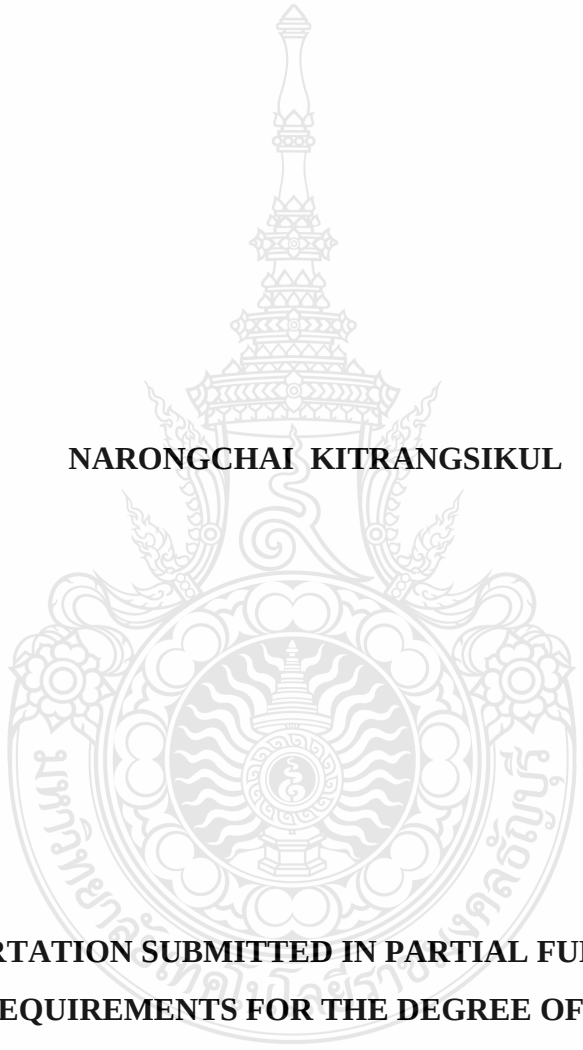

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Dissertation Title	A Resource-Based View Approach on Mediating Effect of Logistics Integration Capabilities on Firm Performance: an Empirical Study on the Food Processing Industry in Thailand
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Dissertation Advisor	Associate Professor Chanongkorn Kuntonbutr, D.B.A.
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ABSTRACT

This research extended the implication of Resource-Based View perspective in the field of logistics management by examining relationships between logistics capabilities and firm performance with the emphasis on mediating effect of integration capabilities. The aim of this study was to determine direct and indirect relationships among logistics capabilities namely: a) demand management, b) supply management, and c) information management, with the firm performance through the mediating role of integration capabilities. The survey was conducted on food processing industry in Thailand and deployed Structural Equation Modeling (SEM) for analysis.

The results suggested that there were no direct relationships between demand and supply management capabilities, and the firm performance, but rather indirect relationships through integration capabilities, which indicated mediating effects. Analysis of the data had further suggested positive relationships among logistics capabilities as well as the effect of information management on logistics capabilities. Moreover, the direct relationships between each of logistics capabilities and the integration capabilities inferred that all logistics capabilities affected integration capabilities.

The mediating role of logistics integration capabilities had strongly supported Resources-Based View perspective that the distinctive and unique capabilities can be created through firm's resources and capabilities integration. The conclusions had contributed theoretically to provide further evident to support RBV, and practically, an

implication for managers to recognize the potential of firm's internal resources as the key enablers in achieving superior firm performance.

Keywords: logistics capabilities, demand management, supply management, information management, logistics integration, firm performance, resource-based view, mediating effect

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I dedicate this dissertation to several people.

My parents, Mr. Song Hai and Mrs. Hui Kheng, who give me eternal love and teach me the importance of education, they have always been proud of my educational success. I would also like to extend my gratitude to my brothers and sisters, for their kindness and support through the years. During this lengthy challenge, my wife Kanokwan, is an utmost important person who has always been here for me. Her love, empathy, and integrity have been a tremendous inspiration. I could not have accomplished this without her patience and unconditionally support. I also dedicate this dissertation to my precious children Puneyavee, Peevara, and Panut, who had been amazingly resilient for the time I was absent for all those years, thank you for your understanding and support. I love you all more than anything.

Narongchai Kitrangsikul

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CHAPTER 1
INTRODUCTION

1.1 Background and Statement of the Problem

An intense competitive market condition in current global economy forces companies to adjust their working practices or restructure the way they operate their business. The basis of competitive advantage has changed drastically to respond to the challenging business environment, which has shifted from volume and price to service, speed, and mass customization.

Logistics has a key role in managing the flow of materials, services and information from source to point of consumption. Logistics facilitates in getting what are needed and desired to the customers and served as enabler of growth of trade and commerce in an economy. However, while basic logistics deals mainly with physical movement of the products, a more comprehensive framework to focus on simplifying transactions faced by customers, and information exchange throughout the channel must be adopted (Donald J. Bowersox & Daugherty, 1987). Logistics is critically important as firm's distinctive resources to create and maintain firm's competitive advantage (Clifford Defee & Fugate, 2010).

The scope of logistics however, has been extended and recognized as important tools for developing competitiveness, which allows for the ability to differentiate in term of strategy and operation. Lynch (1998) referred logistics as activities with a potential impact on firm performance in order to enhance the revenue and reduce cost. Lynch, Keller, and Ozment (2000) examined relationships among capabilities, strategy, and firm performance within a logistics context and referred logistics capabilities as areas that provide foundation which competitive advantage was enhanced and superior firm performance was produced.

The value added potential of logistics had been highlighted in the study of Stanley E Fawcett, Stanley, and Smith (1997) that desirable firm performance depended on firm's abilities to create capabilities which included logistics excellence. Logistics capability is viewed as firm's resources (J. Barney, 1991), source of competitive advantage (Lynch et al., 2000; Zhao, Dröge, & Stank, 2001) and makes a major

contribution to corporate strategy and firm performance (Daugherty, Stank, & Ellinger, 1998). Therefore, effective logistics management is a key component for increasing competitive advantage and profitability of businesses (J. R. Stock & Lambert, 2001).

Logistics capabilities assume a prominent role and have been demonstrated to be a critical source of competitive advantage, thus becoming central focus for firm to effectively and efficiently perform business activities. (Fugate, Mentzer, & Stank, 2010). However, the lack of internal ability to communicate, to integrate, and to streamline of the logistics processes creates a barrier for the success of logistics management (Stanley E Fawcett, Magnan, & McCarter, 2008), particularly with respect to working with other areas as to enhance firm's competitive advantage (Reed & DeFillippi, 1990). Firms need to leverage existing logistics capabilities or build new logistics capabilities to achieve sustainable competitive advantage (Karagöz & Akgün, 2015).

Various studies emphasize the development of logistics capabilities as a prerequisite for businesses to stay competitive and provide differentiated services. A review of logistics research suggested that logistics capabilities can be viewed in various ways. Esper, Fugate, and Davis-Sramek (2007) proposed a classification with five components such as customer focused capabilities, supply–management capabilities, measurement capabilities, information exchange and integration capabilities.

It has been known of the crucial roles of logistics in the food industry as logistics involves in the movement throughout the process of the industry, starts from acquiring raw material, storage, put through the process and the delivery of finished goods to the customers. Logistics helps the food industry to maintain an uninterruptable supply of food products from different suppliers and distributors across various locations to the customers domestically and globally.

Thailand is one of the world's largest producers and exporters of food and processed food products and has earned the designation of "Kitchen of the World". From the Thailand Board of Investment (BOI)'s Thailand Investment Review July 2016 vol. 26 no. 7, Thailand's exportation was accounting for around 65 percent of Gross Domestic Product (GDP). Thai food industry is a key contributor to the national

economy which accounts for as much as 23 percent of the GDP. According to National Food Institute (NFI), Ministry of Industry, in 2015 Thailand exported THB 897 billion (US$ 25.5 billion) worth of food products to the world, out of which THB 183.1 billion (US$ 5.43 billion) or 21.5% were processed food products. There are more than 116,000 food processing companies comprise the Thai food industry, where 96% of which are SMEs. The increasing number of food processing companies indicates the continuously growing of this sector. The industry has been developing by taking advantage of the country's abundant labor force and raw materials. The country is then becoming one of the world's most dynamic food processing centers.

Despite the robust export trade of foods products due to country's highly competitiveness and rapid growth of demand in the food sector, the current world economy and challenging competitive environment would be a threat. It is undoubtedly necessary for the industry to adjust or improve the way they operate their business.

The government's policy to support and encourage Thai food processing sector to engage with new technology and know-how such as product development and manufacturing process by emphasizing on quality, hygiene, sanitation, food safety, wholesomeness, as well as improving the efficiency to lower production costs and make value-addition in order to response to an increasing domestic and international export demand.

The Thai government promotes "Thailand 4.0" or "Value-Based Economy" economic model and aims at pulling Thailand out of the middle-income trap, and developing into a high-income country. The Thailand 4.0 model has three elements, which marks significant changes in the country's economy and production : The first element aims to enhance the country's standing to become a high-income nation through developing it as a knowledge-based economy, with an emphasis on R&D, science and technology, creative thinking, and innovation; the second element, moves towards an "inclusive society" with equitable access to the fruits of prosperity and development; and the third element focuses on "sustainable growth and development" in order to achieve economic growth and sustainable development without destroying the environment.

Thailand 4.0 focuses on “5 Engines of Growth” one of which is on Food, Agriculture & Bio-Technology Industry. The Thailand 4.0 model is also aimed for transformative shifting of current businesses e.g., from traditional SMEs to smart enterprises and from traditional services to high-value services. The Government has implemented model and supported to strengthen the competitiveness of Thai food industry, especially with the SMEs which accounts for about 96% of the whole industry to grow and benefit from the growth of this sector. As well as to improve production effectiveness to enhance value addition and helping them to stay competitive in the world market. The food processing industry needs to find effective logistics management tools and practices to improve on inefficiency and ineffectiveness practices which hamper the process to achieve superiority of organizational performance.

The aforementioned has emphasized the important role of food processing industry in contributing to the development of the country’s economy and is seen as potential source to bring about synergy between agricultural and industry sector, as such logistics is likewise a key measure to balance the demand and supply of the industry. Food processing is an agricultural raw material based industry, with potentially high wastage and short shelf life, which the challenges are about the inconsistency of supplies and storage, and as well, on the customer side, the increasing and diverse of consumer demand, the need for high standards of quality, and the more stringent regulations make it even more intense. The need for improvement of the efficiency and effectiveness in the industry, in order to stay competitive, especially in the open up of the borderless AEC economic community, would the right integration of logistics capabilities be addressing for the challenges faced by the industry, therefore, is a problem statement of this study.

This study applied the Resource-Based View of the firm as the ground theory to examine the relationship between logistics capabilities and firm performance with the focus on integration capabilities.

The Resource-Based View of the firm perspective (RBV) is an influential theoretical framework for understanding how competitive advantage within firm is achieved and sustained (Eisenhardt & Martin, 2000). Rooted in strategic management

literature, the basis of the RBV is that successful firms will find their future competitiveness on the development of distinctive and unique capabilities, which may often be implicit or intangible in nature (Teece, Pisano, & Shuen, 1997). According to RBV perspective, superior firm performance is the result of the ability of firms to accumulate "VRIN" resources, which referred by Barney (1991) as the attributes for firm-specific resources, those were: (1) it must be Valuable; (2) it must be Rare; (3) it must be Inimitable; (4) it must be Non-substitutable.

The RBV provides a theoretical lens to address the development of logistics and supply chain management practices and their impact on firm competitiveness. M. Gligor and Holcomb (2014) suggested logistics capabilities to be strategically designed to align with the criteria of Resource-Based View of the firm.

Several empirical studies on logistics management which deployed RBV to examine the effects of logistics capabilities on firm performance had affirmed that logistics capabilities were significantly and positively related to firm performance (Kim, 2009; Shang & Marlow, 2005; Sinkovics & Roath, 2004). Improvement of integration of various functional areas can also improve firm's value (Ellinger, Daugherty, & Keller, 2000). While integration of firm's interdependent functional areas is found to be positively related to the performance, integration of logistics capabilities is considered a source of better supply chain performance and will enhance firm's competitive advantage (Payne, Christopher, Peck, & Clark, 1998). Stevens (1989) suggested that firm's degree of collaboration depended on internal supply chain process. Integration of supply chains was considered to be strategic, as well as, operational importance (Bechtel & Jayaram, 1997). The inability of fully integration within the firm's logistics can lead to strategic alliance failure along the supply chain.

Firm must have good understanding of the integration process since firm's survival lies on integration and must have a relatively high level of collaboration among internal functions before initiating any external integration (Gimenez & Ventura, 2005). Managers involved in the logistics or supply chain process should seek to enhance competitiveness by closely integrating the internal functions within a company and effectively linking them with suppliers or the external operations (Kim, 2009).

Several studies suggested significant and positive relationship between logistics capability and firm performance (Davis-Sramek, Mentzer, & Stank, 2008; Innis & La Londe, 1994; Stank, Goldsby, Vickery, & Savitskie, 2003; Sterling & Lambert, 1987). Despite the strong emphasis in the relevant literature, there was still limited research effort made on the study of how integrated logistics capabilities would impact firm performance. Most of the earlier studies were conducted with the focus on specific factors or separate aspects of the logistics capabilities such as customer demand, speed, flexibility, reliabilities, responsiveness, and post-sales customer service. Few of them take into account the effects of integration, however none, to the knowledge of the researcher, was found to be studied on logistics integration capabilities as the mediator between demand management capabilities, supply management capabilities, and information management capabilities with the firm performance.

The motivation for this study was to bridge the gaps by exploring relationship and examining effect of integration capabilities of demand management capabilities, supply management capabilities and information management capabilities through the mediating model of logistics integration capabilities and the impact on firm performance. The other point of interest in this study was also to analyze relationships of information management capabilities with firm's other logistics capabilities, on how it would facilitate other logistics capabilities, and their direct impact on firm performance.

The empirical study on the food processing industry in Thailand would have helped to affirm results of this research. In this regard, the outcome should have provided theoretical insights for an overall understanding of the relationships between of logistics capabilities and firm performance through mediating effect of integration capabilities, as well as to provide managerial perspective through the implication of the results of the study. The effective logistics management would also have enabled the company to improve their work practices and led to the achievement of superior firm performance.

1.2 Purpose of the Study

The purpose of this study was to extend an understanding of Resource-Based View perspective in the field of logistics management with the food processing industry in Thailand, by empirically examining relationships between firm's logistics capabilities namely demand management capabilities, supply management capabilities and information management capabilities and logistics integration capabilities on firm performance with the emphasis on the analysis on effects of logistics integration capabilities as the mediator and its impact on firm performance of the food processing industry in Thailand. This study also analyzed the interactions of information management capabilities, demand management capabilities, and supply management capabilities and how information management capabilities would facilitate the relationships of logistics capabilities and firm performance.

Therefore, the objectives of this study were as follows:

1. To identify what were the criteria based on RBV perspective considered firm's significant resources and capabilities for logistics and logistics integration capabilities.

2. To develop appropriate firm's logistics capabilities and logistics integration capabilities measurement constructs.

3. To examine the relative significant between firm's logistics capabilities in terms of demand management capabilities, supply management capabilities, and information management capabilities, and firm performance of the food processing industry in Thailand.

4. To investigate how information management capabilities facilitate other logistics capabilities.

5. To investigate the effects of logistics integration capabilities as the mediator and the impact on firm performance on the food processing industry in Thailand.

These research objectives, which emerged from the literature review of previous studies, could further be delineated per below research questions. The methods employed for this study included the formulation of specific research hypotheses and data collection, and empirically analysis of data received from food processing companies in Thailand.

1.3 Research Questions and Hypotheses

The preceding discussion raised the following major research questions for this study:

RQ 1. Do logistics capabilities and firm performance relate?

RQ 2. Do information management capabilities facilitate other logistics capabilities?

RQ 3. Do logistics integration capabilities mediate firm's logistics capabilities and firm performance?

Consequently, the following hypotheses had been proposed.

1. Hypotheses on the relationship between firm's logistics capabilities and the firm performance.

The study by Stanley E Fawcett et al. (1997) suggested that superior logistics capabilities helped to improve performance of organizations. Daugherty et al. (1998) noted that many firms focused on the logistics capabilities to achieve competitive advantage and differentiation. Donald J Bowersox, Closs, and Stank (2000) emphasized the potentiality of logistics capabilities as source of competitive advantage for firms to succeed. Therefore, it was proposed that:

H1: There is a positive relationship between demand management capabilities and firm performance of the food processing companies in Thailand.

H2: There is a positive relationship between supply management capabilities and firm performance of the food processing companies in Thailand.

H3: There is a positive relationship between information management capabilities and firm performance of the food processing companies in Thailand.

2. Hypotheses on the role of information management capabilities which facilitate firm's other logistics capabilities.

Bharadwaj (2000) found that the synergy and combination of information technology resources with firm's other resources enabled the development of superior IT related capabilities and was a source of competitive advantage and provided essential services to support firm to operate and generate revenue in an increasingly competitive

marketplace (Renaud, Narkier, & Bot, 2013). The effective and efficient use of IT was a key factor in differentiating successful and less successful firms (Bharadwaj, 2000). Information technology was one of among other productivity tools with the power to simultaneously increasing firm capability and decreasing firm's total cost (Closs, Goldsby, & Clinton, 1997). Thus proposed that:

H4a: Information management capabilities facilitate demand management capabilities.

H4b: Information management capabilities facilitate supply management capabilities.

3. The mediating model to determine the impact of demand management capabilities, supply management capabilities and information management capabilities on firm performance through the mediating role of logistics integration capabilities.

The fact supported that single capabilities would not suffice for firm to achieve sustainable competitive advantage (Mentzer & Williams, 2001), an appropriate combination of logistics capabilities, rather than being implemented as stand-alone abilities is necessary. R. M. Morgan and Hunt (1999) elaborated that firm's competitive advantages could only be realized when the firms combined basic resources in such a way that they achieved a unique capability that was valued by the customers. Esper et al. (2007) argued that the two challenges under the changing dynamic context and hypercompetitive business environment were how firms utilized their logistics capabilities strategically, and how firms could achieve sustainable logistics integration.

The following hypotheses were put forth to establish the model relationships:

H5: Demand management capabilities positively affect logistics integration capabilities.

H6: Supply management capabilities positively affect logistics integration capabilities.

H7: Information management capabilities positively affect logistics integration capabilities.

H8: Logistics integration capabilities have positive impact on performance of the food processing companies in Thailand.

1.4 Research Framework

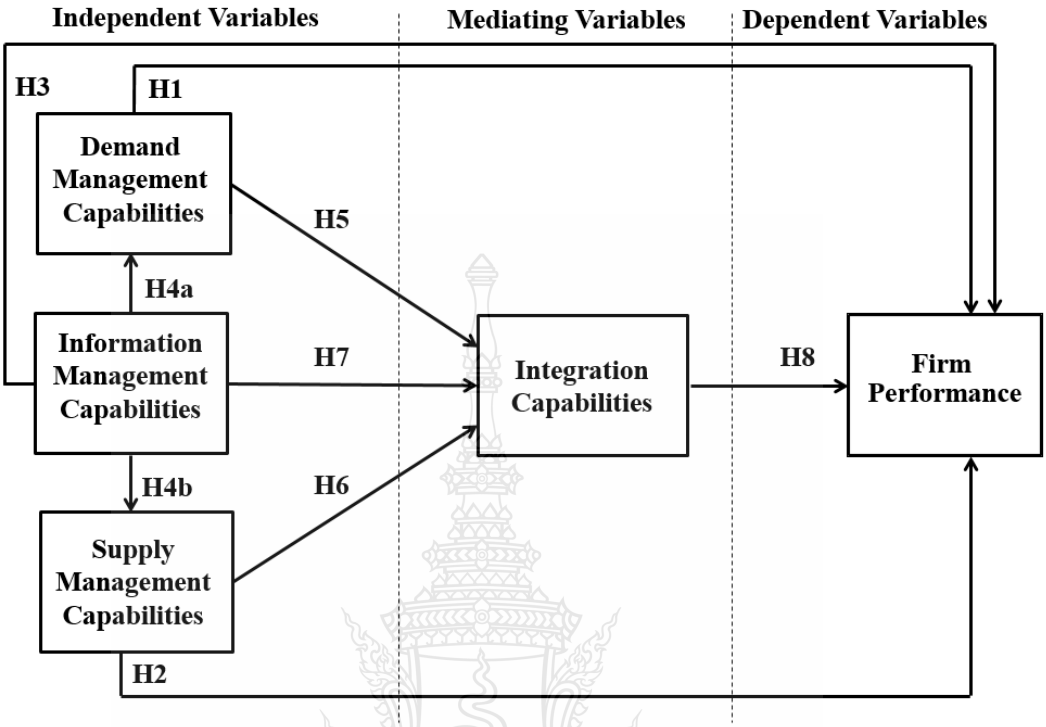


Figure 1.1 Research Framework

1.5 Definitions of Terms

The term definitions in the following, described the terminology used in this study.

1.5.1 Resource Based View of the Firm (RBV)

RBV is one among the popular and widely accepted theories of competitive advantage with focus on relationships of internal characteristics and competitive advantage of the firm. The fundamental of RBV is that firm-specific resources must have the following attributes: Valuable, Rare, Inimitability and Non-substitutability, known as VRIN.

1.5.2 Logistics Capabilities

The capabilities which enable firms to respond logistically with an efficient and effective manner, involve multiple processes and sub-processes in the fulfillment of the demand of the customers from supply to distribution of products and services.

1.5.3 Demand Management Capabilities

The abilities to combine customer's needs with logistics capabilities, as well as the abilities to plan, forecast and predict, and manage the demand for products, delivery and services to meet the requirements of the customers and fulfill customer satisfaction.

1.5.4 Supply Management Capabilities

The abilities to effectively manage of supply-chain partnerships using process planning, evaluating, implementing, and controlling strategic and operating sourcing decisions.

1.5.5 Information Management Capabilities

The abilities to acquire, deploy and leverage the IT assets, use and provide data and information to users at appropriate levels and to coordinate informational resources and put them into productive use, as well as to adapt to response to changing market needs and directions.

1.5.6 Logistics Integration Capabilities

The practices and operational activities in the supply chain which organize and coordinate the flow of materials and information throughout the value stream from suppliers to customers which connects the cross boundary activities and functions.

1.5.7 Firm Performance

Firm performance is an evaluation on the effectiveness of the organizations (Ivancevich & McMahon, 1977), which is an evaluation based of the outcomes or level of target achieved from the firm's operations with the predetermined objectives. The more effective the firm's operations are completed, the more positive the firm performance is, which basically measured over a certain period of time (Mithas, Ramasubbu, & Sambamurthy, 2011).

1.6 Scope of the Study

The key objectives of this study were to examine the relationships between firm's logistics capabilities, logistics integration capabilities, and firm performance as to develop a better understanding of the mediating role of logistics integration and its impact on the food processing industry in Thailand. This study chose to focus on one

industry as it allowed more control of extraneous variables and provided robust results for theory testing (Innis & La Londe, 1994; Morash, Droge, & Vickery, 1996; Snow & Hambrick, 1980).

The target key respondents were logistics managers or logistics directors who were considered of having adequate knowledge about company's logistics capabilities and were in the roles that were able to share the surveyed information, therefore, their responses were assumed to be valid and reliable.

This study used a cross-sectional and mail survey methodology to collect data. The questionnaires were sent to companies' logistics managers or logistics executives for their response.

1.7 Organization of the Study

This study consisted of five chapters.

Chapter One: Introduction, presented background and statement of the problem for this study, including research objectives, research questions, hypotheses and conceptual framework, and scope of this study.

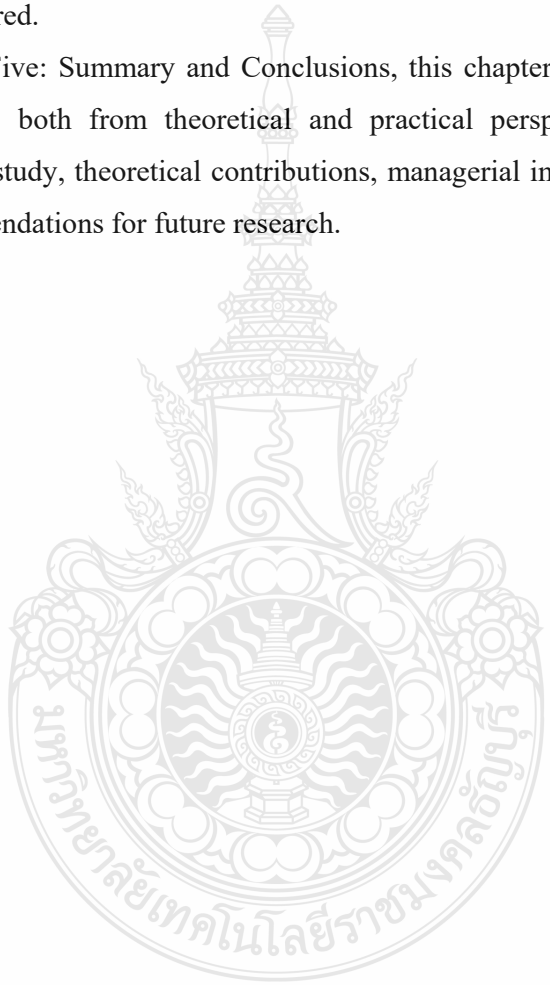
Chapter Two: Review of Literature, based on the reviewing of previous studies in related areas to lay a foundation for this study both theoretically and empirically. This chapter was designed to review each of the major theoretical concepts used in research works in the field of logistics management and logistics capabilities those were demand management capabilities, supply management capabilities, information management capabilities, logistics integration capabilities, and as well as the firm performance. In addition, Resource-Based View perspective was thoroughly reviewed for the relevancy and the application to the research questions addressed in this study.

Chapter Three: Research methodology, presented methodology relevant in this study, based on research questions, research hypotheses and literature reviewed in Chapter One and Two. Topics of relevance were research design, survey methodology, sampling plan, measurement properties of the selected scales, data analysis plan and quantitative measurement. Particular attention was given to the test for validity and

reliability of the research constructs. Qualitative research was also conducted to affirm the quantitative research results.

Chapter Four: Analysis of the Data, presented in this chapter was the results findings. The data from empirical survey had been analyzed and presented. This included the analysis of the constructs along with their reliability and validity. The hypothesis testing and summary of findings was reported to the extent that hypothesized relationships occurred.

Chapter Five: Summary and Conclusions, this chapter presented conclusions from the findings, both from theoretical and practical perspectives, including the discussions of the study, theoretical contributions, managerial implications, limitations, as well as recommendations for future research.



CHAPTER 2
REVIEW OF THE LITERATURE

Introduction

The review of the literature consisted of five main sections, the first section provided the theoretical perspective of the Resource-Based View of the firm, the second section discussed logistics capabilities which were categorized into demand management capabilities, supply management capabilities, and information management capabilities, the third section defined the logistics integration capabilities and discussed the roles in integrating firm's logistics capabilities, the fourth section discussed firm performance as to evaluate the output of the logistics capabilities and logistics integration capabilities, and finally, the last section proposed the theoretical framework used for this study.

2.1 Resource-Based View of the Firm

The Resource-Based View of the Firm perspective (hereafter Resource-Based View or RBV) is an influential theoretical framework to determine of how competitive advantage within firm is achieved and sustained (Eisenhardt & Martin, 2000), RBV is one among a widely accepted theories of competitive advantage with the focus on relationships of internal characteristics and competitive advantage of the firm (Spanos & Lioukas, 2001). Fahy and Smithee (1999) referred firm-specific resources, found in works by Chamberlin and Robinson in the 1930s, as the earliest acknowledgement of RBV. However, Resource-Based View was initiated in the mid-1980s (Bridoux, 2004), with the appearance of a well-known strategic management research article published in 1984 by Birger Wernerfelt, namely A Resource-Based View of the Firm. Wernerfelt (1984) analyzed firms in term of resources rather than products, on growth strategies. More attention had then been focused on the provision of RBV, R. Rumelt (1984) studied strategy and firm's unique resources and capabilities and J. Barney (1991) examined the link between firm resources and sustained competitive advantages with more contributions from various academics (Amit & Schoemaker, 1993; Black & Boal, 1994; Margaret A. Peteraf, 1993; Teece et al., 1997). RBV has since been growing in

popularity in the strategy literature (Fahy & Smithee, 1999). The understanding of the relationships among firm distinctive internal resources, capabilities, and competitive advantage emerged (Hart, 1995) and hence, RBV became dominant contemporary approach in the field of strategic management (Bridoux, 2004).

Rooted in strategic management literature, the basis of the RBV is that successful firms will find their future competitiveness on the development of distinctive and unique capabilities, which may often be implicit or intangible in nature (Teece et al., 1997). Fahy and Smithee (1999) defined the principal contribution of RBV as a theory of competitive advantage with an exploitation of internal rather than external resources, thus, the RBV at its most basic could be defined as an "inside-out" process of strategic management (Grant, 1991). According to J. Barney (1991), firms with equal resources would have no profitability differences because any strategy could be implemented by any firm in the same industry. R. Rumelt (1984) defined an essence of RBV by the firm's unique resources and capabilities. If firm possesses certain special characteristics of resource and capabilities, these can be important factors of sustainable competitive advantage and superior firm performance (J. Barney, 1991). The Resource Based View's basic logic is a relatively simple one which based on an assumption that the desired outcome of managerial effort within the firm is competitive advantage which allows the firm to earn economic rents or above-average returns (Fahy & Smithee, 1999). The value creating potential of firm's strategy critically depends on the underlying resources and capabilities which is considered firm's unique ability (Conner, 1991). J. Barney (1991) explained that, if all the firms were equal in terms of resources there would be no profitability differences among them, any firm in the same industry would be the same, thus RBV is an efficiency-based explanation of firm performance differences.

The fundamentals of Resource-Based View stem from J. Barney (1991) that firm-specific resources must have the following attributes: (1) it must be valuable; (2) it must be rare; (3) it must be inimitable; (4) it must be non-substitutable, it was otherwise, known as VRIN or Valuable, Rare, Inimitability and Non-substitutability.

Valuable is the attribute that allows the firm to either outperform its competitors or reduce its own weaknesses (Amit & Schoemaker, 1993; J. Barney, 1991)

and must enable a firm to employ a value-creating strategy, such as improving quality or enhancing attractive features to relatively differentiate to competitors or further reduce costs (Grant, 1991). The value perspective suggests that firm's valuable and unique resources can be used to exploit opportunities and neutralize the threats from the business environment (Dierickx & Cool, 1989) and thereby, should provide potential in getting to the markets as well as, making significant contribution of value to customers (Prahalad & Hamel, 1990). Mahoney and Pandian (1992) emphasized that valuable resource had the potential of yielding superior rates of return and enabled firm to implement strategies to improve firm's efficiency and effectiveness.

Rare firm's resources must be rare so that they are valuable. Rare resources are those that are scared in supply, acquiring is limited or it can only be acquired by very few companies and they are not equally accessible or equally distributed among all the current and potential competitors (Madhani, 2009; Theriou, Aggelidis, & Theriou, 2009), therefore, firm's resources must be considered rare in order to result in a competitive advantage. When more than few companies have acquired the same resources, it results in competitive parity (Rothaermel, 2012). With the relatively high levels of rareness, firms can expect to attain an increased level of economics rents, through the deployment of their valuable resources (Ryman, 1999).

Inimitability refers to the extent to that imitation or replication is difficult or not feasible, firm's valuable resources must be difficult to copy or replicate by the competitors or other firms, which could be due to complexity of resources themselves or there are difficulties in acquiring the resources (Madhani, 2009) or from the factors such as social complexity (Dierickx & Cool, 1989). If a firm can control its valuable resources, it can thus be considered source of firm's competitive advantage (J. Barney, 1991), Ryman (1999) argued that firm must protect its valuable resources endowments from imitation by competitors, otherwise, competitive advantage cannot be sustained overtime. Firm's competitive advantage could be sustained if competitors are not able to perfectly replicate these strategic resources or assets (Margaret A. Peteraf, 1993). An important underlying the inimitability is causal ambiguity i.e., the source from which a firm's competitive advantage stems from is unknown (Lippman & Rumelt, 1982; Margaret A. Peteraf, 1993). Firm must be able to raise the barriers to the imitation of

their strategic resources (R. Rumelt, 1984), so that other firms will not be able to easily imitate these strategic resources up to the level that enables them to compete with the firm who possess the valuable resources (Mahoney & Pandian, 1992; Margaret A. Peteraf, 1993).

Non-substitutability of resources implies that the resources cannot simply be replaced or substituted by similar resources. The importance of non-substitutability is that even if a firm possess resource which is valuable, rare and difficult to imitate, but if aspect of substitutability is lack of, there would not be considered source of competitive advantage (Dierickx & Cool, 1989). By definition, resource is not substitutable if there is no replacement of an identical or adequate resource that could be used to replace the existing resource (Talaja, 2012). This barrier inhibits competitors' abilities to obtain or duplicate strategic resources, therefore, creates unequal distribution of resources and immobility of resources across competing firms in the business. This leads to a differentiation of firm in a long run for the ability to generate rents (Oliver, 1997).

The VRIN framework however, on some studies were referred as VRIO, following observations from Porter (1991) on theoretical arguments and empirical evidence by Newbert, Kirchhoff, and Walsh (2007) that resources are not sufficient by itself to generate competitive advantage but must be deployed in order to generate rents. Amending by subsuming non-substitutable to be under inimitable and adding "organization" as to exploit and deployment, therefore the framework is then VRIO.

The Resource-Based View suggests that the results of performance of the firm are a consequence of firm-specific resources and firm capabilities. Wernerfelt (1984) described firm-specific resources as a defensible position in the market and allow firm to utilize them for corporate strategy formulation (J. B. Barney, 1986) and is costly to be replicated by other competitors (J. B. Barney, 1986; R. P. Rumelt, 1987; Wernerfelt, 1984). Hence, within the Resource-Based View perspective, it can be described that the two components which create firm's competitive advantage are resources and capabilities (Eisenhardt & Martin, 2000).

Grant (1991) provided a classification of resources into tangible and intangible, supported by work of Maijoor and Van Witteloostuijn (1996) which defined

resources as those (tangible and intangible) assets that are tied semi-permanently to the firm.

Tangible resources refer to the fixed and current assets which includes financial capital, physical assets of the firm such as plant, equipment, land, other capital goods and stocks of raw materials debtors and bank deposits that have a fixed long run capacity (Wernerfelt, 1989). Tangible resources have the properties of ownership and their value is relatively easy to measure (Hall, 1989). The book value of tangible resources is assessed through conventional accounting mechanisms and is usually reflected in the balance sheet valuation of companies (Fahy & Smithee, 1999). Grant (1991) argued that tangible resources are those transparent and relatively imitable and substitutable by competitors when compared with intangible resources, due to its nature of tangibility.

Intangible resources encompass assets such as intellectual property includes trademarks and patents, firm reputation, brand image, product quality, company networks and databases (Hall, 1992; Williams, 1992). The presence of intangible resources account for the significant differences that are observed between the balance sheet valuation and stock market valuation of publicly quoted companies (Grant, 1991; R. P. Rumelt, 1987). Intangible resources in comparison with tangible resources, is relatively more resistant to imitability and substitutability by competitors (Fahy & Smithee, 1999).

Grant (1991) described the two assumptions underlined Resource-Based View. First, a firm's strategy started from their stable foundations which were resources and capabilities. Firm which focused more on utilizing these resources and capabilities would have had a better adjustment to external changes and would have had superior firm performance. Second, resources and capabilities were basis for firm's profitability. Therefore, firms with specific resources and capabilities were more successful than those without. The strategy based on these specific resources was inimitable which made it difficult for competitors to imitate the value that firm's resources created.

Bharadwaj (2000) distinguished resources and capabilities that while resources provided basic units of analyses, competitive advantage was developed by pooling resources that work together to create organizational capabilities. Capabilities were

referred as dynamic routines acquired from assembling, integrating and deployment of the valuable resources process through organizational management (Amit & Schoemaker, 1993; Russo & Fouts, 1997; Schendel, 1994) and essentially encompass skills of individuals or groups and the interactions to coordinate the firm's resources (Grant, 1991), through teamwork, organizational culture and trust between management and workers (Fahy & Smithee, 1999). Capabilities are an interaction-based which makes it even more difficult to imitate by competitors due to causal ambiguity. The RBV literature have tended to favor capabilities as the most likely source of sustainable competitive advantage (Collis, 1994). Wernerfelt (1989) suggested that capabilities had limited capacity in the short run due to learning and change difficulties within the firm, but however had potential and relatively unlimited capacity in the long run and would continuously improve the effectiveness of the organization (Moingeon, Ramanantsoa, Métais, & Orton, 1998). In contrary, Itami and Roehl (1991) described information based resources as invisible assets which was as just essential for effective operation as a more visible resources and could prove to be a real source of competitive power and important for a long term success.

Hierarchy of organizational capabilities was described by Grant (1996) that firm utilized functional capabilities to form collaborated unique capabilities which led to the firm’s competencies (Prahalad & Hamel, 1990). Logistics capabilities had also been referred to as important functional capabilities of the firm (Michael, 2007; Morash et al., 1996). Logistics capabilities can provide sustainable competitive advantage and create firm’s superior performance (Donald J Bowersox & Daugherty, 1995).

Haack (1997) argued that Resource-Based View perspective’s major drawback was that there was not a comprehensive framework of how resources within the organization that interact with each other to create something new and unique. J. Barney (1991) stated that the basic question RBV attempted to address concerned what combination on VRIN framework that resources and capabilities would lead to a competitive advantage. Margaret A. Peteraf (1993), one among major contributors to the RBV perspective, suggested that RBV was based on the notion that firms were fundamentally heterogeneous in terms of their resources and capabilities, however while heterogeneity not precisely defined, it implied that firms with varying capabilities are

able to compete in the market place. In a study of Oliver (1997), defined firm heterogeneity as relatively durable differences in strategy and structure across firms in the same industry that tended to produce economic rents and a sustainable competitive advantage.

Margaret A Peteraf and Barney (2003) suggested an assumption of resource heterogeneity and then considered which of a given collection of resources satisfy the VRIN conditions and emphasized that different resources had different impact on the firm's ability to generate source of a competitive advantage, hence firm performance. Different levels of value creation can be obtained by resources bundled across firms to bear on particular value-added tasks (Foss & Foss, 2004). Therefore, from a Resource-Based View perspective, competitive advantage is a result of discretionary rational managerial choices, selective resource accumulation, strategic leverage core competencies and deployment (Oliver, 1997).

2.2 Logistics Capabilities

The term “capabilities” reflects a major role of strategic management in utilizing, integrating resources, competencies and skills, usually in combination, to cope with challenges of the external environment and obtain desired results. The key characteristics of capabilities are that they must be specific to the firm and have been developed over time. (Amit & Schoemaker, 1993; Grant, 1991; Prahalad & Hamel, 1990). In other words, capabilities are complex bundles of accumulated resources, determined as firm's capacity of efficiency and ability.

Council of Supply Chain Management Professionals (CSCMP) had provided a definition of logistics as “part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements”. The concepts of logistics capabilities and supply chain management are related, however, it may be necessary to point out some of the distinct differences. Mentzer, Flint, and Kent (1999) defined Supply Chain Management as systemic, strategic coordination and tactic across business functions to a sustainable improvement of the firm and the whole supply chain. Supply chain

management is considered a network of logistics systems which involves activities of each member in the supply chain (Coyle, Langley, Novack, & Gibson, 2016). Logistics capabilities are viewed as members of supply chain and are critical part of the success of a supply chain (Mentzer, Min, & Michelle Bobbitt, 2004). Multiple processes or sub-processes are involved in the fulfillment the supply chain with demand from supply to distribution of products to the customer. Therefore, logistics capabilities can be used to react and fulfill the supply chain to respond to requirement of the market (M. Gligor & Holcomb, 2014).

J. Barney (1991) defined logistics capabilities as part of a firm's resources which included all assets, work processes, organizational competencies, information, knowledge, and firm attributes to allow firm to implement strategies that improve efficiency and effectiveness. Morash et al. (1996) referred capabilities as attributes such as abilities, processes, knowledge and skills that allowed a firm to achieve superior performance, also defined logistics capabilities as the level of efficiency, effectiveness, and differentiation which related to the implementation of firm's logistics activities. Douglas M Lambert, Cooper, and Pagh (1998) viewed logistics management as a key opportunity to improve competitive performance and profitability of a firm. Lynch et al. (2000) conducted a study which shown the correlation between logistics operations and excellence in capabilities and superior organizational performance. Logistics capabilities have been highlighted in academic and practical fields, and have been recognized as a source of competitive advantage affecting firm performance which consequently leads to unique organizational skills and processes that creates distinctive capabilities (Stanley E Fawcett et al., 1997). Such a focus on logistics, encourages firms to develop and sharpen logistics capabilities (Daugherty et al., 1998).

The study by Stanley E Fawcett et al. (1997) emphasized that superior logistics capabilities helped to improve performance of organizations. Daugherty et al. (1998) noted that many firms focused on the logistics capabilities to achieve competitive advantage and differentiation. R. M. Morgan and Hunt (1999), in the context of demand-oriented aspect, elaborated that firm's competitive advantages could only be realized when the firms combine basic resources in such a way that they achieve a unique capability that was valued by the customers. Donald J Bowersox et al. (2000)

emphasized potentiality of logistics capabilities as source of competitive advantage for firms to succeed. According to Mentzer and Williams (2001), logistics capabilities contributed to a firm's competitive advantage and helped firms to develop cost leadership and differentiation strategy. Hayes and Pisano (1994) additionally, defined logistics capabilities as important parameters to enhance financial and market performance.

Several of more recent studies have evaluated the relationship between logistics capabilities and firm performance such as Lynch et al. (2000); Ellinger et al. (2000); Hafeez, Zhang, and Malak (2002); Ray, Barney, and Muhanna (2004); Stank et al. (2003); Zhao et al. (2001), these studies described logistics capabilities as crucial contributions on the strategy implementation, firm performance, and competitive advantage. Logistics capabilities have vital roles to improve firm’s competitiveness and fulfill customer satisfaction (Mollenkopf & Dapiran, 2005). Logistics capabilities significantly contribute to firm’s superior performance, as well as, providing sustainable competitive advantage in a challenging and competitive environment (J. J.-K. Cho & Ozment, 2005). As such, based on firm's unique logistics resources, firms can particularly create and maintain competitive advantage by providing value added service, an advantage which is difficult to imitate by competitors (Mentzer & Williams, 2001). Esper et al. (2007) argued that the two challenges under the changing dynamic context and hypercompetitive business environment were 1) how firms can utilize their logistics capabilities strategically, and 2) how firms can achieve sustainable logistics integration.

Firms must consider logistics capabilities in a boarder perspective, not merely just a simple source of cost savings but let logistics capabilities enhance value addition of the product and service and create competitive advantage (Mentzer et al., 2004). Logistics should further be considered as resources to both supports and enables new strategic to strengthen firm’s competitive advantage (Abrahamsson, Aldin, & Stahre, 2003). Lynch et al. (2000) emphasized that logistics capabilities must be embedded in organizational routines and practices, so that they could not be traded or imitated and thus logistics capabilities can be defined as firm distinctive capabilities.

Gaining a better understanding of the relationship between logistics capabilities and firm performance has the managerial as well as the theoretical implications. The role of logistics capabilities to enhance business success is main objective of all businesses. Logistics capabilities have been proved to be valuable factors and enabled firms to survive through the efficient and effective manner in the changing business conditions.

2.2.1 Categorizing logistics capabilities

Researchers in the field of logistics defined logistics capabilities from different perspectives, a review of the previous studies indicated that logistics capabilities can be classified and grouped in various ways. J.-K. J. Cho (2001) reviewed previous logistics capabilities literature, summarized the contributions to the development of logistics capabilities (see table 2.1) and described that logistics capabilities had been a major topic of interest due to their contribution for superior firm performance and competitive advantage.

Table 2.1 Summary of the Contributions to the Development of Logistics Capabilities (J.-K. J. Cho, 2001)

Author(s) and Date	Article/Book Title	Main Contributions
MSU Global Logistics Research Team (1995)	World Class Logistics: The Challenge of Managing Continuous Change	Identified 17 global logistical capabilities in four competency groups
Daugherty and Pittman (1995)	Utilization of Time-based Strategies	Emphasized speed, time-based strategies, information exchange and communication
Eckert and Fawcett (1996)	Critical Capabilities for Logistics Excellence: People, Quality, and Time	Identified people, quality, and time as critical capabilities for logistics excellence
Morash, Droge, and Vickery (1996)	Strategic Logistics Capabilities for Competitive Advantage and Firm Success	Identified four key logistics capabilities adapted from MSU study: Delivery speed, Reliability, Responsiveness, Low cost distribution
Clinton and Closs (1997)	Logistics Strategy: Does It Exist?	Identified five factors that are closely related with logistics strategy
Stank and Lackey (1997)	Enhancing Performance Through Logistical Capabilities in Mexican Maquiladora Firms	Utilized thirteen capabilities adapted from MSU research to describe four logistics competencies

Table 2.1 Summary of the Contributions to the Development of Logistics Capabilities (J.-K. J. Cho, 2001) (Cont.)

Author(s) and Date	Article/Book Title	Main Contributions
Fawcett, Stanley, and Smith (1997)	Developing Logistics Capability to Improve the Performance of International Operations	Identified significant effect of logistics capability on firm performance in the international operations
Thomas (1998)	The Quest Continues	Recognized five areas that logistics professionals rated the most critical areas for logistics quality
Lynch (1998)	The Integration of Firm Resources: The Role of Capabilities in Strategy and Firm Performance	Examined the relationship between logistics capabilities developed by MSU study and Porter's strategy
Stank. Daugherty, and Ellinger (1999)	Marketing/Logistics Integration and Firm Performance	Examined the importance of integration of logistics capabilities seventeen capabilities adapted from MSU study-and marketing function for better performance
Ellinger (2000)	Improving Marketing/ Logistics Cross-Functional Collaboration in the Supply Chain	Used five logistics performance measures to investigate the importance of collaboration with marketing function for firm performance

Daugherty and Pittman (1995) examined the linkage between logistics and competitive advantage, and suggested crucial factors for logistics capabilities to be time-based capabilities, information technology and flexibility. From the study of Global Logistics Research Team at Michigan State University in 1995, cited in M. Gligor and Holcomb (2014), which conducted one of the most comprehensive examinations of logistics capabilities with an in-depth interviews and surveys to identify seventeen universal logistics, of which had grouped logistics capabilities into four competencies those were positioning, integration, agility, and measurement. A study of Morash et al. (1996), reviewed logistics capabilities by employing major value disciplines (closeness or intimacy and operational excellence) to categorize strategic logistics capabilities and suggested that strategic logistics capabilities can be categorized into demand-oriented capabilities and supply-oriented capabilities, where the former emphasized on external dimensions e.g., customer, customer interfaces, and

goals and objectives thus associate mainly with customer service, time advantages, and responsiveness to markets, while the latter was related to the firm's operational capabilities and emphasized on product availability, convenience, and low total distribution cost. Eckert and Fawcett (1996) included people, quality, and time as critical capabilities for logistical excellence in the study. Clinton (1997) indicated the five factors aligned with logistics capabilities to be alliances, information systems, EDI practices, inventory management, and reengineering. Lynch et al. (2000) discussed logistics capabilities to include operational capability and value-added service. Donald J Bowersox and Daugherty (1995) pointed out that logistics capabilities could be classified in a variety of ways such as demand-management capabilities, supply-management capabilities, and information-management capabilities.

More recent research of Zhao et al. (2001), provided empirical evidence that customer-focused capabilities and information-focused capabilities were significantly related to firm performance. Firm needed to evaluate their own strengths and weaknesses in order to fulfill customers' expectation. Mentzer et al. (2004) examined the relationship of the structure and role of logistics capabilities and conceptualized logistics capabilities, in the context of theory of the firm, led to four categories: 1) demand management interface capabilities, which relates to customer service and logistics quality; 2) supply management interface capabilities, which relates to low cost distribution and supply; 3) information management capabilities, which relates to information sharing and IT management; and 4) coordination capabilities, which involves internal and external coordination.

In contrary, Stank et al. (2003) presented a comprehensive, broad classification of logistics capabilities that encompassed four categories: customer focus, time management, integration, and information exchange and evaluation and note that logistics capabilities represented resource expertise in other functional areas then become key logistics capabilities such as manufacturing, marketing, and purchasing. Study of Shang and Marlow (2005), used the context of integration, had suggested that information integration and general integration capabilities comprised logistics capabilities.

Esper et al. (2007) observed earlier studies of logistics management and categorized logistics capabilities that are most frequently discussed in the literature and proposed a classification of logistics capabilities into five categories, those were (1) customer focus capability, (2) supply-management capability, (3) integration capability, (4) measurement capabilities, and (5) information exchange capabilities (see table 2.2).

Table 2.2 Categorization of Logistics Capabilities (Esper et al., 2007)

Capability	Descriptions	Cites
Customer Focus Capability	Provides product or service differentiation and service enhancement for continuous distinctiveness for customers by targeting a given customer base and meeting or exceeding their expectations by providing unique, value-added activities	Zhao, Droge, and Stank 2001; Morash, Droge, and Vickery 1996; Stank and Lackey, Jr. 1997; Lynch, Keller and Ozment, 2000; Mentzer, Min, and Bobbitt 2004; Bowersox, Closs, and Stank 1999.
Supply-Management Capability	Involves I) total cost minimization to minimize total system costs so that cross-functional cost tradeoffs are explicitly considered, 2) effective management of time to eliminate wasted capital and inventory, 3) response to demand fluctuations with less distortion of the order cycle process, and 4) use of resources to enable postponement speculation, modularization, and standardization	Morash, Droge, and Vickery 1996; Daugherty and Pittman 1995; Lawson 2003; McGinnis and Kohn 1993; Mentzer, Min, and Zacharia 2000; Murphy and Farris 1993.
Integration Capability	A state that exists among internal organizational elements that are necessary to achieve unity of effort to meet organizational goals. Includes internal component (communication aspects associated with interdepartmental activities the willingness of departments to work together), and an external component (two or more firms voluntarily agree to integrate human, financial, and/or technical resources in an effort to create a new, more efficient, effective or relevant business model)	Daugherty, Stank, and Ellinger 1998; Stank, Davis and Fugate 2005; Kahn and Mentzer 1996; Bowersox, Closs, and Stank2003.
Measurement Capability	Refers to the degree to which a firm monitor internal and external operations. Aligned with strategy to make accurate, detailed, relevant, and timely information accessible to managers for strategic planning and daily decision making and enables the translation of business objectives into measurement specific operational and financial targets for elements in the supply chain	Global Logistics Research Team at Michigan State University 1995; Fawcett, Smith, and Cooper 1997; Gilmour 1999; Holmberg 2000; Bowersox, Closs, and Stank 2000.
Information Exchange Capability	Acquires, analyzes, stores, and distributes tactical and strategic information both inside and outside the firm through the application of hardware, software and networks to enhance information flow and facilitate decisions	Zhao et al. 2001; Mentzer, Min, and Bobbitt 2004; Closs, Goldsby, and Clinton 1997.

The aforementioned review emphasizes on several logistics capabilities of the firm which strongly demonstrated to be a strategically key for firm success.

Despite many companies focus and build these types of logistics capabilities to sustain competitive advantage and business performance. However, problems would arise, if firm lacks a full complement to create competencies (R. M. Morgan & Hunt, 1999). The real success needs to go beyond customer satisfaction but direct to their expectations by having products and services beyond their current demand (Prahalad & Hamel, 1990). Therefore, firm needs to leverage their logistics capabilities to effectively influence market demand through the application of excellent logistics systems, techniques, and programs and command relatively high market returns gained from relatively small investments (Donald J Bowersox, Mentzer, & Speh, 2008) and build new logistics capabilities to achieve sustainable competitive advantage in current global economy (Karagöz & Akgün, 2015). Relationship of performance and logistics capabilities contributes to the integrated activities of functional areas e.g. finance, operations and marketing (Ellinger et al., 2000). Improved capabilities will increase overall performance, "capability" and "efficient utilization of resources" have a positive effect on logistics performance in terms of the logistics capabilities framework (Karagöz & Akgün, 2015). The preponderance of logistics capabilities researches illustrated the impact on firm performance, therefore, to complement the body of literature reviewed, these researches were reviewed with the focus on logistics demand, supply and information management capabilities as firm's logistics capabilities and the effects of integration capabilities to enabling an in-depth examination of the elements and their impact on firm performance.

2.3 Demand Management Capabilities

From stream of research in demand management capabilities, these have also been referred to as customer-focused (Zhao et al., 2001), valued-added (Lynch et al., 2000), demand-management interface capabilities of logistics (Mentzer et al., 2004) or customer integration capabilities (Donald J Bowersox, Closs, & Stank, 1999).

Demand management capabilities are the process within supply chain management that balance the customers' requirements and the capabilities of the supply

chain, with the goal to effectively and efficiently serve customers' requirement (Croxton, Lambert, García-Dastugue, & Rogers, 2002). Firm would be able to proactively react to anticipated demand, as well as to reactively deal with unanticipated demand. Crum and Palmatier (2003) defined demand management as the efforts to understand the customers' demand for products and services and to acquire and deploy the resources to meet their demand, and as well as, to influence the demand which both benefit customers and the company. Demand management disciplinary received considerable attention in the supply chain management literature. The substantial amount of literature had provided evidence that demand management capabilities create value by increasing customer satisfaction and lead to firm's competitive advantage (Daugherty et al., 1998; Davis-Sramek et al., 2008; Innis & La Londe, 1994). Evidence also exists that superior logistics demand management and customer service has crucial roles in improving the overall of firm performance (Leuschner, Charvet, & Rogers, 2013).

Rosane Lucia Chicarelli Alcantara (2014) compiled the concepts of demand management from literature by several authors, as summarized in table 2.3, which implied that demand management cannot be considered as an isolated process, but together with operations and marketing. This helped in providing a clearer understanding of the influence of market, strategy, and the customer needs on the demand management capabilities.

Table 2.3 Demand Management Definitions (Rosane Lucia Chicarelli Alcantara, 2014)

Authors	Demand Management Definition
Croxton et al.(2008)	Supply chain process composed of operational and strategic sub-processes that focus on determining sales forecasting, synchronize it with the production capacity of the company and the chain, incorporate the company strategy, and map customer needs
Hilletofth et al. (2009); Hilletofth and Ericsson (2007); Juttner et al. (2007); Walters (2006); Walters and Rainbird (2004)	Alignment of demand creation and demand fulfillment processes within the internal functions of a particular company and across companies within the chain thus exploring the synergies between market and SCM aiming at obtaining competitive advantages

Table 2.3 Demand Management Definitions (Rosane Lucia Chicarelli Alcantara, 2014) (Cont.)

Authors	Demand Management Definition
Mentzer et al. (2007); Mentzer and Moon (2005)	An element of the supply chain management. Creation of a coordinated demand flow between the members of the supply chain network and their markets
Vollmann et al. (2004)	Key interface between the production activities of a company, and planning and market control systems. It encompasses several activities including forecasting, processing customer orders establishing delivery dates, and balancing demand and supply
Rainbird (2004)	Understanding of the current and future customer expectations, market characteristics, and available alternative responses that result from operational processes

Morash et al. (1996) proposed the four dimensions for customer service, which were timeliness, availability, delivery quality, and communication with customers. These dimensions when combine with a broader aspect of customer service, they created core competency (Olavarrieta & Ellinger, 1997). Customer service quality includes flexibility to respond to unexpected circumstances and accommodate customer's unique and changing requirements and demand (Donald J Bowersox et al., 1999; Christopher, Schary, & Skjott-Larsen, 1979). Understanding customer service is a focal point in starting to create comparative customers' value (Lambert,1992). Miricescu (2013) referred customer service as the process of supply chain and delivery management. Therefore, in this context, it is the process that provide significant benefits and added value through logistics capabilities. Flint, Larsson, Gammelgaard, and Mentzer (2005) argued that customers select products and services based on the value they received, otherwise called trade-off. The trade-off between functional, service, and benefits with monetary and non-monetary sacrifices relates to firm's specific goals (Lapierre, 2000; Ulaga, 2003). Thus, the ability which relates to customer's perception, that a firm performs for collectively lower cost than rivals or to perform some activities in unique ways that create end-customer value, is considered source of competitive advantage (Porter, 1991).

To implement customer management capabilities effectively, firm must understand the market (Croxton et al., 2002; Esper et al., 2007). Combining the strengths of marketing knowledge and supply chain competencies will create value and ability to meet differing needs of the customer (Jüttner, Christopher, & Baker, 2007). For a thorough understanding of customer requirements in order to establish specific customer service strategy, Douglas M. Lambert (1992) offered methodology which comprises of 1) External audit: To develop a comprehensive and meaningful variables for customers to evaluate vendors' performance, 2) Internal audit: To determine if and how performance is being measured and reported to management, 3) Evaluation of customer perceptions: To determine services for which customer perceives when compared with performance as measured by internal reports, and 4) Identification of opportunities to gain differential advantage: To identify marketing services which offer the best opportunity for improved market share and/or profit improvement.

G. S. Day and Wensley (1988) suggested that logistics activities such as timely delivery, shipping methods, or order handling activities could create superior service to satisfy customer. The case of apparel industry is a good example of the crucial roles of logistics and supply chain management. By linking together all members of the supply chain, the consumers to the retailers to the apparel manufacturers to the fabric manufacturers to the fiber producers, results in a quick turn up in store, better assortment of products, fewer markdowns, and less inventory in the logistics pipeline (Douglas M. Lambert, 1992). Customer focused capabilities are the output of a firm's logistics system, as such firm must utilize the logistics network to efficiently serve the customers. These capabilities help firm to target at key customers and provide unique value-added activities to meet their expectations (Donald J Bowersox et al., 1999; Lynch et al., 2000). Competency of demand management is the ability of a firm to respond timely and effectively to the various and changing needs of the customer for service, deliver time, and price (Zhang, Vonderembse, & Lim, 2005). J.R. Stock and Lambert (2001) identified the attributes in customer logistics service which were consistently ranked very important by customers, as follows:

-Availability is the ability of manufacturers to fulfill customer orders within a specified time.

-After-sales service is the process to follow up and make sure customers are satisfied with products and services.

-Efficient logistics service communications is the ability to handle customer queries and effectively communicate about the product or service.

-Documentation is the internal process which to handle relevant paperwork in the customer's system efficiently and accurately.

-Deliver is the ability to deliver within the timeframe as committed.

Demand management capabilities provide product and service differentiation, as well as enhance a lasting distinctiveness for the customers (Donald J Bowersox et al., 1999; Morash et al., 1996), these are also considered an important and challenging factor in logistics management which have direct linkage and have an impact with the firm performance (Donald J Bowersox et al., 1999). Superior logistics performance counts on the capabilities to produce desirable business outcomes and contribute to the firm's financial performance (Andraski & Novack, 1996; Novack, Rinehart, & Langley Jr, 1996). Demand management capabilities therefore, create commitment and trust which are necessarily for developing and maintaining of long-term relationships with customers (Zhao et al., 2001).

Customer satisfaction is fundamental for business practice. The degree of customer satisfaction can be determined by the attributes of products and service versus the cost paid. Improvement of the quality of logistics service can increase customer satisfaction (Sharma, Grewal, & Levy, 1995). Customer satisfaction leads to long-term profitable relationship (Carpenter & Fairhurst, 2005). Firms should try to increase customer satisfaction and make them a central strategic goal to achieve competitive advantage (Mittal & Kamakura, 2001; Patterson & Spreng, 1997), and thus, customer's satisfaction or dissatisfaction is one of a major factor that impacts firm performance. Concerning customer satisfaction with the logistics context, Mentzer et al. (1999) conceptualized logistics service quality (LSQ) and proposed a nine dimension scale. The LSQ served as valuable contribution to measure the impact on the customer satisfaction (Kamble, Raut, & Dhume, 2010) and have a significant role in assisting to determine and to achieve customer satisfaction, loyalty, and long-term relationship (Bourlakis, Melewar, Banomyong, & Supatn, 2011). The LSQ scale was aimed at

improving and standardizing logistics service measurement systems for logistics managers to quantify performance in respect to both internal and external operation and can precisely measure customer-perceived satisfaction of logistics services, as illustrated in figure 2.1.

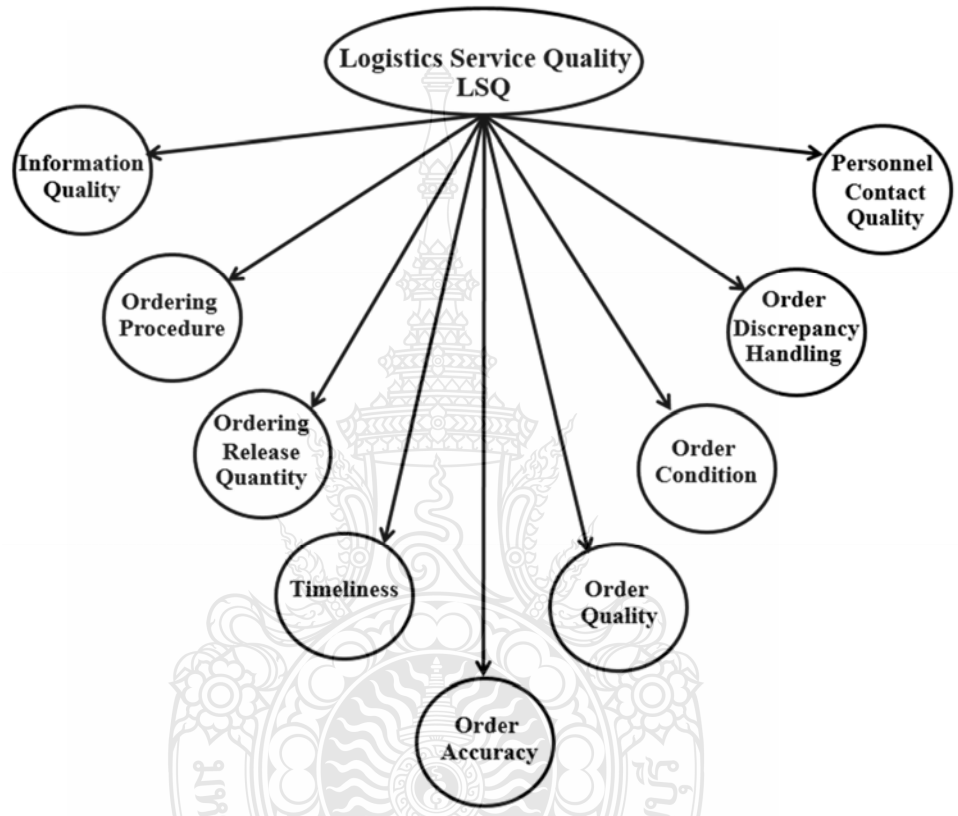


Figure 2.1 The Nine Dimensions of Logistics Service Quality (Mentzer et al., 1999)

The nine dimensions LSQ per details as follow:

(1) Information Quality refers to customer's perception on the details and accuracy of the information available from supplier regarding products from which customers may choose.

(2) Ordering Procedure relates to the efficiency and effectiveness, as well as the ease of use of the requisition procedures of the supplier.

(3) Ordering Release Quantity relates to the concept of product availability without challenges and difficulty in obtaining quantities desired.

(4) Timeliness indicates whether orders delivered at the customer in timely fashion as promised. Timeliness includes the length of time between order placement and receipt and can be affected by back-order time when products are unavailable.

(5) Order Accuracy is the correctness of customer's orders upon arrival, which includes right products with no substitutions, and with correct quantity.

(6) Order Quality refers to the performance of products and service, includes conformity to product specifications and customers' requirements.

(7) Order Condition refers to condition of the delivered products with no damage in the transition process. Products must be delivered in the conditions as promised and expected by customers.

(8) Order Discrepancy Handling refers to level of satisfactory or adequacy on any discrepancies in orders to be addressed after the orders arrive.

(9) Personnel Contact Quality refers to quality of personnel or contact person who provides the service in accordance with customer orientation, including knowledge, empathize with the situation, and problems solving skills.

Demand management focus in logistics management can differentiate product-service offering to customer such as timeliness, efficiency, accuracy on the distribution which can induce customer’s buying behavior, firm may have to focus on a proper design on the distribution in order to provide value and unique offering, which is difficult for competitor to imitate (D. Lambert & Stock, 1993). Donald J Bowersox et al. (1999) offered a comprehensive conceptualization of customer integration, a competency that focusing on creating customer value and building sustainable distinctiveness by identifying long-term requirements and expectations of existing and future customers and proposed four capabilities within the customer integration namely: segmental focus (identify core customers), relevancy (satisfy existing and emerged needs), responsiveness (accommodate unique requirements), and flexibility (adaptability to changing circumstance). Demand management capabilities are viewed as a multi-dimensional constructs. Morash et al. (1996) proposed major demand (oriented) management capabilities which consisted of the following components as shown in table 2.4.

Table 2.4 Components of Demand Management Capabilities (adopted from Morash et al., 1996)

Demand Management Capabilities	Definitions
Pre-sales Customer Service	The ability to service the customer during the purchase decision process
Post-sales Customer Service	The ability to service the customer after the sale of the product to ensure continuing customer satisfaction
Delivery Speed	The ability to reduce the time between order taking and customer delivery to as close to zero as possible
Delivery Reliability	The ability to exactly meet quoted or anticipated delivery dates and quantities
Responsiveness to Target Customer	The ability to response to the needs and wants of the firm's target customer

All perspectives from the literature review herein suggested that demand management capabilities were not just operational factors but also a set of processes that dynamically lead to competitive advantage with an impact on performance of the firm.

2.4 Supply Management Capabilities

Cousins and Spekman (2003) defined supply management as functional activities which involved with the flow of goods and services through the organization. Liao, Hong, and Rao (2010) argued that the concept of supply management had been extended to encompass the more comprehensive evolution to a strategic focus of procurement and had increasingly integrated with company strategic plans in order to maximize firm's responsiveness to the market. Therefore, strategic orientation in supply management was particularly important in a competitive global marketplace (Yeung, 2008) and gained more attention due to the influential trend in shaping the future logistics functions (Carter & Narasimhan, 1996). Supply management is a significant business performance enhancer for the firm which has increased with a more strategic role of supply management (Ofori-Amanfo, 2014).

The strategic role of supply management has played a crucial part in corporate strategy. Supply management strategies are proved to be a valuable source of competitive advantage that is used for integrating suppliers' operations with supply management function (Boon-itt & Paul, 2006; Sarkis & Talluri, 2002). Yeung (2008) found strategic supply management to be highly correlated with a firm's competitive advantage and business performance and thus, the existence of supply strategy and the strategic nature of supply management are highly important. Stream of supply management research suggested that supply management had positive relationship and impact on firms' financial performance on ROI, profitability, net income, and market share (Carr & Pearson, 1999).

While supply chain management involves coordinating and integrating the whole business process flows of products, services, and information from supplier to the customers. Supply management on the other hand, takes charge of the upstream portion of supply chain management (Antonette, Giunipero, & Sawchuk, 2002) and organizes the flow of high quality, value for money materials or components from suitable set of innovative suppliers to manufacturers (Wagner, 2003). Leenders, Fearon, Flynn, and Johnson (2001) also proposed similar definition that supply chain management involved all aspects of delivering products and services to customers, whereas supply management emphasized primarily the buyer–supplier relationship. Scannell, Vickery, and Droge (2000) identified upstream supply chain management practices to be supplier development, supplier partnering and JIT purchasing. Antonette et al. (2002) suggested supply management functions to include the management of the supplier base, supplier development, and supplier integration, while Sezhiyan and Nambirajan (2011) defined supply effort management to involve supplier's long term and strategic relationship, supplier involvement, and selection of quality suppliers.

In contrary, Esper et al. (2007) suggested that functionally, supply management capabilities involved: 1) Minimization of the total cost of the system; 2) Time effectiveness; 3) Responsiveness to the fluctuations and distortion of demand; and 4) Ability to cope with postponement, speculation, modularization, and standardization of resources.

Ofori-Amanfo (2014) argued that the supply management must be viewed differently from the firm resources. While firm resources comprise of the capacity and all stock within firm's possession (Wang & Ahmed, 2007), supply management capabilities, on the other hand, are the distinctive and superior ways of facilitating and deploying resources (Schreyögg & Kliesch-Eberl, 2007) and are embedded in organizational processes (Ofori-Amanfo, 2014). The importance of supply management capabilities thus, are not only significant by themselves as functional capabilities, but also are part of firm's operational capabilities which interconnect with resources. Supply management should not be considered as simply purchasing function but rather, a strategic tool for supply chain integration (Yeung, 2008). Capabilities helps firm to diverge strategies (Nelson, 1991) and since supply management capabilities are developed on bundles of skills and resources with strategic supply approach (Bowen, Cousins, Lamming, & Farukt, 2001), hence, play a key linking role between external and internal operations (Novack & Simco, 1991).

Strategic supply focus allows firm to consider a range of strategic relationships (Cousins, 1999; Lamming, 1993) and develops close cooperation, as well as to allow the transfer of key resources, knowledge, and capabilities between firm and its supplier (Lamming, 1993). Key suppliers can provide expertise in products innovation and market knowledge, necessary to successfully produce and market the products, as well as, the cost effectiveness. Managing suppliers is an essential issue in the supply chain management as this is means for achieving sustainable competitive advantage (Wagner, 2003).The supplier partnership involves high level of trust, commitment, and long-term contracts (Scannell et al., 2000). Firms must be certain that their suppliers are high performer in order to be competitive with other supply chains in the same industry (Yeung, 2008).

The competitive pressure in the market forces firms to improve quality and reduce cost, many firms thus concentrate on core competencies and subcontract out those noncore operations (Krause, Ragatz, & Hughley, 1999; Liker & Choi, 2004). Manufacturing firms try to reduce number of their suppliers (Wisner, 2003), close relationships should be developed with small group of keys suppliers, based on the value of that they provide to the firms (Douglas M Lambert, García-Dastugue, &

Croxton, 2008) and create and sustain a loyal supplier relationship that drives both parties to the success.

The deployment of supply management capabilities helps to create long-term supplier orientation which generates collaborative advantages among partnering firms (Chen & Paulraj, 2004; Dyer & Chu, 2000). Sandberg and Werr (2000) argued that the performance of supply management duties such as managing inventories, securing material availability, and supply management, were essentially based on human competence, of which the relationships were also built upon. Sustainable relationship of firm and its buyer was| crucial in the business process. (Carr & Pearson, 2002) The disciplines of supplier relationship include supplier integration, supplier partnering, supplier selection, supplier development and supplier strategic alliances which contribute important roles in strategic supply management.

Supplier integration is defined as a combination of internal resources of the buying firm with the resources and capabilities of selected key suppliers through the business processes to achieve a competitive advantage (Wagner, 2003). Supplier integration is the creation of unique links with suppliers that facilitate the management of the flow of quality materials (Eltantawy, 2009) and can be considered as a rare resource due to the abilities to ward off competitors from imitating at a cost that affords economic rents (Rungtusanatham, Salvador, Forza, & Choi, 2003). Eltantawy (2009) summarized that firms can turn the valuable, rare, imperfectly mobile, and unique links with suppliers into competitive advantages through supplier integration.

Supplier partnering Mentzer, Min, and Zacharia (2000) referred strategic partnering as an on-going process to create long-term relationship among firms in order to achieve strategic goals. A partnership requires mutual commitment, trust, and common goals, as well as communication and cooperation (R. M. Morgan & Hunt, 1994). Partnering is a common way for firm to maintain their competitive advantage (Mentzer et al., 1999). To understand partnering helps to develop success relationships in supply chain (Mentzer et al., 1999).

Frazier, Spekman, and O'neal (1988) distinguished the 2 type of partnering: strategic partnering viewed partner as an extension of own firm and be part of long term

strategic initiatives; and operational partnering which viewed partner as associate in improving supply chains efficiency and effectiveness in the short term.

Supplier selection refers to the criteria used to evaluate and select suppliers in order to configure and establish a supply chain for long-term competitive advantage (Tracey, Vonderembse, & Lim, 1999). Supplier quality is a critical determinant of the overall product quality and costs (Sezhiyan & Nambirajan, 2011) and is important due to the direct impact on firm performance. Supplier performance can contribute to firm's financial, as well as impact on the business operation (Ittner, Larcker, Nagar, & Rajan, 1999). An overall quality performance of supplier and right sources of supplies, with due consideration of time, delivery, and price helps to determine quality suppliers (Baxter, Ferguson, Macbeth, & Neil, 1989). Therefore, the abilities in the supply management to react to customer's changing demand depend on the selection of capable suppliers.

Supplier development refers to the practices that create the continuous improvement mechanism for suppliers to achieve sustaining competitive advantage (Scannell et al., 2000). The importance of supplier development is that it supports a firm's time-based strategy by ensuring the performance and capabilities of the suppliers to fulfil the needs of the buying firm (Krause et al., 1999). Firms encourage supplier development for the benefit that firm can be more reliance on their supplies and can be ascertain that supply sources will support a long-term competitive advantage (Watts & Hahn, 1993).

Strategic supplier alliances is the close and long-term relationships with suppliers (Macbeth & Ferguson, 1994) and has evolved to a broader scope than simple buyer and supplier relationship to include risk and reward sharing for involved parties (Donald J. Bowersox & Daugherty, 1987). Strategic supplier alliances provide a framework for collaboration, ensuring greater open communication and faster joint for faster problematic issues resolution with higher responsiveness (Mentzer, Foggin, & Golicic, 2000). The efficient performance of these activities produce benefits shared by both partners (Donald J Bowersox et al., 2008) and encourage mutual planning and problem solving efforts between the firm and its suppliers (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006). Linking partners into strategic alliances and partnerships create

value for the firm (Donald J Bowersox et al., 2008). The emphasis of strategic alliances is a shared total cost of ownership and the array of value-added services provided (Frazier et al., 1988).

Chen and Paulraj (2004) analyzed the four streams of research effort that contribute to the core of supply chain management literature, those were: strategic purchasing; supply management; logistics integration; and supply network coordination and conceptualized the framework of the supply management which associated with the supply chain management for a better understanding of their scope.

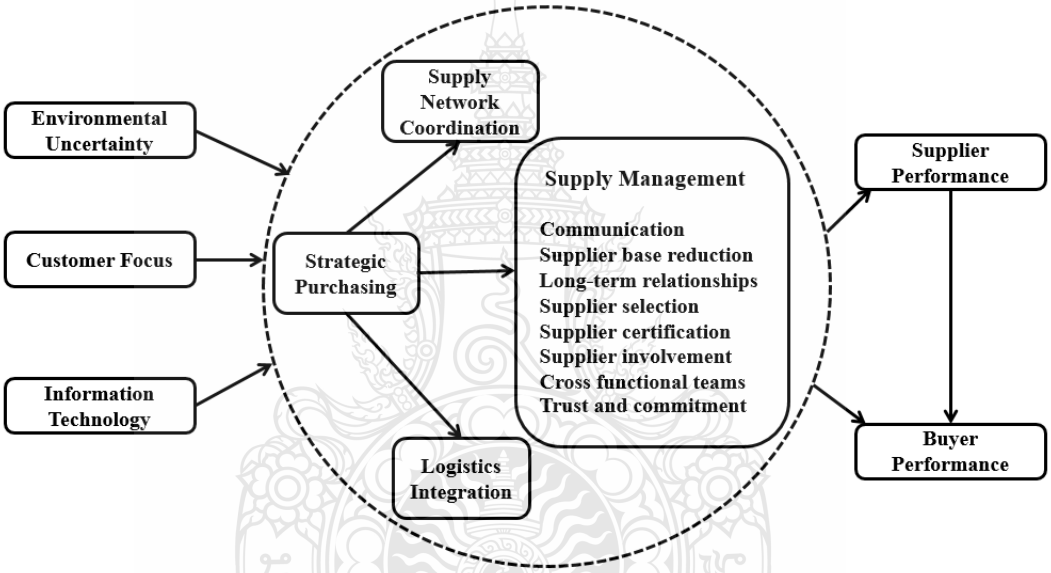


Figure 2.2 Framework of Supply Chain Management (Chen & Paulraj, 2004)

1. Communication: Effective two-way communication is essential for supplier relationship success. Effective inter-organizational communication could be characterized as frequent, genuine, and involving personal contacts. Joint problem solving solutions achieve through willingness to share information. Poor communication causes weakness in the interface between buyers and suppliers. Effective two-way communication with suppliers creates positive effect on the buying firm's competitiveness.

2. Supplier base reduction: A unique characteristic of contemporary buyer and supplier relationship which helps to reduce firm's administrative or transaction costs, reduce number of primary suppliers and allocating a majority of the purchased material requirements to a single source. The benefits including: fewer suppliers to contact, lower inventory management costs, volume consolidation and discount, economies of scale on the ordering volume, shorter lead time, lower logistics costs, more effective replenishment coordination, improvement of product design coordination, improve on trust and performance, and better customer service and market penetration.

3. Long-term relationships: No specific time period for long-term relationships, however, not a temporary. Long-term contracts with fewer suppliers also help to lower potential costs such as transaction costs and inventory holding costs. Long-term perspective will improve buyer and supplier coordination and definitely have a positive impact on a firm's supplier performance.

4. Supplier selection: Selecting of suppliers is a critical decision for most organization, suppliers with the abilities to meet quality standards, timeliness deliver, with a good performance history are the most critical determinants. Supply selection must be focusing on the quality or pay attention on the importance of quality criteria at the most, while the importance of price at the least. This includes quality of supplies and delivery e.g., on-time delivery, and uninterruptable supply which are considered critical selection criteria.

5. Supplier certification: Involves a thorough examination of all aspects of a supplier's performance. Certified supplier is certified to provide materials and components without routine testing. Certifying of suppliers involves high levels of trust and communication, and leads to an improved quality, and lower cost, as well as, enhancing the quality and productivity.

6. Supplier involvement: An important part of the strategy, may range from small task to the whole project such as minor design suggestions or responsible for the complete development. The effective supplier involvement can benefit on cost reduction and improvement of quality of products.

7. Cross functional teams: Teamwork is a critical component for organizational transformation and encourages the customer focus. Team effort

contributes to the firm's value chain and supplier's relationship. Firm interaction with customers, suppliers and partners enables an efficiency and effectiveness of the supply chain.

8. Trust and commitment: Supply chain management is built on a foundation of trust and commitment. Trust creates stability and long term relationship and built on faith, reliance, belief or confidence from the supply partners. Commitment implies that the partners are willing to work together to sustain the relationship which will reduce the conflict and lower negotiation cost.

In addition, (Ofori-Amanfo, 2014) had further identified supply management capabilities and proposed six constructs with the definitions as shown in table 2.5.

Table 2.5 Supply Management Capabilities Sources (Ofori-Amanfo, 2014)

Supply Management Capabilities	**Definitions**
Long-term collaborative relationship with suppliers	The initiatives taken by the buying firm to encourage collaboration with suppliers on a long-term relationships basis
Close working relationship with limited number of supplier	The understanding of cooperative relationship with selected key suppliers
Open communication between exchange partners	The frequent two-way information sharing as well as free interactions in buyer-supplier relationships
Integration between supply strategy and corporate strategic objectives	The purposeful marriage between supply activities and practices, and the manufacturing competitive priorities of the firm
Application of information technology in supply management	The company-wide adoption of information communication technology in the buyer-supplier relationship management, including the day-to-day operational activities of supply management function
Highly skilled and empowered purchasing staff	The skills, training and experience possessed by supply management staff and an accompanying authority that encourages supply staff to make some key supply related decisions without top management involvement

2.5 Information Management Capabilities

The definition of information management capabilities was offered by Zhang et al. (2005), who had synthesized definitions of IT capabilities from the existing literature, as an ability to deploy and leverage its IT investment in combination with other resources and capabilities as to support and enhance distinctive competencies and skills in other business functions in order to achieve business objectives through IT implementations. Mithas et al. (2011) had further defined information management capability as the ability to provide accurate, timely, and reliable data and information to relevant entities and stakeholders which enables firms to configure other organizational capabilities to influence firm performance.

Information technology is one among all other productivity tools with the power to simultaneously increasing firm capability and decreasing firm's total cost (Closs et al., 1997). Bharadwaj (2000) found that the synergy and combination of information technology resources with firm's other resources enabled the development of superior IT related capabilities and was a source of competitive advantage and provided essential services to support firm to operate and generate revenue in an increasingly competitive marketplace (Renaud et al., 2013). Jaturat (2011) investigated IT management under the context of sufficiency economy and suggested that IT reasonableness had direct impact on firm performance.

It is evident that effective and efficient use of IT is a key factor in differentiating successful and less successful firms (Bharadwaj, 2000). The acquisition and use of IT makes firm to be competitive and stay ahead of its competitors. Information technology is valuable means for achieving competitive advantage and to meet the logistics objectives at the least total cost (Closs et al., 1997).

Information technology enhances supply chain logistics efficiency by providing real-time information regarding product availability, inventory level, shipment status and production requirements (Radstaak & Ketelaar, 1998). Technology is a significant tool for differentiation in the logistics services (Sauvage, 2003). Organizations increasingly rely on information technology to improve the supply chain process (Wu, Yeniyurt, Kim, & Cavusgil, 2006). IT creates business value by supporting process innovation and transformation at the operational level (Mooney,

Gurbaxani, & Kraemer, 1996). De Carolis (2003) noted that technological capabilities made a difference in firm performance by developing and exploiting inimitable capabilities and under the context of supply chain management, Karagöz and Akgün (2015) asserted that IT management affected the overall logistics capabilities by improving the services and reducing costs as well as preventing the failure in supply chain management.

The relationships between IT based capabilities, logistics performance and financial performance were examined by Shang and Marlow (2005) and found that IT capability had an indirect influence on financial performance through logistics performance. To achieve customer demand focused capabilities, firm requires processing system which are both accurately and in a timely manner in order to respond to frequent changes and fluctuation in customer demand (Douglas M Lambert & Cooper, 2000). Interestingly, the researches had found that information focused capabilities alone cannot be considered a distinctive factor directly relating to firm performance but instead they can be used to facilitate the creation of other capabilities and make it difficult for competitors to replicate (Zhao et al., 2001).

According to the literature review, an effective usage of information technology can yield an impact on logistics capabilities. Closs et al. (1997) suggested that the logistics literature in the recent years had promoted information technology as a means to enhance logistics competitiveness, information is a valuable logistics resource. Information is as importance as materials as they flow together alongside in the logistics channel. Clemons and Row (1991) pointed out that the importance of information exchange was the ability of a firm to share knowledge with its supply chain partners, the information shared in supply chain communication system encompasses information between direct channel partners and throughout the entire supply chain network. An effective information exchange is considered as the one of most fundamental capabilities in the supply chain process (Wu et al., 2006).

Bharadwaj (2000) defined firm's IT capability as the ability to deploy or combine IT-based resources with other of firm resources and capabilities, IT resources capabilities can be including of: 1) IT infrastructure (assets and physical components); 2) Human IT resources (technical and managerial IT skills); and 3) IT enabled resource

(knowledge, IT customer focus, and team synergy). The similar view of IT capabilities had been adopted by Ross, Beath, and Goodhue (1996) who offered categorization of IT assets as human assets, technology assets and relationship assets, where human asset characterized by technical skills, business understanding, and problem-solving orientation, technology asset was characterized as set of sharable well-defined technology architecture, and relationship asset encompasses the shared responsibilities for effective IT utilization. Zhang et al. (2005) viewed IT capabilities as a multidimensional construct and was able to identify the 4 dimensions of IT capabilities to be IT architecture, IT infrastructure, Human IT resource, and IT relationship resource. On the other hand, Zhao et al. (2001) adapted from research by the Global Logistics Research Team at Michigan State University which portrayed information-focused capabilities into three dimensions namely: information technology (e.g., hardware, software and network investment and design to facilitate processing and exchange); information sharing (i.e., the willingness to exchange key technical, financial, operational, and strategic data); and connectivity (i.e., the capability to exchange data in a timely, responsive, and usable format). Mithas et al. (2011), adapted the operational capabilities of Marchand, Kettinger, and Rollins (2000) and noted that information management capability provided required data for users with accuracy, timeliness, and confidentiality, with universal connectivity and access, and as well as, tailored for an emerging business needs.

The effective use of information technologies has either direct or indirect effect on firm's functional competencies (Karagöz & Akgün, 2015). Firms can benefit from IT enabled information flows which support different stages of their customers' purchasing process. Ives and Learmonth (1984) found that firms with good IT management capabilities would be in a better position to capture customers information (Nambisan, 2002). The shared information and knowledge between IT and customer service units would significantly influence the ability to develop customer knowledge (Mithas et al., 2011; Ray et al., 2004). Information based capabilities have been empirically studied to have an impact on financial performance with indirect effect through logistics performance (Shang & Marlow, 2005). Therefore, this affirms that the

information management capability of a firm enhances customer management capability.

Tsang and Kwan (1999) pointed out that IT capabilities allowed firms to provide necessary coordination with their suppliers. IT helps to resolve problems in the supply chain, as well as, improving overall company performance and operational quality by improving efficiency, lowering errors and reducing processing lead time (Esper, Ellinger, Stank, Flint, & Moon, 2010). Karagöz and Akgün (2015) argued that the most important characteristic of the IT capabilities was the ease of use of the customer and procurement data within the functional units of firms. Quality of supply chain performance is also dependent on the quality of information which shared among partnering firms (Youn, Yang, Kim, & Hong, 2014). Information quality is a crucial factor which the firm and its supply chain partners share strategic and operational information in trust relationships. Zhou and Benton (2007) defined three dimensions of the quality of information sharing to be: accuracy, trustworthiness (reliability or credibility), and timeliness. Another essential attributes of information quality is security (Y. W. Lee, Strong, Kahn, & Wang, 2002).

Information technology facilitates the logistics integration and contributes to the supply chain success by improving the delivery performance (Shang & Marlow, 2005). Stanley E. Fawcett and Cooper (1998) asserted the positive relationship between logistics capabilities and technological innovation and the impact on firm's ability to coordinate with their production and logistics activities. Information management capability enables customer focus capabilities (Mithas et al., 2011).

IT Infrastructure Overall IT infrastructure comprises physical IT assets, the computer, and communication technologies and the shareable technical platforms and databases (Ross et al., 1996). Keen (1991) described IT infrastructure as a business resource for attaining long-term competitive advantage and had been elaborated further by Reed and DeFillippi (1990) who described the unique characteristics of the IT infrastructures to be the abilities to identify and develop key applications, information sharing, management of supply chain management transaction process across the business, and explore opportunities for synergy across business units. Firms must also learn to utilize and redesign their infrastructure capabilities in order to significantly

reduce the time and cost to build the system (Weill, 1993) which the building of an integrated infrastructure takes time and effort and involves experiential learning (Bharadwaj, 2000). The IT infrastructure is a shared information delivery base, the business functionality (Keen, 1991). Development of IT infrastructures that expand the network for an entire organization, connecting key customers and suppliers (Ross et al., 1996). Bharadwaj (2000) noted that IT infrastructure was that it should enable firms to implement the right applications which render the inimitable cost and value of technological innovation. Venkatraman (1991) on the other hand, proposed that the role of IT infrastructure in the organization could be viewed as one of these three characteristics: independent (i.e., IT infrastructure planning and management are relevant to firm's business planning and management), reactive (i.e., IT infrastructure planning and management accord to firm's business planning and management) or interdependent (i.e., IT infrastructure planning and management are part of firm's business planning and management). Xia (1998) reviewed literature based on McKay and Brockway (1989) and Weill (1993), and conceptualized and illustrated as a three layers building block which leads to IT supported business capabilities, as illustrated in figure 2.3. At the base are the shared technological components such as hardware, operating software, communications, and other equipment. The second layer is the IT human and organizational capabilities that require an effective utilization and leverage, which demonstrate the ability that combines and deploys those technological components into a shared set of capabilities. The third layer is a set of shared IT services such as electronic data interchange or a full service network.

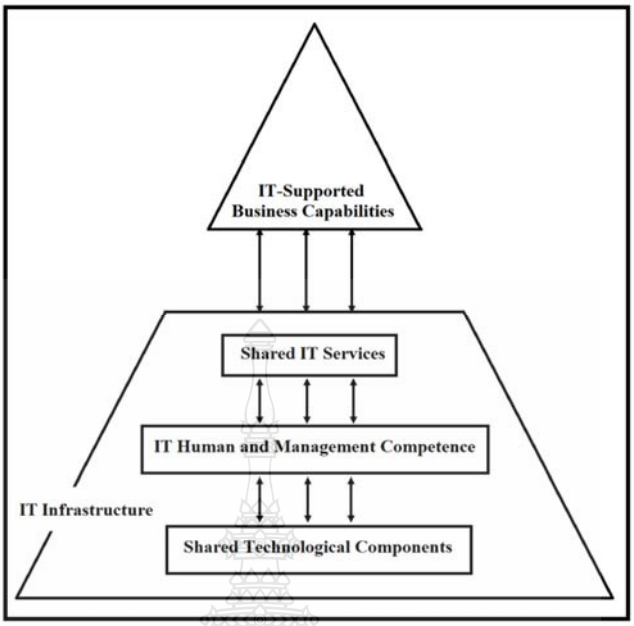


Figure 2.3 Elements of IT Infrastructure
(adopted from McKay and Brockway,1989; Weill, 1993)

Human IT Resources are technical and managerial IT skills which typically developed over time through the accumulation of experiences (Katz, 2009). The critical dimensions of human IT resources comprise: technical IT skills and the managerial IT skills, where the former are programming, system analysis and design competencies and the latter refers to the abilities of effective management of IS functions, coordination and user's interaction, as well as project management and leadership skills (Capon & Glazer, 1987; Copeland & McKenney, 1988). Bharadwaj (2000) asserted that human IT resources was evaluated through the ability to effectively integrate IT and business strategy, the ability to develop cost effective and reliable applications, the ability to communicate with other units effectively, and as well as, the ability to anticipate innovate value for future business needs.

IT-Enabled Intangibles Bharadwaj (2000) noted that many authors described the key organizational intangibles such as know-how, corporate culture, corporate reputation, and environmental orientation which had been recognized as key drivers of superior performance, and defined IT's enabling organizational intangibles into three key intangibles which were customer orientation (the ability to respond for the

changing of demand from the customers), knowledge assets (an embedded in the skills and experience of its employees which developed over time to become competencies), and synergy (the sharing of capabilities and resource between departments which enhance the efficiency and effective of the organization).

Information Sharing Many companies have embarked on initiatives that enable information sharing within the supply chain. Information sharing refers to the willingness of companies to share information on the timely, accurate and responsive basis with partnering firms. Information sharing is an enabler for firm's competitive advantage and create effective supply chain coordination and thus, critical to supply chain partnerships' success (Donald J Bowersox et al., 1999; Douglas M Lambert et al., 1998). G. S. Day (1994) indicated the benefit of firm's multilevel information sharing as the employees of both firms can develop linkages at different levels to achieve an interrupted operation. A lower cost, shorter lead time and less incidence of customer service failure due to stock-out, can be achieved by providing the supplier with accurate information sharing (Mentzer et al., 1999).

There are evidence that logistics information capabilities result in world class performance (Closs et al., 1997). Breznik (2012) argued that while many researchers had sought to contribute in this discipline by emphasizing the potential of IT in creating a sustainable competitive advantage and the impact on firm performance, it was still difficult to judge as it was still unclear whether IT really had effect on business performance and competitiveness. Zahra and Covin (1993) found no direct technology-performance connection. Zhao et al. (2001) reported that information-focused capabilities were not directly relating to firm performance.

Breznik (2012) had reviewed the relationship of IT with competitive advantage and firm performance, further from the study of Wade and Hulland (2004) which observed the research on the relevant topics during the 1980s to 1990s, and found that the relationships were quite diverse, the findings was illustrated in figure 2.4.

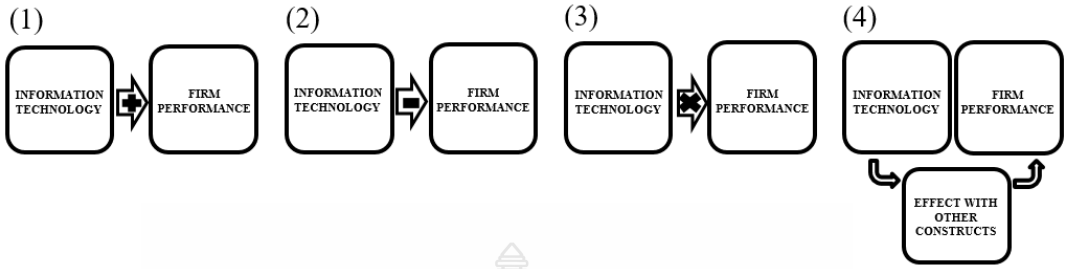


Figure 2.4 Varied Relationships between IT and Firm Performance (Adopted from Breznik, 2012)

There was still diversity of the results in four different relationships: (1) there was a direct and positive effect; (2) there was a direct and negative effect; (3) there was no connection and no effect; and (4) there was a contingent effect. The relevant studies still tried to answer whether IT was source of competitive advantage and performance of the firm, the conclusion was still vague and would be subject to further empirically examination, as what could be concluded, to date, IT was an endogenous strategic resource that would have an influence if bundled with other resources (Breznik, 2012).

2.6 Logistics Integration Capabilities

Logistics integration is the operational practices and activities in the supply chain that organize and coordinate the flow of materials throughout the value stream from suppliers to customers (J. R. Stock & Lambert, 2001). Such coordination produces connection that crosses the boundary of activities between firms (Prajogo & Olhager, 2012). It has been well argued that logistics integration reduces various issues in the supply chain (Geary, Disney, & Towill, 2006). Firms collaborate to access external supply chain partners to obtain synergies and expertise from the combined operations (Zhao et al., 2001). Logistics integration allows all partners to work and coordinate as single entity and results in improved performance (Tan, Kannan, & Handfield, 1998).

A stream of literature on supply chain and logistics capabilities suggests that capabilities lead to firm performance improvement and create sustainable competitive advantage (Daugherty et al., 1998; Esper et al., 2007; Lynch et al., 2000; Mentzer et al.,

2004; Olavarrieta & Ellinger, 1997; Zhao et al., 2001). The fact supported that single capabilities is not sufficient for achieving sustainable competitive advantage (Mentzer et al., 2004). In other words, they should be classified and integrated in order to make a significant impact on supply chain and sustainable competitive advantage (Mentzer et al., 2004). Earlier studies emphasized the crucial roles of integration capabilities of supply chain and logistics. Integration of logistics capabilities has been observed as tool to increase firm performance (Kahn & Mentzer, 1996). Logistics integration supports interrelated processes within firm and make it difficult to replicate by other firms (Daugherty et al., 1998) then it is source of competitive advantage (Gimenez & Ventura, 2005).

G. S. Day (1994) classified the integration (linkage) between firm's proficiency and capabilities and classified into three categories:

1. Outside-in processes capabilities are the capabilities that enable competitiveness of the firm by anticipating and responding to the changes in markets demand with relationship development with customers, suppliers and other members.

2. Inside-out processes capabilities refers to internal capabilities that allows firm to utilize opportunities to create values for customers as well as, a long term stability of the firm.

3. Spanning processes capabilities are the capabilities that focus on providing superior value by anticipating and fulfilling the needs to both internal and external customers, through integrating the outside-in and inside-out capabilities. The framework of supply chain management suggests that boundary spanning logistics capabilities can be used to gain a competitive advantage (M. Gligor & Holcomb, 2014).

Lockamy and McCormack (2004) noted that the strategic importance of integration which included of sourcing, making, and delivering processes, should link suppliers and customers to manufacturers, which reflected the Supply Chain Operations Reference (SCOR) Model. SCOR model, developed by the supply chain council, is a management tool used to improve and communicate all supply chain management decisions within a company and with suppliers and customers, SCOR comprises of Plan (Demand and supply planning of the resources), Source (sourcing of infrastructure and material acquisition), Make (manufacturing process and production activities), Deliver

(order management, warehousing, and transportation), and Return (handle of the return of containers, packaging, or defective product). Frohlich and Westbrook added that existing literature suggested the two interrelated forms of integration that firms employ regularly. The first type of integration involves coordinating and integrating the forward deliveries as a physical flow from suppliers to manufacturers and customers. The other type of integration involves the coordination of information technology and the backward flow of data from customers to suppliers (see figure 2.5).

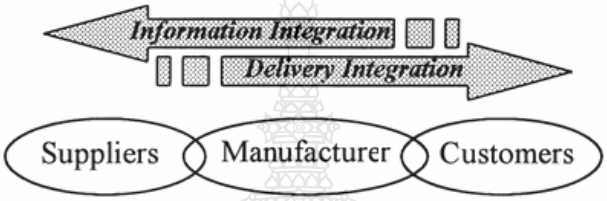


Figure 2.5 Integration in the Supply Chain (Frohlich & Westbrook, 2001)

Empirical researches affirmed that integration of logistics is means which helps to achieve firm performance (Donald J Bowersox et al., 1999; Ellinger et al., 2000; Frohlich & Westbrook, 2001; Kahn & Mentzer, 1996).

Kahn and Mentzer (1996) suggested that integration comprised of the two fundamental components, interaction and collaboration. Interaction is the interdepartmental communication. Collaboration is willingness to work together between departments. Integration should create a cohesive organization, such as extending across functional boundaries of a firm (Ellinger et al., 2000; Stank, Keller, & Closs, 2001). The inter-firm integration are likely to benefit in (1) improvement on products quality, (2) shorter the response time to customer, (3) costs reduction and (4) cost savings through better design and efficiencies (Carr & Pearson, 1999; Cousins, Giunipero, Handfield, & Eltantawy, 2006). Supply chain and logistics integration have also been defined as procedures and practices that support the operational and strategic efficiencies, through the collaboration within internal functions and with other firms (Rodrigues, Stank, & Lynch, 2004; Stank, Keller, & Closs, 2001; Wook Kim, 2006). Most researches on logistics and supply chain integration agree that integration results

in improved and sustained firm performance (Wook Kim, 2006). Therefore, the integration and improvement of the logistics processes enables firms to improve efficiencies, which in turn improves firm performance (Stonebraker & Liao, 2006) e.g., achieving higher ROI (return on investment), higher ROA (return on assets), higher level of customer service, better quality of the products, cost reduction, or a more effective knowledge management mechanisms (Handfield, Petersen, Cousins, & Lawson, 2009; Douglas M Lambert et al., 2008; Rao Tummala, Phillips, & Johnson, 2006).

Mentzer et al. (2004) emphasized the distinctive role in the integration process of logistics capabilities which improved efficiency and effectiveness and led to long term profitability and competitiveness. Logistics integration can then be considered as an intervening variable that leads to improved firm performance even when the firm's competitive and supply chain capabilities are strong (Wook Kim, 2006). The supply chain and logistics integration strategy creates value for the firm by combining customers and suppliers into the process of value creation (Tan et al., 1998; Vickery, Jayaram, Droge, & Calantone, 2003). The goal of integration is to consistently coordinate the process across the supply chain and crate the capabilities which most competitors cannot easily replicate (Anderson & Katz, 1998). Firms which have high levels of integration achieved higher performance than those firms with lower levels of integration (Gimenez & Ventura, 2005).

Integration also creates performance improvement in the areas of customer service, customer and supplier satisfaction, inventory management and forecast accuracy (Kahn & Mentzer, 1996; Stank, Daugherty, & Ellinger, 1999), the linkage of internal activities helps in reduction of redundant works (Stank, Keller, & Closs, 2001). Frohlich and Westbrook (2001) suggested that the most successful companies were those who link together of the suppliers and customers into integrated networks. The combined capabilities are based on collaborative relationships and are strongly related to the chosen strategies (Andersen & Kheam, 1998).

Logistics integration in the traditional approach was interested in the integration across functional boundaries within the firm or internal integration (Donald J. Bowersox & Daugherty, 1987), however, the more recent approach also pays

attention on the integration across firm boundaries or external integration (McGinnis & Kohn, 1990; G. N. Stock, Greis, & Kasarda, 1998). Firm's logistics capabilities can be categorized into demand management capabilities, supply management capabilities, and information management capabilities (Donald J Bowersox et al., 1999; Morash et al., 1996; Zhao et al., 2001), all of which require internal and external coordination of capabilities. Current logistics integration is the extent to which firm implements both internal and external integration. It can be characterized by integration of logistics activities within the firm across functional departments, and integration of the firm's logistics activities with other members on logistics activities in the supply chain (G. N. Stock et al., 1998). Thus, logistics integration is recognized as a coordinator among multiple functional units of the firm to create competitive advantage and firm performance.

Stanley E Fawcett and Magnan (2002) proposed the three-stage process of supply chain and logistics integration. The first stage was the integration among members in the supply chain, this stage was limited to information integration, using information to facilitate the transactions among members. The second stage was the development of inter-firm integration. The third stage was the most advanced integration process which covers the development of inter-firm relationships as well as, the collaboration of decision making. Mellat-Parast and E. Spillan (2014), with the same perspective, identified logistics integration into information integration, cognitive integration, and managerial integration.

Donald J Bowersox et al. (2000) discussed several elements of integration including cross-functional unification, structural adaptation and process standardization, simplification, and compliance. Gustin, Daugherty, and Stank (1995) suggested that integrated firms can achieve significant tangible logistics benefits such as inventory savings, lead time reductions, customer service improvements, and improved and more accurate forecasting and scheduling. The rationale behind the integration is rather simple but important. Andraski and Novack (1996) inferred that superior logistics performance can only be achieved when all relevant functional areas work closely together. Firm needs to develop effective integration within and beyond its boundaries

as to maximize the potential in converting capabilities into competitive advantage, then firm performance and profitability (Dyer & Singh, 1998).

2.6.1 Logistics Integration Capabilities and the Resource-Based View

The Resource-Base View of the firm implies that resources and capabilities should not exist in a vacuum, but rather, they should leverage each other to create the value in order to acquire and maintain superior performance (Shang & Marlow, 2005). The relationship between logistics management and competitive capability can be explained with RBV perspectives. G. S. Day (1994) pointed out that RBV presented two sources of competitive advantage, those were: firm resources and firm capabilities. Resources are those intangible and tangible assets, while capabilities are related to the way of accomplishing different activities (Wernerfelt, 1984). G. S. Day (1994) defined capabilities as complex bundles of skills and accumulated knowledge, exercised through organizational processes to enable firms to make use of their assets to create competitive advantage through a focus on customer value creation. Stalk, Evans, and Shulman (1991) added that capabilities were considered sets of processes that reflect the way resources should be allocated and deployed (Dutta, Narasimhan, & Rajiv, 1999; R. E. Morgan, Strong, & McGuinness, 2003). The difference between resources and capabilities is that resources are on the "having" side and capabilities are on the "doing" side, this gives a clear definition and makes it more invisible (Bogaert, Martens, & Van Cauwenbergh, 1994).

RBV suggests that firms create competitive advantage from the accumulated internal resources and capabilities, according to RBV, firms that are able to accumulate resources and capabilities that are rare, valuable, non-substitutable, and difficult to imitate, will achieve a competitive advantage over competing firms (J. Barney, 1991). This implies that firm's logistics capabilities that meet these criteria can help to enhance the firm's performance (M. Gligor & Holcomb, 2014), through its distinctive combination of assets, skills, capabilities, and intangibles as an organization (Divandri & Yousefi, 2011), therefore, the main objectives for firms applying RBV perspective are to identify their resources and capabilities, in order to develop these resources and capabilities further into competitive advantage (G. S. Day, 1994).

Brooks and Cullinane (2006) identified the three basic types of resources underlying RBV to be as follows:

1) Tangible assets: refers to firm assets, includes of production facilities, raw materials, real estate, financial resources, and information technology equipment.
2) Intangible assets: refers to assets that not physically noticeable but normally are very critical in creating competitive advantage such as brand names, technical knowledge, company reputation, patents, and trademarks, organizational morale, and accumulated experiences within organization.
3) Organizational capabilities: refers to skills or the ability to organize assets, people, and processes to transform from inputs into outputs.

The RBV also underlines the heterogeneity of logistics and supply chain management capabilities as significant factors in generating competitive advantage (J. B. Barney, 2012). Development of unique logistics and supply chain systems will enable firm to achieve competitive advantage and superior performance in the marketplace (Ghemawat, 1986). Carter and Narasimhan (1996) noted that supply chain strategies and operational resources should be used to support business strategies. Dangayach and Deshmukh (2001) asserted that firms that can manage their practical resources in a supply chain more effectively were likely to gain. The RBV also presents an explanation of how firm engages their strategic planning (Stank, Davis, & Fugate, 2005) and create competitive advantage from internal resources and capabilities, rather than from the product or service (J. Barney, 1991; Wernerfelt, 1984). G. S. Day and Wensley (1988) advised that if firms could identify their skills and activities that could exert to the maximum advantages and performance, the firm then could allocate appropriate resources to develop the capabilities and competencies with the least expenditure.

Menor, Tatikonda, and Sampson (2002) emphasized the effectiveness a firm use and combine resources, including financial, human resources, technological assets, and physical assets. The combination of resources can generate unique, inimitable and

non-substitutable capabilities which developed further into competitive advantages. In other words, RBV theory indicates that a firm's unique resources generate superior rents and provide intensive competitive capability. The development of firm's resources into the capabilities helps firm to manage its environment and enhance performance (G. S. Day, 1994).

RBV, therefore, provides a useful theoretical lens to examine the role of logistics integration capabilities in order to achieve firm's superior performance, Divandri and Yousefi (2011) suggested that RBV can help to create a more focused, measureable approach for internal analysis of resources and capabilities and is considered a method for analyzing and identifying a firm's strategic advantages.

2.7 Firm Performance

One of the greatest challenges for firms in the current competitive business environment is to stay competitive by maintaining and improving their performance. Superior firm performance not only has an impact on their customers but also within their internal organization. Firms are forced to stay alert on their performance in meeting the expectations of customers because of the pressure from the changing and increasing demand of customers and stiffer competition in the market. The study of firm performance has been a center of interest and is grounded in several disciplines such as economics, sociology, and organizational behavior. Several research works have attempted to explain why certain firms perform better than others (J.-K. J. Cho, 2001).

Firm performance is an evaluation on the effectiveness of the organizations (Ivancevich & McMahon, 1977) and are the results of organizational activities or investment which basically explained over a certain period of time (Mithas et al., 2011). Lin and Huang (2011) pointed out that performance was not only about previous achievements, it was expanded to cover the potential capability to achieve future goals. The enhancement of firm performance is at the core of corporate strategic management, which influences the prospects of the organization (Venkatraman, 1991). Firm performance includes all behaviors which relate to the whole organizational objectives and is depending on the contribution levels of individuals in the organization (Borman & Motowidlo, 1993). Performance of a firm is significantly impacted by corporate

governance which enables to attract investment and helps firm in maximizing the funds, and results in the expected increase in firm performance (Ehikioya, 2009). Firms that perform well may have easier access to capital to finance further investments and innovations (Abel & Blanchard, 1986; Hubbard, Kashyap, & Whited, 1993).

Despite of the common concept in the management literature, the definition of firm performance is still arguably due to the wide variety of the meanings and changed over time. Gavrea, Ilies, and Stegerean (2011) had conceptualized and identified the definition of firm performance over the timeline, in the '50s, performance evaluation was focused on work, people and organizational structure thus the performance is viewed as social system to fulfill organizational objective, in the '60s and '70s, performance was defined as an ability to exploit its environment due to the scarce resources, and in the '80s and '90s, performance was considered in a more complex ways with the aspect of efficiency and effectiveness as a success organization can accomplishes its goals (effectiveness) by using a minimum of resources (efficiency).

The main stream of firm performance literature points out that firm performance measurement is based on multivariate effectiveness measures and divided into financial and non-financial measurement indexes. While financial performance is a measure based on the following criteria of return on investment, sales growth rate, and revenue, the non-financial or operational performance covers market share, product quality, new product innovation, marketing effectiveness, added value process, and other non-financial criteria. Venkatraman (1991) assumed that performance must not only be measured based on the financial measurement index alone, but also by organizational performance, which were business performance, and organization effectiveness. Carter and Narasimhan (1996) referred firm performance measures as growth, profitability, and market share. The same viewed is shared by Chen and Paulraj (2004) who classified firm performance factors to be: market share, sales growth, and profit margin on sales. Green & Inman (2005) identified measures used in the field of organizational performance as marketing performance and financial performance. Gunasekaran, Putnik, Saad, and Patel (2006) quoted that at the organizational level performance measurement, it was essential to focus on firm’s tangible and financial factors.

Vivek and Ravindran (2009) recognized the empirical results from the study of SMEs in India and identified six dimensions used to measure organizational performance, those were: return on investments (ROI), growth of ROI, market share, sales, profit margin on sales, and overall competitive position, and had further added that supplier performance significantly influenced organizational performance. Ruekert, Walker Jr, and Roering (1985) identified the performance measurement index for firm performance into three dimensions which comprised of efficiency, effectiveness, and adaptability, Keats and Hitt (1988) pointed out that the organizational performance index could be classified into univariate and multivariate effectiveness measures, while Katou and Budhwar (2010) referred the organizational performance to be consist of six variables, those were: effectiveness, efficiency, development, satisfaction, innovation, and quality.

Tippins and Sohi (2003) referred profitability, rate of return on investment, customer retention, and sales growth rate as the firm performance measurement indexes. H. Lee and Choi (2003), on the other hand, suggested that market share rate, success rate comparisons with other companies, profitability, growth rate, and innovative capability were firm performance measurement indexes. Im and Workman Jr (2004) proposed the five dimensions' index to measure firm performance as: the relative market share rate, relative sales value, relative, return on investment rate, relative revenue rate, and degree of target achievement. Richard, Wu, and Chadwick (2009) defined firm performance to encompassed three specific areas of firm outcomes: (a) financial performance (profits, return on assets, return on investment, etc.); (b) product market performance (sales growth, market share, etc.); and (c) shareholder return (total shareholder return, economic value added, etc.).

The framework to measure firm performance used by Santos and Brito (2012) had been adopted from an empirical study of Spanos and Lioukas (2001) which proposed a measurement dimensions for firm performance. The model was grounded on stakeholder theory and a review of empirical articles, able to identify potential indicators, through an investigation on related academic journals and annual reports, for each presumed performance aspect (growth, profitability, market value, customer and employees' satisfaction, and social and environmental performance) and proposed the

two dimensions of firm performance to be financial, and strategic performance. The former reflected profitability, growth, and market value of the firm, while the latter reflected customers' satisfaction, employees' satisfaction, firm effectiveness, environment performance, and social performance.

Table 2.6 Firm Performance Dimensions and Indicators
(Adopted from Santos and Brito, 2012)

Dimensions	Indicators
Profitability	Return on Assets, EBTIDA margin, Return on investment, Net income/Revenues, Return on equity, Economic value added
Market Value	Earnings per share, Stock price improvement, Dividend yield, Stock price volatility, Market value added (market value / equity), Tobin's q (market value / replacement value of assets)
Growth	Market-share growth, Asset growth, Net revenue growth, Net income growth, Number of employees growth
Employee Satisfaction	Turn-over, Investments in employees development and training, Wages and rewards policies, Career plans, Organizational climate, General employees' satisfaction
Customer Satisfaction	Mix of products and services, Number of complaints, Repurchase rate, New customer retention, General customers' satisfaction, Number of new products/services launched
Environmental Performance	Number of projects to improve / recover the environment, Level of pollutants emission, Use of recyclable materials, Recycling level and reuse of residuals, Number of environmental lawsuits
Social Performance	Employment of minorities, Number of social and cultural projects, Number of lawsuits filed by employees, customers and regulatory agencies

2.7.1 Logistics Capabilities and Firm Performance

It has been found that that logistics capability contributes greatly towards the achievement of superior performance and sustained competitive advantage of the firm. The integration of the cross-functional activities within the firm and the effectively external linkage with suppliers, customers and business partners in the supply chain can drastically improve the performance of the firm (Bechtel & Jayaram, 1997; Douglas M Lambert et al., 1998; Narasimhan & Kim, 2002). The supply chain integration strategy creates value for the relevant parties in the supply chain, by pooling suppliers and customers into the value creation process (Tan et al., 1998; Vickery et al., 2003). Crook, Ketchen, Combs, and Todd (2008) found that supply chain effectiveness reduced cycle time and down time, reduce inventories, improve productivity, new development capabilities, with better responsiveness and reduces unnecessary activities. Logistics capabilities play important role in contributing for firms to achieve superior performance and sustain competitive advantage (J. J.-K. Cho & Ozment, 2005). Stanley E Fawcett et al. (1997) asserted the firms with higher logistics capabilities achieved higher performance and vice versa for the firms with poor logistics capabilities. It was suggested from researches of several authors that logistics capability is a source of competitive advantage (Donald J Bowersox et al., 1999; Lynch et al., 2000; Zhao et al., 2001). Studies by Michigan State University Global Logistics Research Team (1995), Morash et al. (1996), Lynch (1998), and Ellinger et al. (2000) suggested that there is a positive impact of logistics capabilities on firm performance. Thomas (1998) proposed the most critical performance areas for logistics quality from the survey conducted with transportation and logistics professionals, the five most critical performance areas rated from most importance were: 1. On-Time Performance; 2. Value (i.e., competitive offered rates, good trade off value); 3. Information Technology; 4. Customer service (i.e., promptness and problem resolution, and service and support); and 5. Equipment and operation availability.

Hayes and Pisano (1994) suggested that firm's logistics capability was considered important parameters to help to exceed customer expectations as well as, to help to improve market and financial performance. Firm must be strategically employing varying logistics capabilities that could add value will foster changing in

demand from the customer (Lynch et al., 2000). Noordewier, John, and Nevin (1990) referred that supply management performance was an important factor that has impact on firm performance. Ellinger et al. (2000) recognized the relationship of performance and logistics capabilities which contributed to integrated activities and other functional areas e.g. marketing, finance and the operations. Carr and Pearson (2002), and Baier, Hartmann, and Moser (2008) modelled a direct relationship between supply management and firm financial performance, despite yielded a rather mixed results, it however, seemed optimistic on the results which suggested that there was positive relationship from the direct link between supply management capability and firm financial performance. In contrary, Ellram, Zsidisin, Siferd, and Stanly (2002), Singhal and Hendricks (2002), Gonzalez-Benito (2007), and Chen, Paulraj, and Lado (2004) found that there was an indirect effect of supply management capability with the firm financial performance. Good logistics practices support the transaction tradeoffs which allow a mutual improvement in both economic performance and service quality (Stank, Keller, & Daugherty, 2001).

Lynch et al. (2000) suggested that logistics capabilities and strategy should be significantly linked to each other and more importantly, capabilities and strategies must be properly matched in order to achieve superior firm performance. According to the studies of De Carolis (2003), it was revealed that, by creating competitive advantage, logistics capabilities have greatly contributed to firm strategies and firm performances. Also, in C.-L. Liu and Lyons (2011), it was found that service capability and performance were positively related, the service capabilities that meet customers' key requirement would gain a superior financial performance for the firm through better operational performance. J. J.-K. Cho and Ozment (2005) supported that the firms needed strong logistics capability in order to achieve a better performance in both traditional and modern market channel, especially in the e-commerce business where logistics capabilities played crucial role to performance of the firm. Shang and Marlow (2005) found significant impact between the knowledge-based capability, comparison capability, and responsiveness capability on logistics performance. The study on logistics capability as a means to create differentiation was investigated to have positive effect by Daugherty et al. (1998). These researchers affirmed the major contribution that

logistics capabilities on corporate strategy and performance of the firm as well as, creating competitive advantage. There are examples about the impact of logistics capabilities and strategies in the logistics literature. These studies emphasized the significant contributions of logistics capabilities in achieving sustainable competitive advantage and superior performance (Sezhiyan & Nambirajan, 2011). Several studies suggested that logistics capability had positive effect on the firm performance (Stanley E Fawcett et al., 1997; Zhao et al., 2001) and competitive advantage (Morash et al., 1996).

Mentzer et al. (2004) suggested that logistics capability contributed to the competitive strength of firms by creating economic value (through cost leadership strategy) and market-oriented value (through differentiation strategy). Morash et al. (1996) found correlation between business success, competitive advantage, and strategic logistics capability. Thus, competitive capabilities improve the overall firm performance (Rosenzweig, Roth, & Dean, 2003). Logistics capabilities have been demonstrated as source of competitive advantage for firms (Donald J Bowersox et al., 1999; Lynch et al., 2000; Zhao et al., 2001). The other studies also confirmed that logistics capabilities are sources of competitive advantage (Donald J Bowersox, Closs, & Helferich, 1996; Olavarrieta & Ellinger, 1997). Further study of Evangelista, McKinnon, and Sweeney (2013) revealed that there was a positive correlation between operational and interactive capability, productivity and efficiency, and performance. Daugherty, Chen, and Ferrin (2011) affirmed that logistics service capabilities led to competitive advantage. X. Liu, Grant, McKinnon, and Feng (2010) conceptualized logistics capabilities into a three dimensional construct as process capability, flexibility capability, and information integration capability, and found that there was no direct impact from information integration capabilities on firm performance, however there was an impact on firm performance indirectly through the firm competitive advantage. Zhao et al. (2001) conducted a research with a focuses on the relationships of two types of capabilities: customer focused capabilities and information focused capabilities with firm performance, it was found that while customer focused capabilities enabled firms to build distinctiveness with customers, information focused capabilities could not create a distinctiveness by itself. The results affirmed that investing and developing information

focused capabilities cannot be justified directly by performance goals, but rather by integrating and diffusing with other capabilities.

The aforementioned review had highlighted the importance and significant relationship between the logistics capabilities and firm performance which were crucial for the success of the business.

2.8 Theoretical Framework

Logistics capabilities have been highlighted in academic and practical fields. They have also been recognized as a source of competitive advantage affecting firm performance (Stanley E Fawcett et al., 1997). Such a focus on logistics encourages firms to develop and sharpen logistics capabilities (Daugherty et al., 1998). Morash et al. (1996) referred capabilities as attributes such as abilities, processes, knowledge and skills which enabled firm to achieve superior performance, and further defined logistics capabilities as the level of efficiency, effectiveness, and differentiation which related to the implementation of firm's logistics strategies. Douglas M Lambert et al. (1998) viewed logistics management as a key opportunity to improve competitive performance and profitability of a firm. Lynch et al. (2000) conducted a study which shown the correlation between logistics operations and excellence in capabilities and superior organizational performance.

Donald J Bowersox, Closs, and Cooper (2013) conceptualized firm's logistics operational scope and suggested that the logistical process was the flow of interrelated system: inventory and information. Information flow was a result of orders, supply chain collaborations, and sales activities and which had been converted into specific manufacturing, merchandising, and purchasing plans. Once the finished products were manufactured, an inventory flow took place and resulted in ownership transfer of finished products to customers.

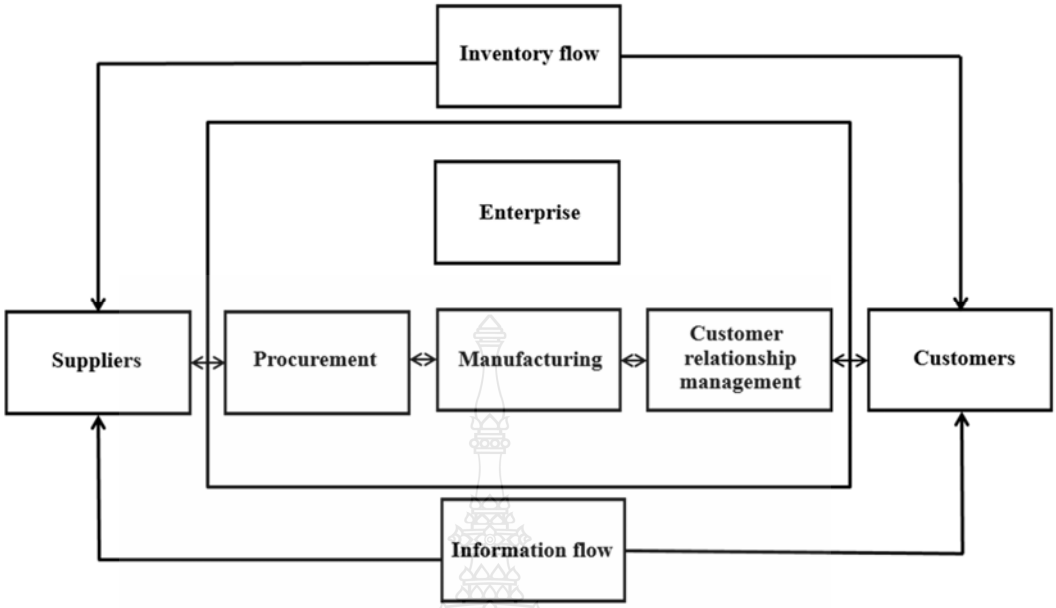


Figure 2.6 Logistics Operational Scope (Bowersox et al., 2013)

Inventory Flow

The flow of inventory represents the company's systems that are used to move the inventory in the form of raw materials, work in process through manufacturing and finished goods to end customer. Firm needs to develop a series of steps for an ongoing inventory flow. From the initial purchase of raw materials, being transformed into finished inventory, and delivering to the customer. The logistics process adds value at each step of moving inventory from the beginning to the destination where needed. The cost of raw materials and its movement becomes part of the value added process, the finished products have greater value when they arrived at the customers.

Logistical Operations

Logistics operations are the operations within the enterprise, can be divided into three areas: (1) customer relationship management deals with the varied aspects of serving customers through the customer relationship management process, (2) manufacturing is managing work-in- process inventory, and (3) procurement concerns the purchasing and arranging for inbound movement of raw materials from suppliers. Within a typical enterprise, the three logistics operating areas overlap. Treating each as an integral part of the overall value adding logistical process can utilize the unique

attributes of each and creates competitive advantage for the enterprise. The major challenge is to integrate the logistical processes of the firms in a manner that facilitates overall efficiency.

Information Flow

The consistent flow of information is crucial in business operation. When information is collected, efficiency is gained. The need for parties to communicate and share information is crucial in the supply chain and logistics management. Information integrates the logistical operating areas and so that it is important for the information to flow in parallel with the actual work performed in customer relationship management, manufacturing, and procurement.

Despite the growing importance of logistics management in a corporate strategy, there found to be little effort in building a theory to explain the role of logistics in the firm. Mentzer et al. (2004) exploited the theories of the firm to serve and provide a way of conceptualizing a unified theory of logistics within the contexts of the strategic role and capabilities of logistics and proposed theory that should serve as a conceptual reference for future theory development and empirical research in logistics. A review of the theories of the firm leads to the explanation that the role of logistics is to provide the boundary-spanning effect. The contribution of logistics activities to create competitive advantage is significant. With the resources and capabilities, the firm needs to create value to fulfill customer's satisfaction through the coordination of logistics capabilities.

Logistics capabilities are defined to include demand-management interface capabilities (e.g., customer service and responsiveness), supply-management interface capabilities (e.g., effective supplier integration, low cost supply and distribution), and information management capabilities (information technology infrastructure, information sharing, and connectivity). Logistics capabilities play a critical role in boundary-spanning interfaces between internal functional areas and between the partnering firms and supply chain partners. The cross functional coordination enables differentiate product and service differentiation as to offer value to fulfill the diverse requirements of customers (Mentzer & Williams, 2001). As for the inter-firm coordination logistics capabilities also help the firm to cooperate with other members in the supply chain in order to smoothen the flow to deliver customer value.

By utilizing the existing literature and the existing theories of the firm, Mentzer et al. (2004) offered the comprehensive view of logistics capabilities within a unified theory of logistics (as shown in figure 2.7), together with theoretical explanation of each capability of logistics. However, the proposed unified theory was a one way of looking at the logistics discipline and therefore, future research to challenge and refine their proposed view of logistics is encouraged.

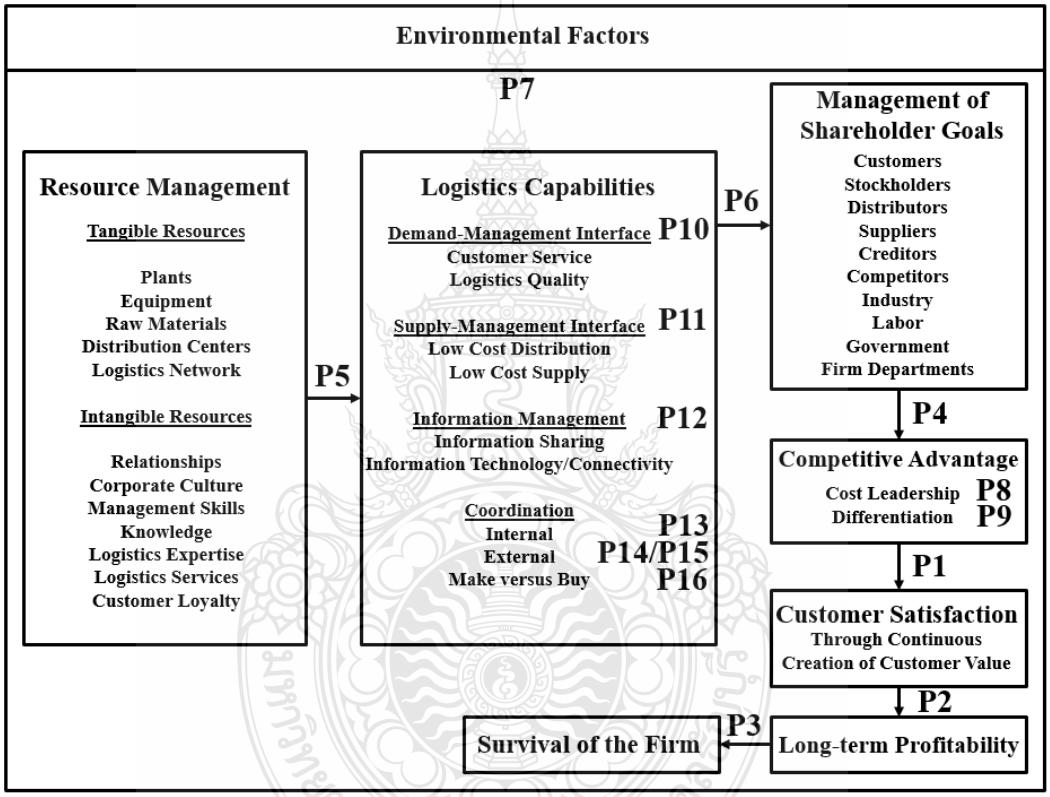


Figure 2.7 Unified Theory of Logistics (Mentzer et al., 2004)

Zhao et al. (2001) examined direct impact of the two core logistics: customer-focused, and information-focused capabilities. The findings suggested that customer-focused capabilities were significantly related to firm performance. The results also suggested that consistent success depended upon firm's ability to create value for end-customers. However, the research findings revealed that there was no direct relationship between information-focused capabilities and the firm performance. The results

suggested that there were interrelated between the two logistics capabilities, therefore information-focused capabilities should have been leveraged through the sharing and connectivity to facilitate customer-focused capabilities and also implied that Information technology through the hardware or particular software application did not have an influence on firm performance but rather, must have been integrated across functional departments and the supply chain in order to create other inimitable specific capabilities.

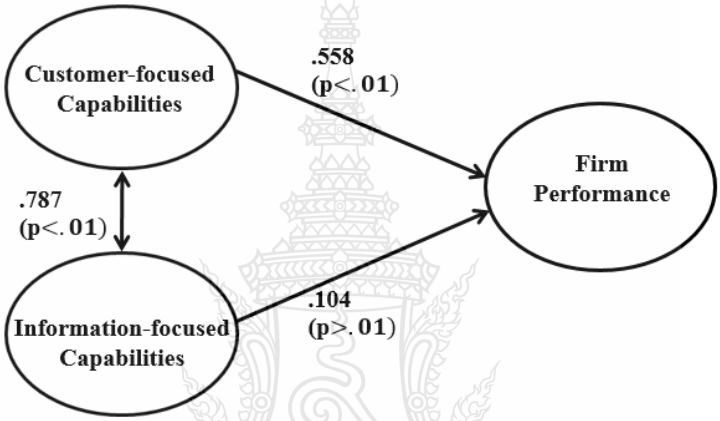


Figure 2.8 Research Model for the Relationship of Customer-Focused, Information-Focused Capabilities, and Firm Performance (Zhao et al. 2001)

Ho and Chang (2015) found that logistics value added service capabilities had positive effect on firm performance. Shang and Marlow (2005) examined the relationships among logistics capabilities, logistics performance, and financial performance. Results showed that the information-based capabilities had an indirect impact on financial performance, however, had the most impact on relationship with other variables (benchmarking capability, flexibility capability, and logistics performance).

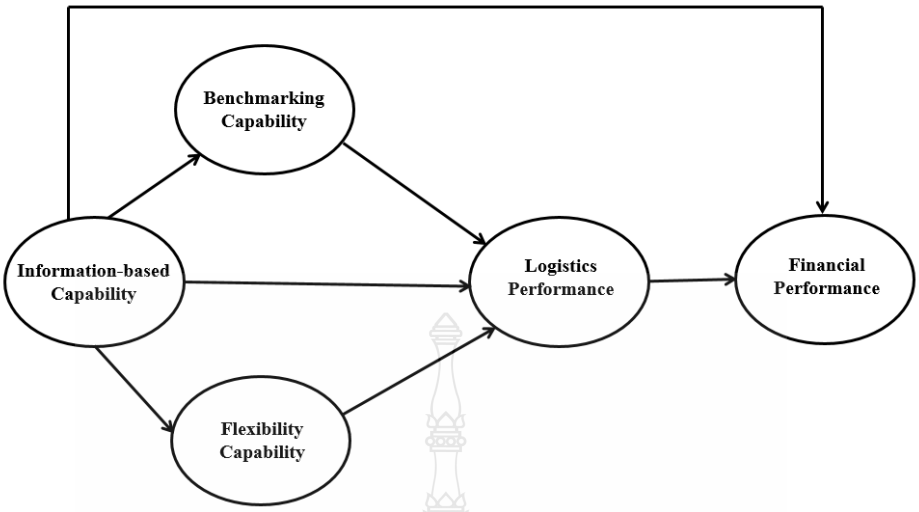


Figure 2.9 Research Model for the Relationship of Logistics Capabilities, Logistics Performance, and Financial Performance (Shang and Marlow, 2005)

Peng et al. (2016) investigated an effect of IT capabilities and firm performance and found that IT capabilities must have been coherently integrated with business processes and supply chains management capabilities as to be able to enhance the superior firm performance.

These researches led to the development of the two constructs: Information Management Capabilities and Demand Management Capabilities and the 4 hypotheses (H1, H3, H4a and H4b) in this study.

Morash et al. (1996) investigated the managerially perceived importance, actual implementation, and financial impact of some major demand-oriented and supply-oriented logistics capabilities. The findings revealed that demand-oriented logistics capabilities had greater impact on firm profitability. However, it was further suggested that logistics capabilities should have been assessed in the context of firm performance rather than just in the financial aspect. This research also demonstrated that logistics capabilities such as customer responsiveness and timeliness could provide core competencies for corporate strategy.

This research led to the development of Demand Management Capabilities and Supply Management Capabilities constructs and hypotheses H1 and H2 in this study.

Sezhiyan and Nambirajan (2011) examined the relationships among the functions on supplier selection, supply effort management, logistics capabilities on supply chain management strategies and firm performance. The survey was conducted with the supply chain professionals within manufacturing firms in India. The conceptual model was developed with seven hypotheses and tested using regression analyses. The results indicated that the predictive variables (supply effort management, supplier-selection, logistics capabilities, and supply chain management strategies) positively influenced firm performance. Interestingly, among the three predictive variables, supply effort management (e.g. supplier's long-term and strategic relationship, supplier involvement, and selection of quality suppliers) had the most significant effect on firm performance than the others. However, since the study measured causal relationships based on simple and multiple regression analyses, the more advanced statistical analytical tools like Structural Equation Modeling was suggested for future research as to understand the causal relationships.

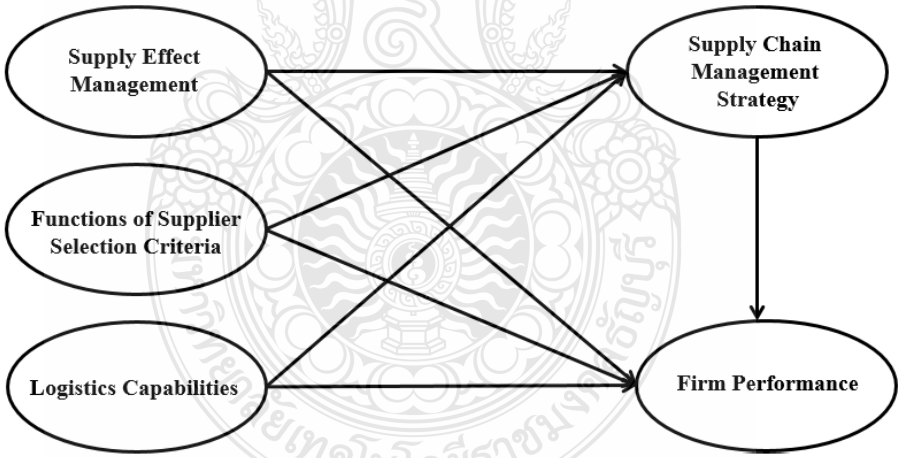


Figure 2.10 Research Model for the Relationship of Supplier Selection, Supply Effort Management, Logistics Capabilities on Supply Chain Management Strategies and Firm Performance (Sezhiyan and Nambirajan, 2011)

This research led to the development of Supply Management Capabilities construct and hypothesis H2 in this study.

Empirical study of M. Gligor and Holcomb (2014) investigated relationships between logistics demand management interface capabilities, logistics information management capabilities and supply chain agility, through the integrated logistics capabilities as a mediator. The results indicated that demand management directly impact supply chain agility. Demand management was found to have direct contribution to the level of integrated logistics capabilities. Information management capabilities had no direct impact on supply chain agility but had been fully mediated by integrated logistics capabilities. The findings suggested that the relationships of the logistics capabilities were fully mediated by the integrated logistics capabilities.

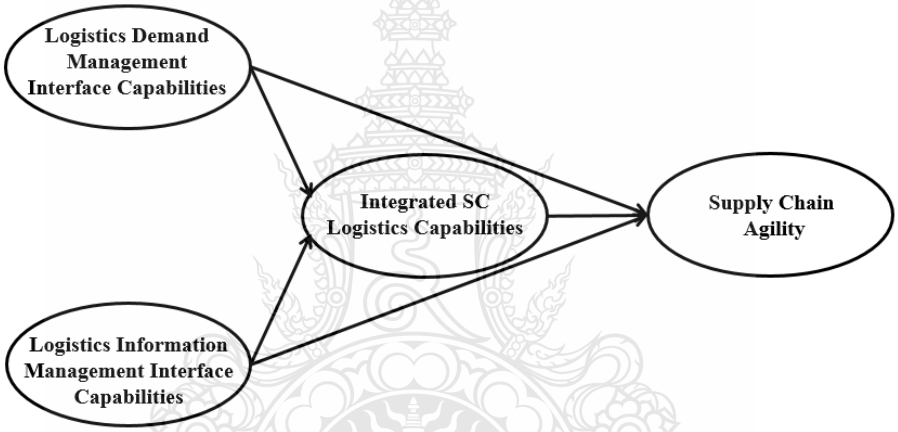


Figure 2.11 Research Model for the Relationship of Logistics Demand Management, Integrated Logistics Capabilities, Logistics Information Management Capabilities, and Supply Chain Agility (Gligor and Holcomb, 2014)

Alam, K. Bagchi, Kim, Mitra, and Seabra (2014) analyzed the relationships between logistics capabilities namely, supplier involvement, length of supplier relationship, and the use of IT and firm's supply chain performance, with logistics integration as the mediator. The results showed that all logistics capabilities did not have significant direct impact on supply chain performance, however, the results suggested that logistics integration capabilities had significant direct effect on supply chain performance.

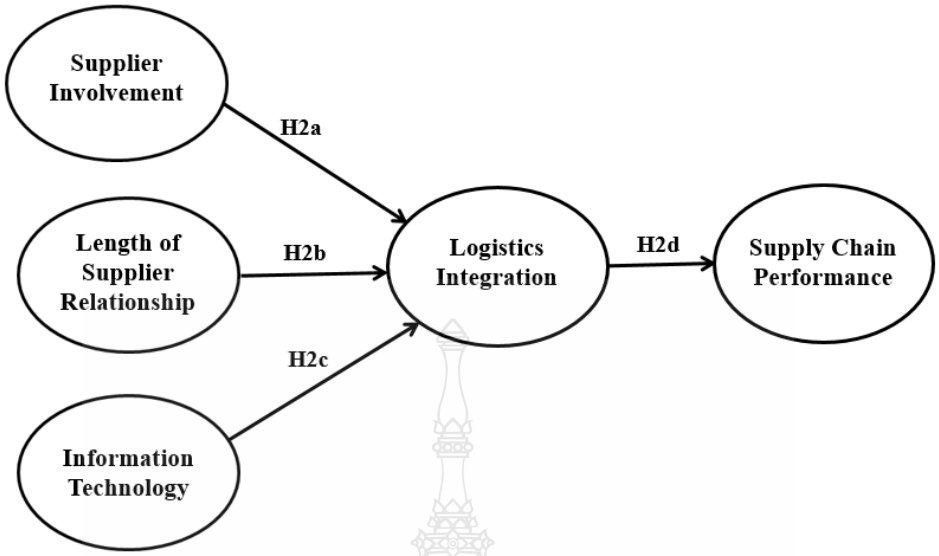


Figure 2.12 Research Model for the Relationship of Logistics Capabilities Namely, Supplier Involvement, Length of Supplier Relationship, and the Use of IT and Firm's Supply Chain Performance (Alam et al., 2014)

These researches led to the development of Logistics Integration Capabilities construct and hypotheses H5, H6, and H7 in this study.

Joong-Kun Cho, Ozment, and Sink (2008) evaluated the relationships between firm's logistics outsourcing, firm's logistics capability, and firm performance in the e-commerce market. The findings suggested that logistics capability was positively related to firm performance while logistics outsourcing were not found with a positively related. M. Beheshti, Oghazi, Mostaghel, and Hultman (2014) investigated the impact of supply chain integration with the Swedish manufacturing firms on their financial (firm) performance and found that at any level of supply chain integration would enhance healthy financial results, the results also suggested that the higher level of integration, the better level of financial performance of the firm. Agan (2005) analyzed supply chain capabilities that affect supply chain integration and firm performance and suggested that market orientation and information technology infrastructure were the capabilities that strongly related to the integration of the supply chain the results also affirmed the positive impact of supply chain integration on firm performance.

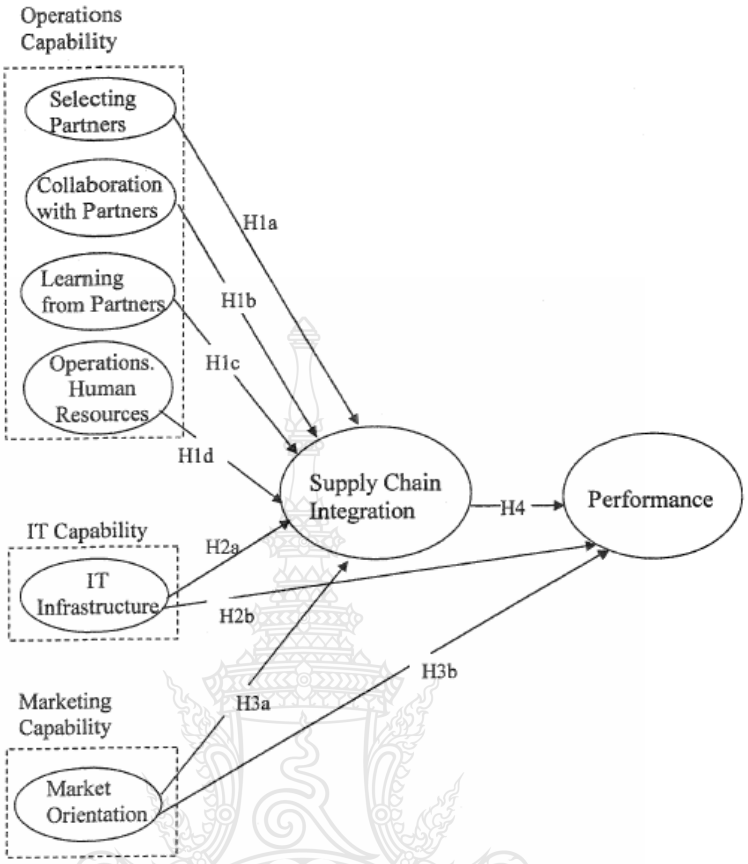


Figure 2.13 Research Model for the Relationship of Supply Chain Capabilities, Supply Chain Integration, and Firm Performance (Agan, 2005)

These researches led to the development of Logistics Integration Capabilities construct and hypotheses H8 in this study.

The ability to integrate logistics capabilities across the supply chain or logistics integration capabilities, was an ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Teece et al., 1997). Integration of logistics capabilities had been observed as tool to increase firm performance (Kahn & Mentzer, 1996). Integration supports internal interrelated processes that could not be easily replicated (Daugherty et al., 1998). Empirical research provided support for integration of logistics as a means to increase firm performance (Ellinger et al., 2000; Frohlich & Westbrook, 2001). Considering the logistics

capabilities which had both internal aspect (e.g., plan, coordinate, and cross-functional integration with other functional areas) and external aspects (i.e., abilities to generate benefits such as asset productivity, operational effectiveness by expanding logistics activities to combine customers and suppliers), from a strategic perspective, logistics were unique resources and capabilities with the ability to collaborate, coordinate and integrate all the interdependent activities across functional areas and expand beyond the firm structure (Langley Jr & Holcomb, 1992) as well as, abilities to create and develop the firm's supply chain capabilities by linking systems and operational interfaces to reduce redundancy while maintaining operational synchronization (Mentzer et al., 2004), the role of resources in the competitive advantage can be explained by Resource-Based View of the firm.

The Resource-Based View of the firm (RBV) provides a useful theoretical lens which, the antecedents of firm's competitive advantage can be examined. RBV considers the firm as a portfolio of resources and capabilities that can enhance the performance of the firm (Wernerfelt, 1984). RBV suggests that firms create competitive advantage from the accumulated internal resources and capabilities that are rare, valuable, difficult to imitate, and non-substitutable (J. Barney, 1991). Therefore, firm-specific logistics capabilities are a source of competitive advantage. The main objective for firms applying RBV perspective is to identify their resources and capabilities, in order to develop these resources and capabilities further into competitive advantage (G. S. Day, 1994). Considering the logistics Integration capabilities by using of RBV theoretical lens, the ability to integrate logistics capabilities across the supply chain is definitely a source of firm's competitive advantage.

Although several studies suggested significant and positive relationships between logistics capabilities and firm performance, there were still limited research efforts made on the study of how integrated logistics capabilities would impact firm performance. Most of the earlier studies were conducted with focus on specific factors or aspects of the logistics capabilities individually such as customer demand, speed, flexibility, reliabilities responsiveness, and post-sales customer service. Few of them take into account of the effect of integration, however none, to the knowledge of the researcher, was found to be studied on logistics integration capabilities as the mediator

between demand management capabilities, supply management capabilities, and information management capabilities with the firm performance. The motivation for this study was to bridge the gaps by exploring relationship and examining effect of integration capabilities of demand management capabilities, supply management capabilities and information management capabilities through the mediating model of logistics integration capabilities and the impact on firm performance. Other point of interest in this study was also to analyze relationship of information management capabilities and firm's other logistics capabilities, and the impact on firm performance.

2.9 Research Model

According to the aforementioned theoretical background and several relevant empirical studies, the research model for the study had, therefore, been developed as shown in figure 2.14, per below. Demand Management Capabilities, Supply Management Capabilities, and Information Management Capabilities were independent variables, Logistics Integration Capabilities represented the mediating variable and Firm Performance was the dependent variable.

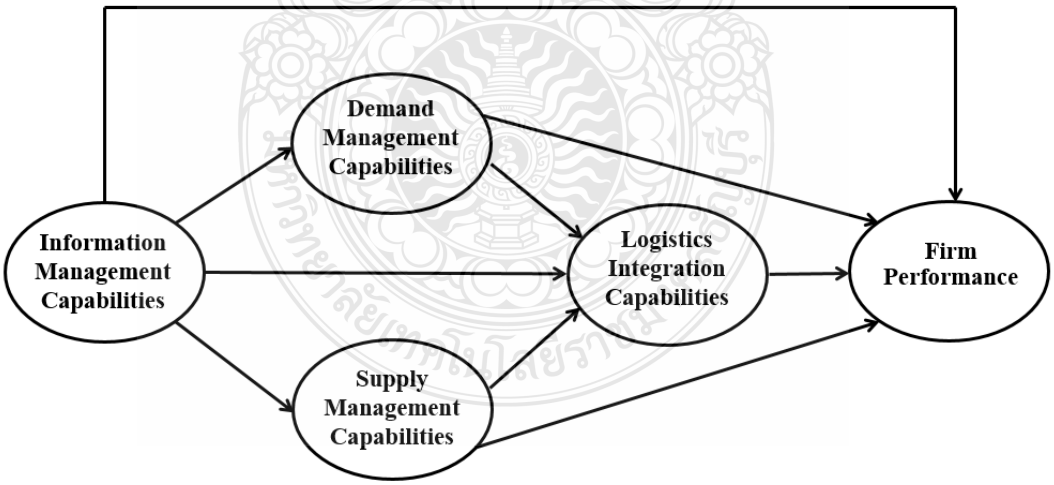


Figure 2.14 Research Model

CHAPTER 3
RESEARCH METHODOLOGY

Introduction

This chapter described research methodology that had been used to test the hypotheses developed in the preceding chapter, by analyzing the relationships between firm's logistics capabilities, the logistics integration as a mediator, and the firm performance. The chapter comprised of five sections, the first section introduced the hypothesized structural model, the second section outlined the research design and the setting of the study, the third and the fourth sections specified the quantitative and qualitative methodology, and the last section discussed the sequence of analysis.

3.1 Hypothesized Structural Model

The proposed hypothesized structural model had been developed based on the aforementioned research framework and hypotheses in the preceding chapter (as illustrated in figure 3.1).

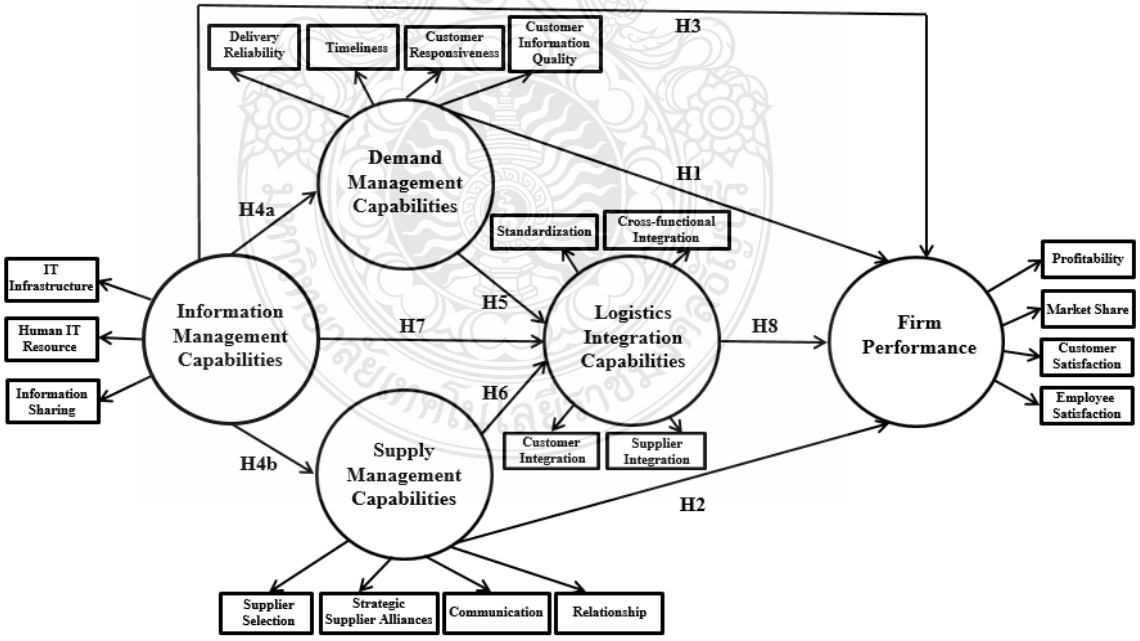


Figure 3.1 The Proposed Hypothesized Structural Model

The study deployed Structural Equation Modeling (SEM) techniques as statistical tools for the analysis of the data in the study. SEM is considered a second generation statistical approaches (Gefen, Straub, & Boudreau, 2000), which allows simultaneous analysis of multiple criterions and independent constructs. This advantage overcomes the shortcoming of the traditional statistical analysis especially with the model with more than one layer of relationship, where single analysis of each individual layer need to be done (Jain, 2007). SEM determines the structural model (of relationships amongst a set of independent and dependent constructs) as well as, the measurement model (such as loadings of observed variables to the latent variables) at the same time (Gefen et al., 2000).

3.2 Research Design and the Setting of the Study

This study was a mixed method research design. The quantitative research used a cross-sectional, mail survey methodology and a questionnaire as instrument for data collection. The qualitative research involved in-depth individual interviews with organization's key logistics personnel (e.g., logistics manager/director).

The setting of the study was the food processing industry in Thailand. The food processing industry had been selected for couple of reasons. Firstly, Thailand is one of the world's largest producers and exporters of food and processed food products. Food industry is one of key contributor to the national economy which accounts for as much as 23 percent of the GDP where 21.5% of which are processed food products. Secondly, it has been known of the crucial roles of logistics in the food industry as logistics involves in the movement throughout the process of the industry starts from acquire raw material, storage, put through the process and the delivery of finished goods to the customers. Logistics helps the food industry to maintain a continuous supply of food products from different suppliers and distributors across various locations to the customers domestically and globally. Thirdly, the large population of food processing industry in Thailand yields a large enough sample to provide a robust assessment of the hypothesized model. And lastly, the findings and implications of this study would support and strengthen the competitiveness of the Thai food industry, which is in

accordance with the “Value-Based Economy” economic model promoted by the Thai government.

3.3 Quantitative Methodology

Qualitative methodology involves collecting, analyzing and integrating of the quantitative data. The study used a cross-sectional, mail survey methodology and a questionnaire as instrument for data collection.

There are several advantages of mail survey have been recognized by researchers, such as relatively low cost, reliable, fast and cover a large and dispersed geographical areas and populations (Joong-Kun Cho et al., 2008). Mail surveys help the test measurement scales (Davis, Allen, & Cosenza, 1988) and also stretch out for the test of relationships between variables (Dunkelberg & Sonquist, 1977), and validity checking (Kerlinger, 1986).

3.3.1 Population and Sampling

The key objectives of this study were to examine the relationships between firm’s logistics capabilities, logistics integration capabilities, and firm performance. The target respondents were logistics managers or logistics executives in the food processing organizations in Thailand. These respondents were considered having adequate knowledge about company’s logistics capabilities and were in the roles that were able and would be willing to share the surveyed information, therefore, their responses were assumed to be valid and reliable. The study chose to focus on one industry as it allowed more control of extraneous variables and provided robust results for theory testing (Innis & La Londe, 1994; Morash et al., 1996; Snow & Hambrick, 1980).

According to the United States Department of Agriculture (USDA), the processed food is defined as any raw agricultural commodity that has been subject to washing, cleaning, milling, cutting, chopping, heating, pasteurizing, blanching, cooking, canning, freezing, drying, dehydrating, mixing, packaging, or other procedures that alter the food from its natural state. This may include the addition of other ingredients to the food, such as preservatives, flavors, nutrients and other food additives or substances approved for use in food products, such as salt, sugars and fats.
(http://www.usda.gov/wps/portal/usda/usdahome)

The study had assigned ten groups of population from the food processing industry in Thailand, based on the guidelines of industrial clustering provided by the Federation of Thai Industries. The sample size was calculated according to the rules of Structural Equation Model (SEM). Bentler and Chou (1987) proposed a simplified guideline which provided the trustworthiness of solutions and parameter estimates, and advised that the ratio of "sample size" and the "number of free parameters" under normal and elliptical theory, could go as low as a 5:1 ratio, particularly, in the study with many indicators of latent variables and with large factor loadings. The higher ratio, the more trustworthiness they are, although it is not evident of which to base a recommendation, a ratio of at least 10:1 may be considered adequate and appropriate sample size. This study chose the 5:1 ratio, with the free parameters from the conceptual model to be 47, the initial sample size was therefore targeted at 235 samples from food processing organizations in Thailand, distribution of sampling from each group was on weighted proportional basis.

Table 3.1 The Population and Distribution of Sample Size

Division of Thai Food Processing Industry	Population (N)	Sample (n)	Percentage
Animal and processed meat products	276	18	7.7%
Poultry products	456	30	12.8%
Fishery and marine products	340	23	9.8%
Milk and dairy products	312	21	8.9%
Fruits and vegetable products	498	33	14.0%
Fat and oil products	312	21	8.9%
Foods products made from flour	241	16	6.8%
Condiments and seasoning ingredients	199	13	5.5%
Beverages and drinks	591	40	17.0%
Sugar and confectionery products	292	20	8.5%
Total	3,517	235	100%

3.3.2 Data Collection

The total of 3,517 contact information of the food processing organizations was obtained from database of Department of Industrial Works under the Ministry of Industry of Thailand. Organizational data comprised of primary contact information, firm size, business sector, registered capital and year of establishment.

This study adopted the key informant survey research methodology for data collection, this method relied on one or a few persons to provide surveyed information. The key informants were deemed especially qualified because of their position, experience, and specialized knowledge (Venkatraman, 1987). This technique, although, had received some criticism of invalid data when only single respondent was used (Phillips, 1981), however, it had been advised that there was no other viable alternative in order gain information from top managers (John & Reve, 1982).

The key informant survey research strategy suggested that the key informants should be both knowledgeable about the issues being studied and willing and able to communicate this information (Campbell, 1955), the target respondents for this study were logistics managers or directors who were well aware of the business strategy, actively engaged in the company's logistics process and activities and were knowledgeable about logistics capabilities of the organization. These respondents were considered key informants.

The mail survey methodology was used to collect data to address the study's research hypotheses. The questionnaires were sent to logistics managers/directors by mail. A mail package contained an introduction letter from the Rajamangala University of Technology Thanyaburi, an information sheet about the study, a questionnaire survey, and a postage-paid, addressed return envelope to the Faculty of Business Administration.

3.3.3 Research Instrumentation

3.3.3.1 Questionnaire

A questionnaire consisted of a series of questions and was designed to extract specific surveyed information from the respondents. Based on the literature review of the relevant study, questionnaire was aimed to fulfill research objectives and answers the research hypotheses. It was argued that with the large scale industry data

collection, low response rate had always been a potential issue, therefore, a well-designed and easy to fill out questionnaire helped to increase response rate (Fowler Jr, 2013).

The questionnaire for this study was thoroughly designed to address the research hypotheses formulated to develop a conceptual framework. The questionnaire was divided into six sections. Section 1: Demand Management Capabilities, Section 2: Supply Management Capabilities, Section 3: Information Management Capabilities, Section 4: Logistics Integration Capabilities, Section 5: Firm Performance, and Section 6: Demographics and background characteristics of the respondents.

Section 1 of the questionnaire was focused on the Demand Management Capabilities, the construct was measured by delivery reliability, timeliness, customer responsiveness, and customer information quality, with the objectives to measure firm's abilities to combine customer's need with logistics capabilities, as well as the abilities to plan and forecast/predict, and manage the demand for products, delivery and services to meet the requirement of the customers and fulfil customer satisfaction. The following Seven-point Likert scales ranging from 1 to 7, were used to rate each question, where 1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree.

Section 2 of the questionnaire was focused on the Supply Management Capabilities, the construct was measured by supplier selection, strategic supplier alliances, communication, and relationship, with the objectives to measure the firm's abilities to effectively manage of supply-chain partnerships using process planning, evaluating, implementing, and controlling strategic and operating sourcing decisions. The following Seven-point Likert scales ranging from 1 to 7, were used to rate each question, where 1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree.

Section 3 of the questionnaire was focused on the Information Management Capabilities, the construct was measured by IT infrastructure, Human IT resource, and Information sharing, with the objectives to measure the firm's abilities to

acquire, deploy and leverage the IT assets, use and provide data and information to users at appropriate levels and to coordinate informational resources and put them into productive use, as well as to adapt to response to changing market needs and directions. The following Seven-point Likert scales ranging from 1 to 7, were used to rate each question, where 1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree.

Section 4 of the questionnaire was focused on Logistics Integration Capabilities, the construct was measured by standardization, cross-functional integration, customer integration, and supplier integration, with the objectives to measure the firm's practices and operational activities in the supply chain which organize and coordinate the flow of materials and information throughout the value stream from suppliers to customers which connects the cross boundary activities and functions. The following Seven-point Likert scales ranging from 1 to 7, were used to rate each question, where 1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree.

Section 5 of the questionnaire was focused on Firm Performance, the construct was measured by profitability, market share, market share, customer satisfaction, and employee satisfaction, with the objectives to measure the firm's efficiency and effectiveness on achieving the predetermined objectives. The following Seven-point Likert scales ranging from 1 to 7, were used to rate each question, where 1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree.

Section 6 of the questionnaire was a survey for the demographics and background characteristics of the respondents including age, educational qualification, as well as working experiences in the logistics functions and responsibility for the purposes of demographical analysis.

3.3.3.2 Testing on the Response Bias

In this study, the questionnaire was used as an instrument to survey the attitude of the target respondents towards the firm's logistics capabilities and the firm

performance, however chances were that the respondents may provide inaccurate or untruthful response which was a “Response Bias”. The research instrument for this study had been designed at best, on the methodology to detect and prevent respondent’s social desirability and non-response biases.

Social desirability bias refers as a phenomenon where respondents provide socially acceptable answers or present in a more favorable way, especially in the surveys which are not confidential. This could be that to avoid embarrassment or the reluctance to admit to undesirable attitudes. The social desirability bias can be avoidable with a proper designed questionnaire which represents no influence content. The researcher may also explain and give a clear objective and the results that would be expected from the survey. It could also be helpful to emphasize to the respondent that participation in the survey is done on behalf of the organization or job responsibility, rather than personal opinion.

Non-response bias refers to the situation that the target respondents do not return the questionnaire or unwilling to participate in the survey. It also refers as the situation where respondent’s opinion is systematically different from the opinions of those who are willingly to participate and return the questionnaire for the survey. Mail survey has been criticized on the non-response bias (Baur, 1947). Lynn (1996) defined the two types of problem generated from the non-response. First, it reduces the size of the sample and therefore increases sampling error, and second, the creation of bias which resulted when respondents’ opinions differ in meaningful ways from non-respondents.

The return rate of mail questionnaire must not be less than 20% to be acceptable (Aaker, Kumar, & Day, 2001). Non-response bias can be tested by comparing characteristics of respondents who returned completed surveys and non-respondents who failed to return a completed survey (Whitehead, Groothuis, & Blomquist, 1993), to assess non-response bias in mail survey is to use statistical significance difference tests (Krause & Scannell, 2002), two sample *t*-test assuming equal variances for 10 percent of sample to compare between the early returned respondents and the follow-up respondents (Agan, 2005), if there is no statistical

significant differences with *t*-test at $p<0.05$, it suggests that non-response bias is not detected (Armstrong & Overton, 1977).

3.3.4 Measurement Variables

The attributes of the Demand Management Capabilities were measured by four variables which were delivery reliability, timeliness, customer responsiveness, and customer information quality. The definition of each variable was presented in table 3.2.

Table 3.2 Definitions of the Measurement Variables for Demand Management Capabilities (DMC)

Variable	Definition	Sources
Delivery Reliability	The ability to exactly meet quoted or anticipated delivery dates and quantities	Morash et al., 1996; Lambert and Stock, 1993; Mentzer et al., 1999
Timeliness	The abilities to deliver at customer on timely fashion	Mentzer et al., 1999; Day and Wensley , 1988; Lambert and Stock, 1993
Customer Responsiveness	The abilities to respond to the needs and wants of the customers	Morash et al., 1996; Lambert and Stock, 1993; Mentzer et al., 1999, Youn et al, 2014
Customer Information Quality	Customers' perception on details and accuracy of the information available for products and services	Morash et al., 1996; Lambert and Stock, 1993; Mentzer et al., 1999; Youn et al., 2014

The attributes of the Supply Management Capabilities were measured by four variables which were supplier selection, strategic supplier alliances, communication, and relationship. The definition of each variable was presented in table 3.3.

Table 3.3 Definitions of the Measurement Variables for Supply Management Capabilities (SMC)

Variable	Definition	Source
Supplier Selection	The abilities to effectively evaluate and select capable suppliers	Tracey et al., 1999; Sezhiyan & Nambirajan, 2011; Ittner et al., 1999; Baxter et al., 1989; Chen and Paulraj, 2004
Strategic Supplier Alliances	The efficient performance collaboration encouraging mutual planning and problem solving and produces shared benefits and total cost of ownership, as well as risk and reward sharing	Macbeth and Ferguson, 1994; Mentzer at al., 2000; Elthantaway, 2009; Rungtusannatham et al., 2003
Communication	The effective frequent, genuine and two-ways communicate between firm and suppliers	Chen and Paulraj, 2004; Ofori-Amanfo, 2014
Relationship	The close relationship between firm and suppliers which increases the intensity of coordination	Chen and Paulraj, 2004; Ofori-Amanfo, 2014; Scannell et al., 2000; Cousins, 1999; Lamming 1993

The attributes of the Information Management Capabilities were measured by three variables which were IT infrastructure, human IT resource, and information sharing. The definition of each variable was presented in table 3.4.

Table 3.4 Definitions of the Measurement Variables for Information Management Capabilities (IMC)

Variable	Definition	Sources
IT Infrastructure	Firm's overall physical IT assets and sharable platform and databases	Ross et al., 1996; Bharadwaj, 2000; Zhao et al., 2001; Reed and DeFillippi, 1990
Human IT Resource	Technical and managerial IT skills and abilities to integrate IT and business planning process	Bharadwaj, 2000; Marchand et al., 2000; Katz, 2009; Capon and Glazer, 1987
Information Sharing	The willingness to share information on the timely, accurate and responsive basis	Bharadwaj, 2000;Clemons and Row, 1991;Wu et al., 2006; Ross et al., 1996; Zhao et al., 2001

The attributes of the Logistics Integration Capabilities were measured by four variables which were standardization, cross-functional integration, customer integration, and supplier integration. The definition of each variable was presented in table 3.5.

Table 3.5 Definitions of the Measurement Variables for Logistics Integration Capabilities (LIC)

Variable	Definition	Sources
Standardization	The common policies and procedure, and consistent and common approach to facilitate logistics operation	Frohlich and Westbrook, 2002; Stank et al., 2001
Cross Functional Integration	The competency of linking the integration function internal functions of the performed work into seamless process	Beheshti et al., 2014; Frohlich and Westbrook, 2002; Stank et al., 2001

Table 3.5 Definitions of the Measurement Variables for Logistics Integration Capabilities (LIC) (Cont.)

Variable	Definition	Sources
Cross Functional Integration	The competency of linking the integration function internal functions of the performed work into seamless process	Beheshti et al., 2014; Frohlich and Westbrook, 2002; Stank et al., 2001
Customer Integration	The collaborative roles to have customers involvement in the process and transactions directly with the supplying firm, this leads to a better understanding of market needs, product quality, and stronger relationship.	Sandmeier and Morrison, 2008; Beheshti et al., 2014; Frohlich and Westbrook, 2002; Kirschner et al., 2008; Stank et al., 2001
Supplier Integration	The combination of firm's resources and the capabilities of supplier through business process	Wagner, 2003; Elthantaway,2009; Rungtusannatham et al., 2003; Beheshti et al., 2014; Frohlich and Westbrook, 2002; Stank et al., 2001

The impact of the Logistics Capabilities on Firm Performance was measured by four variables which were profitability, market share, customer satisfaction, and employee satisfaction. The definition of each variable was presented in table 3.6.

Table 3.6 Definitions of the Measurement Variables for Firm Performance (FP)

Variable	Definition	Sources
Profitability	The condition of yielding a financial gain of the firm, considered by price to earnings	Santos and Brito, 2012; Frohlich and Westbrook, 2001; Tippins and Sohi, 2003; Vivek and Ravindran, 2009
Market Share	The portion of sales volume of the firm's products in the market, measured in percentage of the total market	Santos and Brito, 2012; Frohlich and Westbrook, 2001; Tippins and Sohi, 2003
Customer Satisfaction	The attribute of product versus cost paid for in term of satisfaction from the products and services provided	Santos and Brito, 2012; Frohlich and Westbrook, 2001; Katou and Budhwar, 1988; Sezhiyan & Nambirajan, 2011
Employee Satisfaction	The contentment and the comfortable of employee with work conditions and work environments	Santos and Brito, 2012; Katou and Budhwar, 1988; Saari & Judge, 2004; Sezhiyan & Nambirajan, 2011; Ellinger et al., 2002

3.3.5 Validity and Reliability

The content validity is the evaluation which relies on subject-matter experts who are familiar with the construct being used in the questionnaire to help determine if the research instrument can provide answers to the research questions. The questionnaire was reviewed and assessed by six subject-matter experts, consisted of four university academicians and two professionals from business sector based on Index of Item-Objective Congruence (IOC) method.

The IOC method is used to evaluate the congruence between the test items and the objectives. The IOC score are calculated as follows:

$$IOC = \frac{\sum R}{N}$$

Where:

R = Expert's assessment scores which:

+1= the question is congruent with the objectives

0 = the question is uncertain to be congruent with the objectives

- 1 = means the question is not congruent with the objective

N = Number of subject-matter experts

The questionnaire with the IOC score between 0.5 and 1.0 is deemed acceptable. The results from the evaluation as well as comments and suggestions on the wordings and rewordings, sequence of questions and presentation of the questions in the questionnaire is used to adjust and improve for the accuracy and validity of the questionnaire.

The assessment of the reliability of the variables used in the model is carried out through the analysis of Cronbach's alpha. Cronbach's alpha is a means to measure internal consistency and to analyze whether how closely a set of items used in the model related to each other (Cronbach, 1951). The theoretical value of the alpha ranges from zero to one, of which the higher value indicates better survey quality, therefore, more reliable. It is suggested that Cronbach's alpha coefficient of 0.7 or higher is considered acceptable (Carman, 2000).

3.4 Qualitative Methodology

Qualitative methodology is a method which provides detailed explanation and descriptions of the procedures, situation, communications, experiences and knowledge related to the questions raised in the study. Qualitative can be defined into three

different level of data collection: Individual surveys, Individual Interviews and, and Expert Panel Interviews. All of these could provoke deep level of responses in an open-ended environment in the data collection process which allows richness of information (Hopp, 2005).

The individual interviews are considered one among the most powerful means for obtaining crucial research data, and is also an effective tool to learn about expert opinions, and explore reaction on important events. Interviews are challenging and yet rewarding forms of measurement (Hopp, 2005), as they provide detailed explanation and descriptions of the procedures, situation, communications, experiences and knowledge related to the questions raised in the study.

Interviewing requires personal sensitivity and adaptability as well as the ability to stay within the bounds of a series of prearranged queries provided specific subject related data points. This process reduces bias that might be generated by the researcher's influence or as to any indiscrimination.

3.4.1 Population and Sampling

This research was conducted across several organizations in the Thai food processing industry, as to ensure appropriate and accurate results, participants would be equally and randomly selected and strictly on voluntarily basis. The target key participants were logistics managers or directors. Otherwise, the participants should, at least, have met the following key criterion:

1. Participant was actively engaged in the company’s logistics process and activities.
2. Participant was recognized as having adequate knowledge about the company’s logistics capabilities.
3. Participant had been identified as a key member and in the role that were able to share the survey information.

The interviews with 5 participants in the logistics functions in the food processing companies would provide opinions and in-depth information to confirm the agreement or disagreement with the elements being studied and the answers for the research hypotheses.

3.4.2 Research Instrumentation

Chava and David (1996) explained that a face-to-face interviewing involves interpersonal role situation, with the predesigned questions for an interviewer to ask respondents to draw answers pertinent to research hypotheses. The interviewing utilized a standardized interview open ended questions to obtain critical insight from the selected interviewee. The standardized open ended questions would facilitate more accurate and focus on the interview topics which would allow faster interview process and easier for the analysis and comparison. The interviewer utilizes a scripted format to maintain reliability and consistency with all interviews. This method would enable the interviewer a more control over the environment and the questions. While the questions are open-ended and penetrating, the process is designed to allow flexibility to the interviewee for thought provoking collaboration as needed.

Individual Interview Practice

The individual interview involved a one-to-one meeting in a neutral setting where the interviewer engages in a series of prepared questions that elicited responses that were relevant to the research questions. The questions, the wording, and the sequence define the structure of the interview (Chava & David, 1996). The interviews were conducted to qualitatively measure the logistics capabilities as resources to create competitive advantage and superior performance of the firm.

3.4.3 Interview Questions

1. What are your company most important logistics capabilities?
2. What do you consider specific resources that support logistics capabilities?
3. What competitive advantage of the company that can be developed based on specific resources?
4. How do IT capabilities facilitate the efficiency of company's other logistics capabilities?
5. How do firm's logistics capabilities influence each other?
6. Do the firm's logistics capabilities coordinate well with each other?
7. How does the integration of logistics functions of your company influence the overall performance of the company?

3.5 Sequence of Analysis

The analysis of the study was presented in the following sequence:

1. Quantitative Research

1.1 Survey Pretesting

1) Content Validity Testing (Item-Objective Congruence method)

2) Reliability Pretesting (30 tryout sampling)

- Cronbach's Alpha Analysis for questionnaire reliabilities

3) Adjustment of the questionnaire, if required

1.2 Statistics Analysis

1) Descriptive Statistics Analysis

-Mean, Standard Deviation, Frequency

2) Normality Testing

3) Structural Equation Modeling

3.1) Reliability Testing (Cronbach's Alpha Analysis)

3.2) Multicollinearity Testing

3.3) Construct Validity Testing

- Convergent Validity (Confirm Factor Analysis)
- Discriminate Validity

3.4) Structural Equation Modeling Analysis

- Development of the Model
- Analysis for Goodness-of-Fit

(χ2, degree of freedom, χ2/df, *p*-value, GFI, AGFI, RMR, RMSEA, NFI, CFI, and Hoelter's critical N)

-If the model does not fit the data, modify the indices.

-Analysis of model's regression weights

-Analysis of the direct and indirect relationships

-Analysis of the mediating effects

4) Quantitative Research Reporting

2. Qualitative Research

2.1 Individual Interview

-Show courtesy, introduction, and affirm confidentiality

-Interview with standardized questions and procedures

-Confirm, clarify, and provide transition between topics

-Tape record the interview and take notes of observations made

-End with gratitude and send prompt thank you notes

2.2 Qualitative Research Reporting

CHAPTER 4
RESEARCH RESULTS

Introduction

This chapter presented empirical findings of research questions and hypotheses set forth through statistical analysis from the data collected from respondents in the food processing industry in Thailand. The chapter was organized into four sections. The first section covered instrument validation and pretesting, and data preparation, followed by demographics summary and descriptive statistics. The next section covered statistical analysis and structural model analysis. The following section discussed the results of hypotheses testing, and the last section was the interview results of the qualitative research.

4.1 Instrument Validation and Pretesting

The validation of the measurement on content validity was evaluated by using Index of Item-Objective Congruence (IOC) method to evaluate and verify content validity of the items used in the questionnaire (Innis & La Londe, 1994), which is an important developmental stage for data collection instrument to ensure the validity of each observed variables within the group of constructs. The IOC for this study was assessed by six subject-matter experts, two logistics managers and four academic researchers. The overall assessment score was 0.87 which was considered acceptable. Comments and suggestions on the wordings and rewordings, sequence of questions and the presentation of the questions were received and incorporated into the adjusted data collection questionnaire.

4.1.1 Pretesting for Reliability

The pretesting was conducted in order to determine if the questions had an ambiguity which could lead to respondent's misinterpretation. Assessment of reliability can be done by comparing the answers from one respondent with another (Weisberg, Krosnick, & Bowen, 1989). A reliable questionnaire should repeatedly yield the same response from respondents. The tryout questionnaires were distributed to the 30 selected respondents with the logistics functions in the food processing industry. The data

collected from the pretesting permitted a preliminary evaluation for reliability. Cronbach's alpha coefficient was used as a means to assess internal consistency of how closely the set of items as a group were related and was considered a coefficient of reliability. Theoretically, value of the Cronbach's alpha ranges from zero to one of which the higher value indicates more reliability. The value at 0.70 or higher is considered reliable (Carman, 2000), the Cronbach's alpha coefficient from the pretesting equaled to 0.94 and indicated the relatively high internal consistency among items used in the study, therefore, the questionnaire was acceptable.

4.2 Data Preparation

4.2.1 The Population and Sample Response Rate

The setting of population for surveyed data collection was the Thai food processing industry. The total of 3,517 contact information was obtained from database of Department of Industrial Works.

Due to the nature of low response rate for mail survey, of which, J.-K. J. Cho (2001) referred to research work of Anderson and Narus in 1990 who received about 10 per cent returned mail. The mail response rate was as low as 4.1 per cent for the study of Agan (2005). However, it was suggested by Aaker et al. (2001) that the return rate of mail questionnaire should not be less than 20 per cent as to be acceptable. Therefore, in order to avoid issues with the low response rate, the questionnaires were mailed to logistics managers or directors of each company of the 1,300 companies from ten clusters in the food processing industry on weighted proportional basis. The data were collected through combination approach where the respondents were provided with options to complete and return the questionnaire through an addressed postage-paid return envelope, by fax or through web-based questionnaire responding.

While the low response rate might raise concerns on the response bias (Armstrong & Overton, 1977), there had no significant differences in means with *t*-test at $p<0.05$ between early (responded within the first month) and late response, therefore, no non-response bias was detected.

A total of 269 questionnaires were received which accounted for 20.69 per cent response rate. There were 12 returned questionnaires with insufficient data,

skipping sections or quit in the middle. These questionnaires were dropped from the statistical analysis. In conclusion, there were the total of 257 completed questionnaires received from 1,300 questionnaires mailed, thus the effective response rate was 19.8 per cent. The characteristics of the returned questionnaire by food processing industry clusters as shown in table 4.1.

Table 4.1 Characteristics of the Returned Questionnaires

Industry Clusters	Population	Sent Mail	Returned Questionnaires	Percentage of Return
Animal and processed meat products	276	102	17	16.7%
Poultry products	456	169	29	17.2%
Fishery and marine products	340	126	29	23.0%
Milk and dairy products	312	115	9	7.8%
Fruits and vegetable products	498	184	34	18.5%
Fat and oil products	312	115	31	26.9%
Foods products made from flour	241	89	29	32.6%
Condiments and seasoning ingredients	199	74	18	24.5%
Beverages and drinks	591	218	19	8.7%
Sugar and confectionery products	292	108	42	38.9%
Total	3,517	1,300	257	19.8%

4.2.2 Data Coding and Entry

The variables in this study had been encoded as to simplify the data processing and interpretation process. The abbreviation used for variables as shown in table 4.2.

IBM's statistical software packages were used for data analysis. SPSS Statistics version 20 was used for descriptive statistics and SPSS Amos version 23 was used for Structural Equation Model (SEM) analysis.

Table 4.2 Abbreviation of Constructs and Observed Variables

Construct	Observed Variable	Type of Variable
Demand Management Capabilities (DMC)	Delivery Reliability (Delv) Timeliness (Time) Customer Responsiveness (Rpsiv) Customer Information Quality (InfQ)	Independent Variable
Supply Management Capabilities (SMC)	Supplier Selection (SSel) Strategic Supplier Alliances (SAli) Communication (SCom) Relationship (SRel)	Independent Variable
Information Management Capabilities (IMC)	IT Infrastructure (ITInfr) Human IT Resource (Hum IT) Information Sharing (InfSh)	Independent Variable
Logistics Integration Capabilities (LIC)	Standardization (Std) Cross-functional Integration (Crssfn) Customer Integration (CIntg) Supplier Integration (SIntg)	Mediating Variable
Firm Performance (FP)	Profitability (Proft) Market Share (MkShr) Customer Satisfaction (CStf) Employee Satisfaction (EStf)	Dependent Variable

4.3 Demographics Summary

The demographic information of the respondents was summarized and described by category, frequency and respondent percentage, as shown in table 4.3.

Table 4.3 Summary of the Demographics

Demographics	Frequency	Respondent Percentage
Age		
Less than 31 years old	48	18.8%
31-40 years old	100	39.1%
41-50 years old	58	22.3%
Over 51 years old	51	19.9%
Educational Qualifications		
Vocational/Technical certificate	8	3.1%
Secondary education	8	3.1%
Undergraduate degree	169	65.6%
Postgraduate degree	72	28.1%
Position and Responsibility		
Executives	66	25.8%
Departmental manager	88	34.0%
Divisional supervisor	65	25.4%
Others	38	14.8%
Years of Working Experiences in the Logistics Functions		
1-5	95	37.1%
6-10	63	24.2%
11-15	46	18.0%
More than 15	53	20.7%
Nature of Investment		
Local company	218	84.8%
Foreign Direct Investment	39	15.2%
Registered Capital (Million Baht)		
Less than 10 million	48	18.4%
10-50 million	71	27.7%
51-100 million	37	14.5%
More than 100 million	101	39.5%
Number of Employee		
Less than 100	89	34.4%
100-500	92	35.9%
501-1,000	42	16.4%
More than 1,000	34	13.3%

4.3.1 Profile of the Respondents

The demographic data from respondents were classified into personal profile and organizational profile. The personal profile comprised of age group, educational background, job position, and experiences in logistics functions, which were used to determine the quality of the key informant (Campbell, 1955), while the organizational profile indicated firm's nature of investment, registered capital, and number of employee, used to determine characteristics of the company.

The personal profile of respondents, in term of age group, the majority of the respondents were within the age group of 31-40 years old, accounted for 39.1%, followed by the age group of 41-50 years old at 22.3%, age group of over 51 years old at 19.9%, and age group of less than 31 years old at 18.8%, respectively. As for the educational background, respondents with undergraduate qualification were the largest group which accounted for 65.6%, postgraduate at 28.1%, those with secondary education and the vocational and technical certificates were at the same percentage at 3.1%. The job positions were majorly departmental manager at 34.0%, followed by executive level at 25.8%, divisional supervisor at 25.4%, and other positions at 14.8%. In the aspect of working experiences in the logistics functions, the group with working experiences between 1-5 years was the dominant at 37.1%, 6-10 years of working experiences at 24.2%, followed by the group with experiences of more than 15 years at 20.7% and the 11-15 years experiences with the least percentage at 18.0%.

The organizational profile of respondents was determined in three operational aspects. Firstly, the nature of business investment, which was classified into local company and foreign direct investment (FDI), local company had outnumbered FDI at 84.8%, while the FDI accounted for only about 15.2% of the total. The second aspect of organizational profile was the firm's registered capital, it was found that firms with registered capital of more than 100 million Baht were the majority of the respondents and accounted for 39.5%, this was followed by the firms with registered capital between 10-50 million Baht at 27.7%, registered capital of less than 10 million Baht at 18.4%, and the smallest group was firms with registered capital between 51-100 million Baht at 14.5%. Number of employee were the third aspect of organizational profile, firms with number of employee in the range of 100-500 were the largest group and represented

35.9% of total. The second largest group was firms with less than 100 employees, which accounted for 34.4%, then followed by firms with 501-1000 employees at 16.4%, and employee of more than 1,000 persons being the smallest group at 13.3%.

The characteristics of the majority of the respondents were summarized as shown in table 4.4.

Table 4.4 Characteristics of the Majority of the Respondents

	Characteristics	**Percentage**
Personal Profile	Age between 31-40 years old	39.1%
	With undergraduate degree	65.6%
	Job position as departmental manager	34.0%
	1-5 years of working experiences in the logistics functions	37.1%
Organizational Profile	Being a local company	84.8%
	Registered capital of more than 100 million Baht	39.5%
	Employees between 100-500	35.9%

The majority of respondents could be summarized that the age group between 31-40 years old was predominant and accounted for 39.1%. The majority of educational qualification was with undergraduate degree, which accounted for 65.6%. Respondents were having 1- 5 years working experiences and holding departmental manager position at the most, which represented 37.15 and 34% respectively. As for the organizational profile, the majority of responding companies were local companies which accounted for 84.8 %, where the companies with registered capital of more than 100 million Baht and employee between 100-500 were the largest group and explained 39.5% and 35.9% of the total.

4.4 Descriptive Statistics

The following section summarized features of data collected for the study and presented in quantitative and comparable fashion.

4.4.1 Demand Management Capabilities

The attributes of demand management capabilities construct were measured by four observed variables, which were delivery reliability, timeliness, customer responsiveness, and customer information quality. These independent variables comprised of two items which were used to rate respondent's level of agreement. The statistical analysis of the minimum and maximum score, mean value and standard deviation value, as shown in table 4.5.

Table 4.5 Descriptive Statistics for Demand Management Capabilities

Variable	Min	Max	Mean	Standard Deviation
Delivery Reliability				
Delv1	2	7	5.47	1.15
Delv2	1	7	5.28	1.30
Timeliness				
Time1	2	7	5.52	1.11
Time2	1	7	5.73	1.14
Customer Responsiveness				
Rpsiv1	2	7	5.44	1.08
Rpsiv2	2	7	5.54	1.17
Customer Information Quality				
InfQ1	1	7	5.45	1.24
InfQ2	1	7	5.65	1.20

The item with the highest mean value was "focus on speed performance" (M=5.73, SD=1.14) under timeliness variable. The item with the lowest mean value was "low delivery discrepancy" (M=5.28, SD=1.30) under delivery reliability variable.

4.4.2 Supply Management Capabilities

The attributes of supply management capabilities construct were measured by four observed variables, which were supplier selection, strategic supplier alliances,

communication, and relationship. These independent variables comprised of two items which used to rate respondent's level of agreement. The statistical analysis of the minimum and maximum score, mean value and standard deviation value, as shown in table 4.6.

Table 4.6 Descriptive Statistics for Supply Management Capabilities

Variable	Min	Max	Mean	Standard Deviation
Supplier Selection				
SSel1	2	7	5.43	1.17
SSel2	1	7	5.09	1.37
Strategic Supplier				
SAli1	1	7	5.09	1.33
SAli2	1	7	4.70	1.43
Communication				
SCom1	1	7	5.27	1.14
SCom2	1	7	5.44	1.10
Relationship				
SRel1	1	7	5.30	1.18
SRel2	1	7	5.56	1.14

The item with the highest mean value was "long term alliance relationship" (M=5.56, SD=1.14) under relationship variable. The item with the lowest mean value was "risks and rewards sharing" (M=4.70, SD=1.43) under strategic supplier alliances variable.

4.4.3 Information Management Capabilities

The attributes of information management capabilities construct were measured by three observed variables, which were IT infrastructure, Human IT resource, and information sharing. These independent variables comprised of two items which used to rate respondent's level of agreement. The statistical analysis of the minimum and maximum score, mean value and standard deviation value, as shown in table 4.7.

Table 4.7 Descriptive Statistics for Information Management Capabilities

Variable	Min	Max	Mean	Standard Deviation
IT Infrastructure				
ITInfr1	1	7	5.33	1.30
ITInfr2	1	7	4.71	1.35
Human IT Resource				
HumIT1	1	7	5.04	1.26
HumIT2	1	7	5.07	1.29
Information Sharing				
InfSh1	1	7	5.39	1.28
InfSh2	1	7	4.91	1.36

The item with the highest mean value was "effective information sharing between departments" (M=5.39, SD=1.28) under information sharing variable. The item with the lowest mean value was "IT system for multiple platforms data exchange" (M=4.71, SD=1.35) under IT infrastructure variable.

4.4.4 Logistics Integration Capabilities

The attributes of supply logistics integration capabilities construct were measured by four observed variables, which were standardization, cross-functional integration, customer integration, and supplier integration. These mediating variables comprised of two items which used to rate respondent's level of agreement. The statistical analysis of the minimum and maximum score, mean value and standard deviation value, as shown in table 4.8.

Table 4.8 Descriptive Statistics for Logistics Integration Capabilities

Variable	Min	Max	Mean	Standard Deviation
Standardization				
Std1	2	7	5.14	1.18
Std2	1	7	5.18	1.24

Table 4.8 Descriptive Statistics for Logistics Integration Capabilities (Cont.)

Variable	Min	Max	Mean	Standard Deviation
Cross-Functional				
Crssfn1	1	7	5.33	1.22
Crssfn2	1	7	5.29	1.30
Customer Integration				
CIntg1	1	7	5.08	1.36
CIntg2	1	7	5.24	1.37
Supplier Integration				
SIntg1	1	7	4.50	1.43
SIntg2	1	7	4.66	1.46

The item with the highest mean value was "extensive utilization of cross functional work teams" (M=5.33, SD=1.22) under cross-functional integration variable. The item with the lowest mean value was "cost information sharing with supplier" (M=4.50, SD=1.43) under supplier integration variable.

4.4.5 Firm Performance

The attributes of firm performance construct were measured by four observed variables, which were profitability, market share, customer satisfaction, and employee satisfaction. These dependent variables comprised of two items which used to rate respondent's level of agreement. The statistical analysis of the minimum and maximum score, mean value and standard deviation value, as shown in table 4.9.

Table 4.9 Descriptive Statistics for Firm Performance

Variable	Min	Max	Mean	Standard Deviation
Profitability				
Proft1	1	7	4.67	1.62
Proft2	1	7	4.44	1.47
Market Share				
MkShr1	1	7	4.67	1.45
MkShr2	1	7	4.74	1.45

Table 4.9 Descriptive statistics for Firm Performance (Cont.)

Variable	Min	Max	Mean	Standard Deviation
Customer Satisfaction				
CStf1	2	7	5.38	1.16
CStf2	1	7	5.04	1.31
Employee Satisfaction				
EStf1	1	7	5.29	1.27
EStf2	1	7	4.64	1.42

The item with the highest mean value was "customers are satisfied with products and services" (M=5.38, SD=1.16) under customer satisfaction variable. The item with the lowest mean value was "better financial results than the same industry" (M=4.44, SD=1.47) under profitability variable.

4.5 Normality Testing

Normality testing is used to determine whether the data set are normally distributed. A good questionnaire design should yield normal distribution of the data. Statistically, two common indicators referred for normal distribution assessment are skewness and kurtosis. Skewness is a measure of the symmetry, whereby skewness value is zero for a symmetry or normal distribution data set. Kurtosis is a measure of combined sizes of the two tails, the kurtosis value for normal distribution equals to 3.0. However, it is often reported in the form of "excess kurtosis" by subtracting 3.0 from the normal value, therefore, the kurtosis value equals to zero. Hildebrand (1986) proposed that the value of skewness should be between -1.0 and +1.0 to judge with normal distribution and George (2011) proposed the value of kurtosis between -2.0 and +2.0 to be acceptable in order to prove normal univariate distribution. The results of the data set indicated that the values of skewness ranged from -0.85to - 0.31, with standard error of skewness at 0.152, and the values of kurtosis ranged from -0.43 to 1.01, with standard error of kurtosis at 0.303, in both case, all the values fell within the limit which indicated normal distribution of the data.

4.6 Structural Equation Modeling

Structural Equation Modeling (SEM) is the technique for analyzing the data which allows simultaneous analysis of multiple criterions and independent constructs. SEM determines the structural model (of relationships amongst a set of independent and dependent constructs) as well as, the measurement model (such as loadings of observed variables to the latent variables) at the same time (Gefen et al., 2000).

AMOS statistical software is an extension graphical module of SPSS module and has been widely used for Structural Equation Modeling, Path Analysis, and Confirmatory Factor Analysis. The software provides visual and graphical features for model drawing, allows direct adjustment of the model, and analyses with quick computation for Structural Equation Modeling analysis. AMOS was used as statistical tools for SEM analysis in this study.

The reliability of the model was assessed through the determining of Cronbach's alpha coefficient, while the model fit was evaluated through Confirmatory Factor Analysis (CFA).

4.6.1 Reliability Testing

The assessment of the reliability of the variables used in the model was done through the analysis of Cronbach's alpha. Cronbach's alpha is a means to measure internal consistency and to analyze whether how closely a set of items used in the model related to each other (Cronbach, 1951). The theoretical value of the alpha ranges from zero to one, of which the higher value indicates better survey quality therefore more reliable. It is suggested that Cronbach's alpha coefficient of 0.7 or higher is considered acceptable (Carman, 2000). The results of Cronbach's alpha coefficient analysis as shown in table 4.10.

Table 4.10 Results of Cronbach's Alpha Coefficient Analysis

Construct	Item	Cronbach's Alpha Coefficient	Mean	SD
DMC	Delv1	.964	5.47	1.15
	Delv2	.964	5.28	1.30

Table 4.10 Results of Cronbach's Alpha Coefficient Analysis (Cont.)

Construct	Item	Cronbach's Alpha Coefficient	Mean	SD
	Time1	.964	5.52	1.11
	Time 2	.964	5.73	1.14
	RPsiv1	.964	5.44	1.08
	RPsiv2	.964	5.54	1.17
	InfQ1	.964	5.45	1.24
	InfQ2	.963	5.65	1.20
SMC	SSel1	.964	5.43	1.17
	SSel2	.964	5.09	1.37
	SAli1	.964	5.09	1.33
	SAli2	.964	4.70	1.43
	SCom1	.964	5.27	1.14
	SCom2	.963	5.44	1.10
	SRel1	.963	5.30	1.18
	SRel2	.963	5.56	1.14
IMC	ITInfr1	.963	5.33	1.30
	ITInfr2	.963	4.71	1.35
	HumIT1	.963	5.04	1.26
	HumIT2	.963	5.07	1.29
	InfSh1	.963	5.39	1.28
	InfSh2	.964	4.91	1.36
LIC	Std1	.964	5.14	1.18
	Std2	.963	5.18	1.24
	Crssfn1	.963	5.33	1.22
	Crssfn2	.963	5.29	1.30
	CIntg1	.964	5.08	1.36
	CIntg2	.963	5.24	1.37
	SIntg1	.964	4.50	1.43
	SIntg2	.963	4.66	1.46

Table 4.10 Results of Cronbach's Alpha Coefficient Analysis (Cont.)

Construct	Item	Cronbach's Alpha Coefficient	Mean	SD
FP	Proft1	.964	4.68	1.63
	Proft2	.964	4.45	1.48
	MkShr1	.964	4.68	1.46
	MkShr2	.964	4.74	1.46
	CStf1	.964	5.39	1.16
	CStf2	.964	5.04	1.31
	EStf1	.964	5.29	1.27
	EStf2	.964	4.65	1.42

The Cronbach's alpha coefficient results for all the items used in the model ranged from 0.963 to 0.964, the mean values ranged from 4.45 to 5.73, and the standard deviation ranged from 1.08 to 1.63.

Demand management capabilities construct consisted of eight items which the overall Cronbach's alpha coefficient was 0.894, mean values ranged from 5.28 to 5.73, and standard deviation ranged from 1.08 to 1.30, this explained the reliability of this construct and acceptable for the measurement of the demand management capabilities in the model.

Supply management capabilities construct consisted of eight items which the overall Cronbach's alpha coefficient was 0.907, mean values ranged from 4.70 to 5.56, and standard deviation ranged from 1.10 to 1.43, this explained the reliability of this construct and acceptable for the measurement of the supply management capabilities in the model.

Information management capabilities construct consisted of six items which the overall Cronbach's alpha coefficient was 0.925, mean values ranged from 4.71 to 5.39, and standard deviation ranged from 1.26 to 1.36, this explained the reliability of this construct and acceptable for the measurement of the information management capabilities in the model.

Logistics integration capabilities construct consisted of eight items which the overall Cronbach's alpha coefficient was 0.919, mean values ranged from 4.50 to 5.33, and standard deviation ranged from 1.18 to 1.46, this explained the reliability of this construct and acceptable for the measurement of the logistics integration capabilities in the model.

Firm performance construct consists of eight items which the overall Cronbach's alpha coefficient was 0.909, mean values ranged from 4.44 to 5.38, and standard deviation ranged from 1.16 to 1.62, this explained the reliability of this construct and acceptable for the measurement of the firm performance in the model.

The total reliability statistics was 0.965 for 38 items. The Cronbach's alpha coefficients were well above 0.7, indicated reliability and accepted for the analysis.

4.6.2 Multicollinearity Testing

The testing of multicollinearity is an analysis for the non-relationship between variables. The tolerance must be more than 0.1 and the value of Variance Inflation Factor (VIF) must be less than 10 (Hair, Anderson, Babin, & Black, 2010). The analyzed tolerance values ranged from 0.17 to 0.52 and VIF values ranged from 1.93 to 5.87, indicated that there was no multicollinearity among variables. The analyzed values as shown in table 4.11.

Table 4.11 Results of Multicollinearity Testing

Construct	Item	Collinearity Statistics	
		Tolerance	VIF
DMC	Delv1	.38	2.61
	Delv2	.45	2.20
	Time1	.39	2.57
	Time 2	.50	2.02
	RPsiv1	.40	2.50
	RPsiv2	.30	3.30
	InfQ1	.34	2.97
	InfQ2	.28	3.58
SMC	SSel1	.37	2.71
	SSel2	.48	2.07
	SAli1	.28	3.57

Table 4.11 Results of Multicollinearity Testing (Cont.)

Construct	Item	Collinearity Statistics	
		Tolerance	VIF
	SAli2	.32	3.10
	SCom1	.26	3.79
	SCom2	.21	4.68
	SRel1	.23	4.41
	SRel2	.26	3.78
IMC	ITInfr1	.23	4.27
	ITInfr2	.23	4.36
	HumIT1	.24	4.10
	HumIT2	.20	4.96
	InfSh1	.27	3.69
	InfSh2	.31	3.24
LIC	Std1	.26	3.81
	Std2	.22	4.64
	Crssfn1	.21	4.80
	Crssfn2	.18	5.68
	CIntg1	.29	3.48
	CIntg2	.23	4.36
	SIntg1	.20	4.93
	SIntg2	.19	5.21
FP	Proft1	.33	3.06
	Proft2	.23	4.44
	MkShr1	.27	3.75
	MkShr2	.17	5.87
	CStf1	.40	2.52
	CStf2	.29	3.40
	EStf1	.36	2.79
	EStf2	.52	1.93

4.6.3 Construct Validity

The construct validity is the evaluation of the degree of which the test is actually measuring the theoretical construct it claims and attempts to measure. The construct validity is divided into 2 categories convergent validity, and discriminant validity.

The convergent validity is the test whether constructs that are expected to be related are in fact, related to the others. The discriminant validity is the test whether constructs that should have not related is in fact, do not have relationship.

Convergent validity assessed the extent that the indicators could represent the construct, in the other words, convergent validity examines the degree to which the measurement is similar to other measurements. In this study, convergent validity had been evaluated through factor loadings. The factor loadings of all items should be exceeding 0.6.

Confirmatory Factor Analysis (CFA) is used to evaluate relationship between variables with the priority in evaluating the relationship pattern of the variables in the model. CFA is an evaluation whether the set of variables are good representatives for the construct (Hair et al., 2010). The assessment indicators include *p*-value (Chi-square Probability Level), $\chi 2$/df or CMIN/df (Relative Chi-square), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit index), RMR (Root Mean Square Residual), RMSEA (Root Mean Square Error of Approximation), NFI (Normed Fit Index) and CFI (Comparative Fit Index). The *p*-value should be significantly associated with each loading. The $\chi 2$/df value should be less than 2.0. The values of GFI, NFI and CFI should be higher than 0.90 and AGFI should be higher than 0.80 (Hu & Bentler, 1999), the Value of RMSEA should be lower than 0.10, RMR value should be close to zero and the Hoelter's Critical N (CN) for a significance level of .05 and .01, Hoelter suggests that a critical N of 200 or better indicates a satisfactory fit. If the aforementioned criteria are met, the CFA would be considered as data-fit model.

The criterion of Fornell and Larcker (1981), which has been commonly used to assess the degree of shared variance between the latent variables of the model, suggested that the convergent validity of the measurement model can be assessed by the Average Variance Extracted (AVE) and Composite Reliability (CR).

AVE measures the level of variance captured by a construct versus the level due to measurement error, (Fornell & Larcker, 1981; Hair et al., 2010). AVE is calculated using the formula as follows:

$$\text{AVE} = \frac{\sum_{i=0}^{n} Li^2}{\text{n}} > 0.5$$

The evaluation of convergent validity is done through CFA. The observed variables can be considered a good representative of the construct if the factor loading value is higher than 0.6. Further, the AVE value above 0.7 is considered very well accepted, whereas, the level of 0.5 is acceptable. CR is a less biased estimate of reliability than Cronbach's alpha, the acceptable value of CR is 0.7 and above (Fornell & Larcker, 1981).

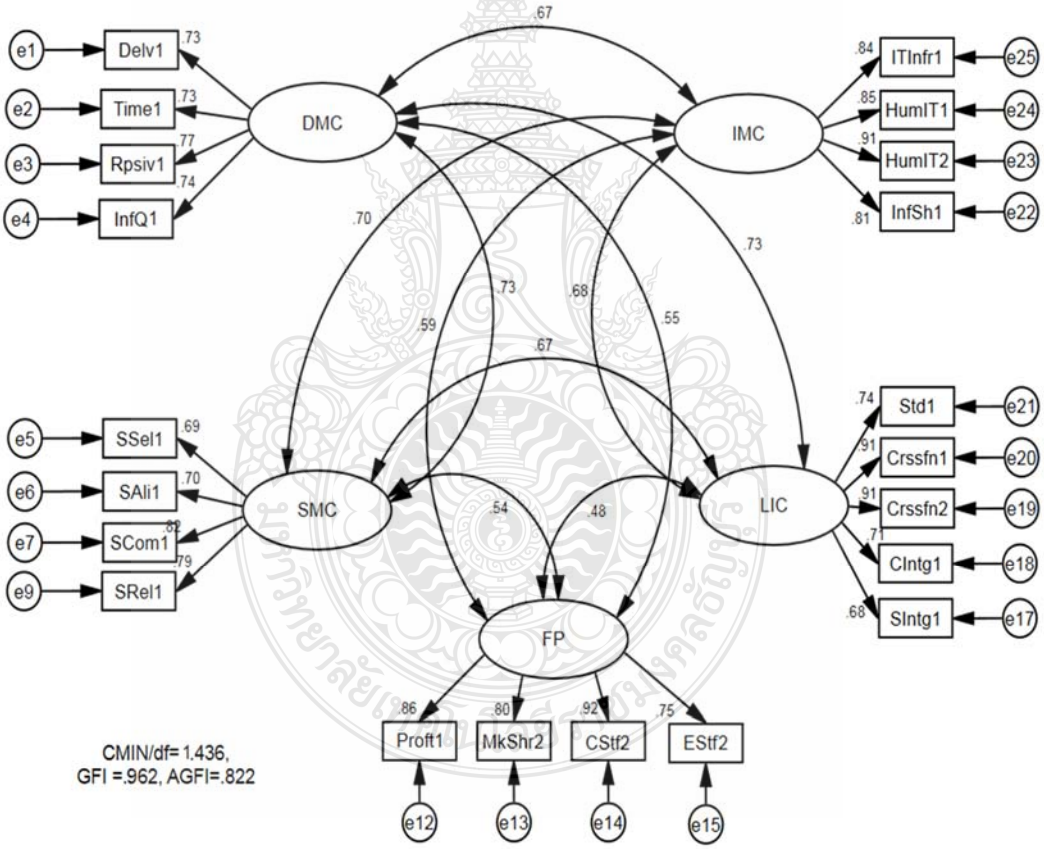


Figure 4.1 Measurement Model

The CMIN/df value was 1.436, GFI value was 0.962, AGFI value was 0.822, and the RMSEA is 0.075, as well as other fit indices such as RMR at 0.103, NFI at

0.907, CFI at 0.923, and Hoelter's CN at 224 which were within the acceptable level, with the *p*-value at <0.001.

4.6.4 Convergent Validity Testing

The table 4.12 to 4.16 indicated the assessment of Convergent Validity.

Table 4.12 Factor loading, R^2, Composite Reliability, Average Variance Extracted of Independent Variables of DMC

Variables	Factor loading	R^2	Composite Reliability	AVE
DMC			0.831	0.552
Delv1	0.73	0.53		
Time1	0.73	0.53		
Rpsiv1	0.77	0.59		
InfQ1	0.74	0.55		

DMC construct had factor loadings values ranged from 0.73 to 0.77, which were all higher than 0.6, and the item R^2 values ranged from 0.53 to 0.59, which were within the acceptable range. Composite reliability at 0.831 and the AVE value at 0.552 indicated construct reliability.

Table 4.13 Factor loading, R^2, Composite Reliability, Average Variance Extracted of Independent Variables of SMC

Variables	Factor loading	R^2	Composite Reliability	AVE
SMC			0.838	0.566
SSel1	0.69	0.47		
SAli1	0.70	0.49		
SCom1	0.82	0.68		
SRel1	0.79	0.62		

SMC construct had factor loadings values ranged from 0.69 to 0.82, which were all higher than 0.6, and the item R^2 values ranged from 0.47 to 0.68, which were within the acceptable range. Composite reliability at 0.838 and the AVE value at 0.566 indicated construct reliability.

Table 4.14 Factor loading, R^2, Composite Reliability, Average Variance Extracted of Independent Variables of IMC

Variables	Factor loading	R^2	Composite Reliability	AVE
IMC			0.914	0.728
ITInfr1	0.84	0.70		
HumIT1	0.85	0.73		
HumIT2	0.91	0.83		
InfSh1	0.81	0.65		

IMC construct had factor loadings values ranged from 0.81 to 0.91, which were all higher than 0.6, and the item R^2 values ranged from 0.65 to 0.83, which were within the acceptable range. Composite reliability at 0.914 and the AVE value at 0.728 indicated construct reliability.

Table 4.15 Factor loading, R^2, Composite Reliability, Average Variance Extracted of Mediating Variables of LIC

Variables	Factor loading	R^2	Composite Reliability	AVE
LIC			0.895	0.634
Std1	0.74	0.55		
Crssfn1	0.91	0.83		
Crssfn2	0.91	0.83		
CIntg1	0.71	0.50		
SIntg1	0.68	0.46		

LIC construct had factor loadings values ranged from 0.68 to 0.91, which were all higher than 0.6, and the item R^2 values ranged from 0.46 to 0.83, which were within the acceptable range. Composite reliability at 0.895 and the AVE value at 0.634 indicated construct reliability.

Table 4.16 Factor loading, R^2, Composite Reliability, Average Variance Extracted of Dependent Variables of FP

Variables	Factor loading	R^2	Composite Reliability	AVE
FP			0.902	0.697
Proft1	0.86	0.74		
MkShr2	0.80	0.64		
CStf2	0.92	0.84		
EStf2	0.75	0.56		

FP construct had factor loading values ranged from 0.75 to 0.92, which were all higher than 0.6, and the item R^2 values ranged from 0.56 to 0.84, which were within the acceptable range. Composite reliability at 0.902 and the AVE value at 0.697 indicated construct reliability.

4.6.5 Discriminant Validity Testing

Discriminant validity testing is an evaluation to confirm that observed variable represents on the same latent variable and is not associated with other observed variable of the other latent variables. This proves that the construct is unique and captures some phenomena that are not similar to other constructs. The correlation coefficient should be between ≥0.2 to 1.0 (Hair et al., 2010), whereby the coefficient from the model ranged from 0.485 to 0.734. The discriminant validity testing is done through the comparison between the value of square root of AVE and the correlation coefficient, the discriminant validity was assessed based on the following criteria from Fornell and Larcker (1981).

$$\sqrt{\text{AVE}} > r^2 \text{ (correlation)}$$

The results showed that the values supported the discriminant validity as shown in table 4.17. The value of square root of AVE for each construct was greater than the level of correlation coefficient involving the construct.

Table 4.17 Comparison of Square Root of AVE with Correlations between Constructs

	DMC	SMC	IMC	LIC	FP
DMC	**0.742**				
SMC	0.725	**0.752**			
IMC	0.675	0.702	**0.853**		
LIC	0.734	0.666	0.684	**0.796**	
FP	0.546	0.543	0.485	0.593	**0.834**

(square root of AVE on diagonal)

4.6.6 Second order Confirmatory Factor Analysis for Logistics Integration Capabilities

Logistics integration capabilities was the mediating variable for this study, LIC had 4 dimensions of measurement (LIC1, LIC2, LIC3, LIC4) and were evaluated with CFA for goodness-of-fit in the model.

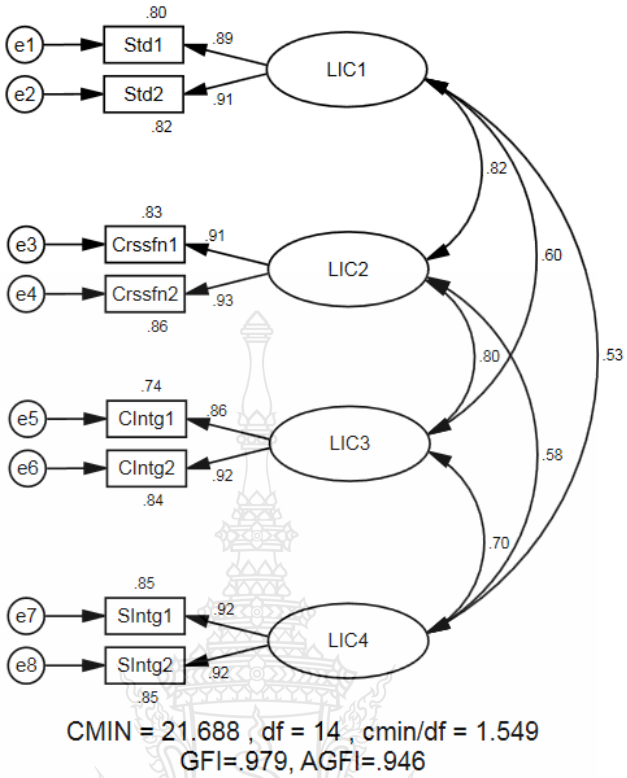


Figure 4.2 Second Order Measurement Model

Table 4.18 Factor loading, R^2, Composite Reliability, Average Variance Extracted of Second Order Analysis

LIC	Item	Factor loading	R^2	Composite Reliability	AVE
LIC1	Std1	0.89	0.80	0.895	0.810
	Std2	0.91	0.83		
LIC2	Crssfn1	0.91	0.83	0.917	0.847
	Crssfn2	0.93	0.86		
LIC3	CIntg1	0.86	0.74	0.884	0.627
	CIntg2	0.92	0.84		
LIC4	SIntg1	0.92	0.85	0.917	0.723
	SIntg2	0.92	0.85		

All dimensions of LIC had been assessed for the second order CFA for model acceptability. The results showed that factor loadings values ranged from 0.86 to 0.93, which were all higher than 0.6, and the item R^2 values ranged from 0.74 to 0.86 which were within the acceptable range. Composite reliability ranged from 0.884 to 0.917 indicated construct reliability. The AVE values ranged from 0.627 to 0.847 also indicated good reliability.

The values of square root of AVE ranged from 0.791 to 0.920 and were greater than the level of correlation involving the construct, this also indicated construct reliability (as shown in table 4.19).

Table 4.19 Comparison of Square Root of AVE with Correlations of LIC Dimensions

	LIC1	**LIC2**	**LIC3**	**LIC4**
LIC1	**0.900**			
LIC2	0.820	**0.920**		
LIC3	0.600	0.800	**0.791**	
LIC4	0.529	0.581	0.696	**0.850**

(square root of AVE on diagonal)

The CMIN/df value was 1.549, GFI value was 0.946, AGFI value was 0.831, and the RMSEA was 0.046, as well as the other fit indices such as RMR (0.027), NFI (0.988), CFI (0.996), and Hoelter's CN (344), were all within the acceptable level, with the *p*-value at <0.001, indicated the model fit.

Table 4.20 Summary of Items Used in the Hypothesized Model Analysis

Construct	Observed Variable	Item	Decision
Demand Management Capabilities (DMC)	Delivery	Delv1	Kept
		Delv2	Dropped
	Timeliness	Time1	Kept
		Time2	Dropped
	Customer	Rpsiv1	Kept
	Responsiveness	Rpsiv2	Dropped
	Customer Info	InfQ1	Kept
	Quality	InfQ2	Dropped
Supply Management Capabilities (SMC)	Supplier Selection	SSel1	Kept
		SSel2	Dropped
	Strategic Supplier	SAli1	Kept
	Alliances	SAli2	Dropped
	Communication	SCom1	Kept
		SCom2	Dropped
	Relationship	SRel1	Kept
		SRel2	Dropped
Information Management Capabilities (IMC)	IT Infrastructure	ITInfr1	Kept
		ITInfr2	Dropped
	Human IT Resource	HumIT1	Kept
		HumIT2	Kept
	Information Sharing	InfSh1	Kept
		InfSh2	Dropped
Logistics Integration Capabilities (LIC)	Standardization	Std1	Kept
		Std2	Kept
	Cross-functional	Crssfn1	Kept
	Integration	Crssfn2	Kept
	Customer	CIntg1	Kept
	Integration	CIntg2	Kept
	Supplier Integration	SIntg1	Kept

Table 4.20 Summary of Items Used in the Hypothesized Model Analysis (Cont.)

Construct	Observed Variable	Item	Decision
		SIntg2	Kept
Firm Performance	Profitability	Proft1	Kept
(FP)		Proft2	Dropped
	Market Share	MkShr1	Dropped
		MkShr2	Kept
	Customer	CStf1	Dropped
	Satisfaction	CStf2	Kept
	Employee	EStf1	Dropped
	Satisfaction	EStf2	Kept

4.7 Analysis of the Proposed Structural Model

This section presented the analysis of the proposed model through SEM analysis in order to test the hypotheses and identify the answers for research questions set forth.

A goodness-of-fit test was carried out as to measure how well the observed data corresponded to the proposed model.

For this study, the two structural models had been proposed. The Structural Model One was to evaluate the direct effects of the constructs and variables, and the Structural Model Two was to evaluate the direct effects and indirect effects of the constructs and variables through the mediating variables.

4.7.1 Structural Model One

The Structural Model One or Direct Effects model was to examine the relationships between demand management capabilities, supply management capabilities, and information management capabilities and firm performance (see figure 4.3).

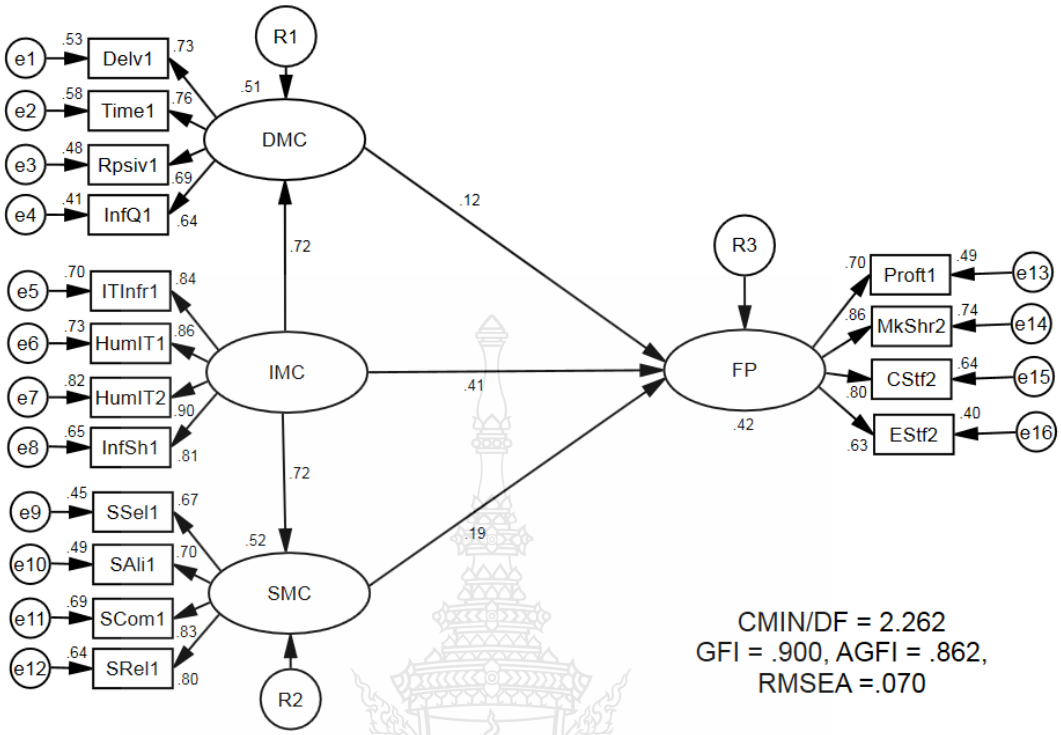


Figure 4.3 Structural Model One

The Structural Model One was to investigate the direct effects of DMC, SMC, and IMC on FP.

The goodness-of-fit assessment results were as follows: Chi-Square = 233.908, df = 99, Chi-Square/Degree of freedom = 2.262, *p*-value = .071, GFI = 0.900, AGFI = 0.862, RMR = 0.096, RMSEA = 0.070 (PCLOSE = 0.004), NFI = 0.907, CFI = 0.945, and Hoelter's CN = 154 (0.01).

The summary and the comparison with the acceptable level for each value, as shown in table 4.21.

Table 4.21 Model Fit Analysis for Structural Model One

Model Fit Criteria	Value	Acceptable level
Chi-Square ($\chi 2$)	233.908	-
Degree of freedom (df)	99	-
$\chi 2$/df	2.262	< 2.0
p-value	0.071	$p > 0.05$
GFI	0.900	> 0.90
AGFI	0.862	> 0.80
RMR	0.096	close to zero
RMSEA	0.070	< 0.10
NFI	0.907	> 0.90
CFI	0.945	> 0.90
Hoelter's critical N	154	> 200

The results suggested that the model did not meet the criteria of model fit as some of the indicators were still unfavorable to the acceptable level. The Chi-Square/ Degree of freedom was 2.262 vs. the acceptable level at < 2.0. The model was adjusted by using modification indices, the covariance between residual errors: e2-e3, e6-e7, and e9-e10 had been added. The criteria after modification were met and indicated model fit, as followed: Chi-Square = 189.23, df = 96, Chi-Square/Degree of freedom = 1.971, *p*-value = .071, GFI = 0.918, AGFI = 0.884, RMR = 0.083, RMSEA = 0.062 (PCLOSE = 0.070), NFI = 0.921, CFI = 0.959, and Hoelter's CN = 221 (0.01).

The summary and the comparison with the acceptable level for each value, as shown in table 4.22.

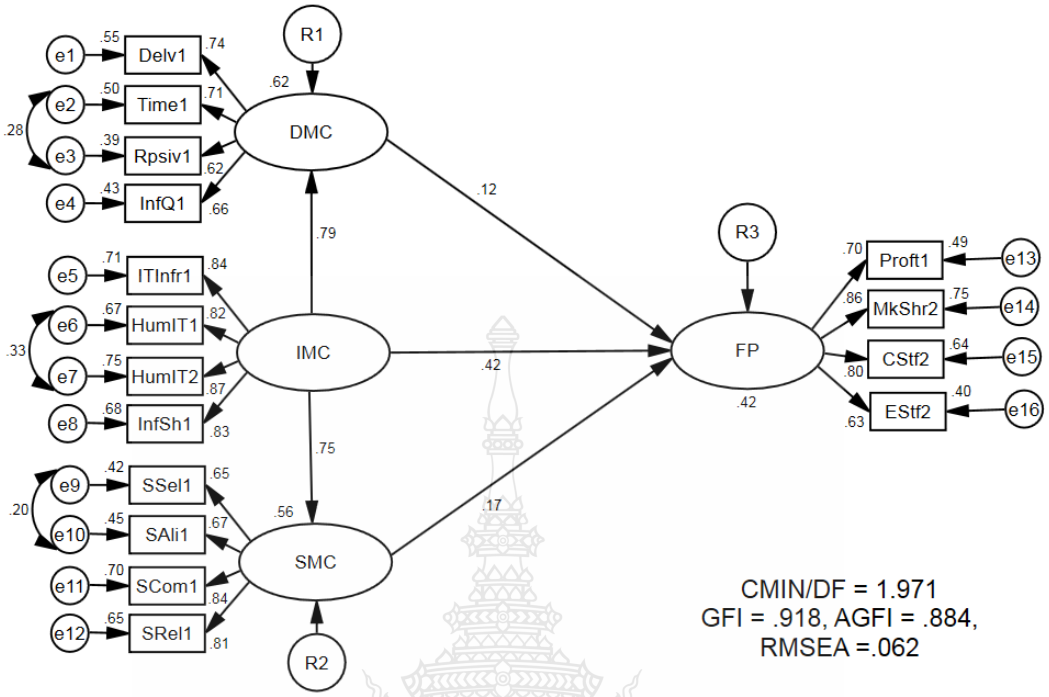


Figure 4.4 Structural Model One (with Modification Indices)

Table 4.22 Model Fit Analysis for Structural Model One (with Modification Indices)

Model Fit Criteria	**Value**	**Acceptable level**
Chi-Square ($\chi 2$)	189.230	-
Degree of freedom (df)	96	-
$\chi 2$/df	1.971	< 2.0
p-value	0.071	$p > 0.05$
GFI	0.918	> 0.90
AGFI	0.884	> 0.80
RMR	0.083	Close to zero
RMSEA	0.062	< 0.10
NFI	0.921	> 0.90
CFI	0.959	> 0.90
Hoelter's critical N	221	> 200

The analysis of Structural Model One, the results showed direct relationship between SMC and FP at $\beta = 0.165$ ($p<0.05$), however, there was no direct relationship

between DMC and FP at $\beta = 0.117$ ($p = 0.35$). As for the relationship between IMC and FP, it showed direct relationship at $\beta = 0.419$ ($p<0.01$).

The results also suggested that IMC affects DMC and SMC due to the positive relationships at $\beta = 0.789$ ($p<0.001$) and $\beta = 0.745$ ($p<0.001$) respectively.

Table 4.23 Hypotheses Testing for Structural Model One

			Estimate	S.E.	C.R.	*p*-value
H1: DMC	→	FP	0.117	0.143	1.148	0.355
H2: SMC	→	FP	0.165	0.117	2.040	*
H3: IMC	→	FP	0.419	0.136	3.102	**
H4a: IMC	→	DMC	0.789	0.057	9.971	***
H4b: IMC	→	SMC	0.745	0.066	9.445	***

***p-value < 0.001 (statistical significance at 0.001 level)
** p-value < 0.01 (statistical significance at 0.01 level)
* p-value < 0.05 (statistical significance at 0.05 level)

4.7.2 Structural Model Two

The Structural Model Two or Mediation model was to examine the relationships between demand management capabilities, supply management capabilities, and information management capabilities with firm performance through logistics integration capabilities as the mediating variable (see figure 4.5).

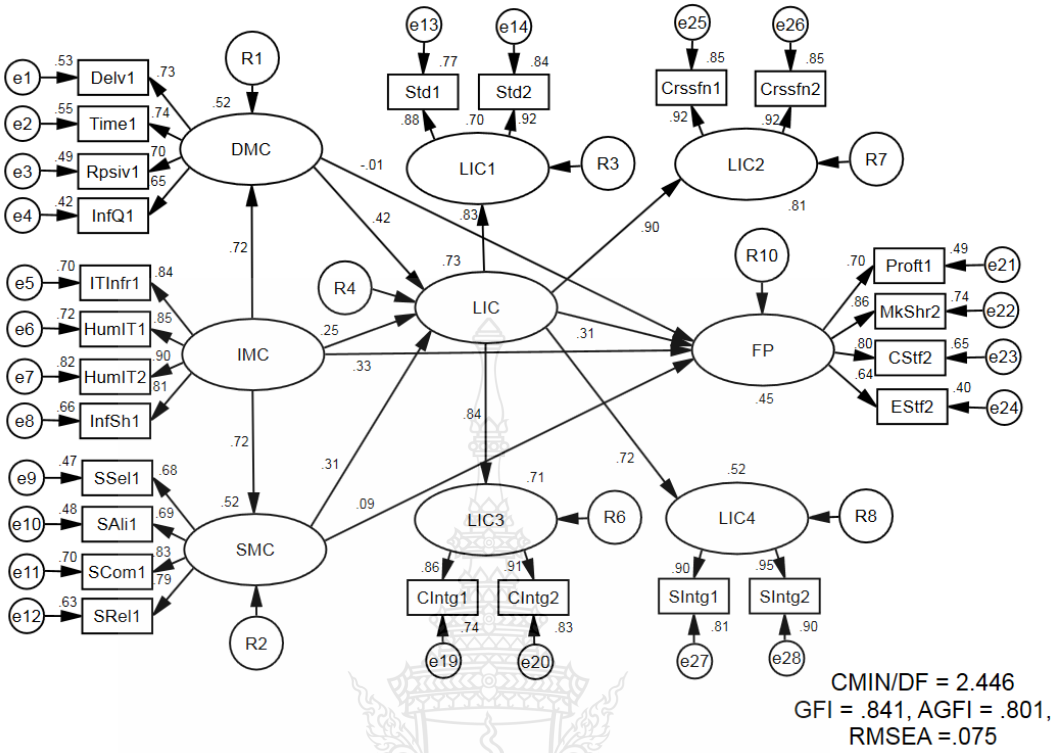


Figure 4.5 Structural Model Two

The Structural Model Two was to investigate the direct effects of DMC, SMC, and IMC on FP and the indirect effects of DMC, SMC, and IMC on FP through LIC as the mediating variables.

The goodness-of-fit assessment results were as follows: Chi-Square = 584.577, df = 239, Chi-Square/Degree of freedom = 2.446, *p*-value = .055, GFI = 0.841, AGFI = 0.801, RMR = 0.103, RMSEA = 0.075 (PCLOSE = 0.087), NFI = 0.875, CFI = 0.921, and Hoelter's CN = 129 (0.01), the summary and the comparison with the acceptable level for each value, as shown in table 4.24.

Table 4.24 Model Fit Analysis for Structural Model Two

Model Fit Criteria	**Value**	**Acceptable level**
Chi-Square ($\chi 2$)	584.577	-
Degree of freedom (df)	239	-
$\chi 2$/df	2.446	< 2.0
p-value	0.055	$p > 0.05$
GFI	0.841	> 0.90
AGFI	0.801	> 0.80
RMR	0.103	close to zero
RMSEA	0.075	< 0.10
NFI	0.875	> 0.90
CFI	0.921	> 0.90
Hoelter's critical N	129	> 200

The results suggested that the model did not meet the criteria of model fit as some of the indicators were still unfavorable to the acceptable level. The Chi-Square/ Degree of freedom was 2.446 vs. the acceptable level at < 2.0. The GFI value was 0.841 against the acceptable level at > 0.90. The model was adjusted by using modification indices, the covariance between residual errors: e2- e3, e2 -e4, e5-e6, e6-e7, e9-e10, and e9-e12 were added. The criteria after modification were met and indicated model fit, as followed: Chi-Square = 438.273, df = 233, Chi-Square/Degree of freedom = 1.976, *p*-value = .055, GFI = 0.907, AGFI = 0.814, RMR = 0.070, RMSEA = 0.070 (PCLOSE = 0.000), NFI = 0.887, CFI = 0.933, and Hoelter's CN = 232 (0.01).

The summary and the comparison with the acceptable level for each value, as shown in table 4.25.

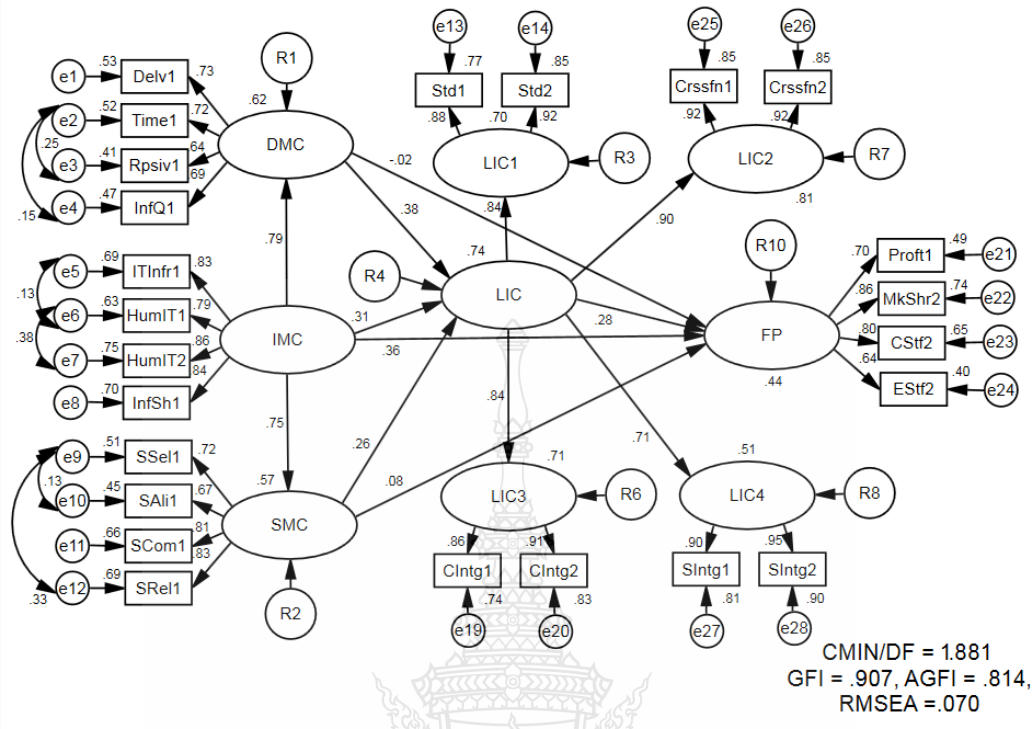


Figure 4.6 Structural Model Two (with Modification Indices)

Table 4.25 Model Fit Analysis for Structural Model Two (with Modification Indices)

Model Fit Criteria	**Value**	**Acceptable level**
Chi-Square ($\chi 2$)	438.273	-
Degree of freedom (df)	233	-
$\chi 2$/df	1.881	< 2
p-value	0.055	$p > 0.05$
GFI	0.907	> 0.90
AGFI	0.814	> 0.80
RMR	0.070	close to zero
RMSEA	0.070	< 0.10
NFI	0.887	> 0.90
CFI	0.933	> 0.90
Hoelter's critical N	232	> 200

The analysis of Structural Model Two indicates that there was no direct relationship between DMC and FP (β = 0.019, p = 0.893), and as well, there was no direct relationship between SMC and FP (β = 0.084, p = 0.432), the relationships between DMC and FP and SMC and FP were statistical insignificant. However, the result indicated that there was a direct relationship between IMC and FP (β = 0.365, p< 0.05).

As for the relationships between IMC and other logistics capabilities, which were DMC and SMC. The results showed that there was direct relationship between IMC and DMC at β = 0.790 (p<0.01) and also, there was a direct relationship between IMC and SMC at β = 0.752 (p<0.01), these suggested that information management capabilities affected demand management capabilities and supply management capabilities.

DMC, SMC, and IMC were also found to have direct relationships with LIC, the results showed that there was direct relationship between DMC and LIC at β = 0.384 (p<0.001) and there was direct relationship between SMC and LIC at β = 0.262 (p<0.01). There was also direct relationship between IMC and LIC at β = 0.308 (p<0.05). These indicated that logistics integration capabilities were affected by demand management capabilities, supply management capabilities, and information management capabilities.

As for the relationship between LIC and FP, the results indicated direct relationship at β = 0.281 (p<0.05), this suggested that logistics integration capabilities affected firm performance.

Table 4.26 Hypotheses Testing for Structural Model Two

				Estimate	S.E.	C.R.	*p*-value
H1:	DMC	→	FP	0.019	0.176	0.032	0.893
H2:	SMC	→	FP	0.084	0.123	0.799	0.432
H3:	IMC	→	FP	0.365	0.134	2.439	*
H4a:	IMC	→	DMC	0.790	0.057	9.965	***
H4b:	IMC	→	SMC	0.752	0.065	9.549	***
H5:	DMC	→	LIC	0.384	0.112	4.544	***
H6:	SMC	→	LIC	0.262	0.081	4.060	**
H7:	IMC	→	LIC	0.308	0.093	2.225	*
H8:	LIC	→	FP	0.281	0.158	2.390	*

***p-value < 0.001 (statistical significance at 0.001 level)
** p-value < 0.01 (statistical significance at 0.01 level)
* p-value < 0.05 (statistical significance at 0.05 level)

4.8 Summary of Structural Model Analysis

The two structural models were developed as to compare the mediating effect of the mediator (Mackinnon & Sherry, 2012), where the mediator for this study was LIC. Structural Model One (Direct Effects model) was analyzed without the presence of LIC, while Structural Model Two (Mediation model) was analyzed with the presence of LIC. Ideally, the path coefficient should get smaller with the mediator being added into the model (Preacher & Hayes, 2008). The comparison of the path coefficients between the two models showed that the path coefficient between DMC and FP which was 0.117 (p>0.05) in model one, had become smaller to 0.019 (p>0.05) with the presence of the mediator in model two. The path coefficient between SMC and FP had become smaller from 0.165 (p<0.05) to 0.084 (p>0.05) and the path coefficient between IMC and FP had also become smaller from 0.419 (p<0.05) to 0.365 (p<0.05).

Additionally, for the analysis whether full or partial mediation occurred in the model. Preacher and Hayes (2008) suggested that full mediating effect occurred when

mediator being added into the model and the indirect path remained significant but the direct path turned insignificant. On the other hand, partial mediating effect occurred when both direct and indirect path remained significant. The results showed that, with the presence of the LIC as the mediator, the indirect path between DMC and FP remained significant with path coefficient $\beta = 0.665$ ($p<0.001$) but the direct path turned insignificant with the path coefficient $\beta = 0.019$ ($p>0.05$). Likewise, the indirect path between SMC and FP remained significant with path coefficient $\beta = 0.573$ ($p<0.001$) but the direct path turned insignificant with the path coefficient $\beta = 0.084$ ($p>0.05$). However, the indirect path between IMC and FP remained significant with path coefficient $\beta = 0.589$ ($p<0.05$) and the direct path also remained significant with the path coefficient $\beta = 0.365$ ($p<0.05$). The results indicated that the relationship between DMC and FP had been fully mediated by LIC, as well as, the relationship between SMC and FP had also been fully mediated by LIC. However, the relationship between IMC and FP had been partially mediated by LIC. The comparison of the path coefficients between Structural Model One and Structural Model Two as shown in table 4.27.

Table 4.27 Comparison of the Path Coefficients between Structural Model One and Structural Model Two

					Model 1 (β)	**Model 2 (β)**
DMC	→	FP			0.117	0.019
SMC	→	FP			0.165*	0.084
IMC	→	FP			0.419**	0.365*
DMC	→	LIC	→	FP	-	0.665***
SMC	→	LIC	→	FP	-	0.573***
IMC	→	LIC	→	FP	-	0.589*

***p-value < 0.001 (statistical significance at 0.001 level)
** p-value < 0.01 (statistical significance at 0.01 level)
* p-value < 0.05 (statistical significance at 0.05 level)

The standardized direct, indirect and total effect coefficients and the R^2 associated with the SEM as shown in table 4.28.

Table 4.28 Standardized Direct, Indirect and Total Effects among Variables

	Standardized Direct Effect						Standardized Indirect Effect					Standardized Total Effects				
	R^2	DMC	SMC	IMC	LIC	FP	DMC	SMC	IMC	LIC	FP	DMC	SMC	IMC	LIC	FP
DMC	.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SMC	.57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IMC	-	.790	.752	-	-	-	-	-	-	-	-	.790	.752	-	-	-
LIC	.74	.384	.262	.808	-	-	-	-	-	-	-	.384	.262	.808	-	-
FP	.44	.019	.084	.365	.281	-	.108	.074	.275	-	-	.127	.158	.640	.281	-

The structural model exhibited reasonable predictive ability and explained 62 percent of the variance in DMC, 57 percent of the variance in SMC, 74 percent of the variance in LIC and 44 percent of the variance in FP.

4.9 Hypotheses Testing

The following research questions were raised in the earlier discussion whether: do firm's logistics capabilities and firm performance relate, do information management capabilities facilitate other logistics capabilities, and do logistics integration capabilities mediate logistics capabilities and firm performance.

Therefore, the following hypotheses were proposed:

H1: There is a positive relationship between demand management capabilities and firm performance of the food processing companies in Thailand.

H2: There is a positive relationship between supply management capabilities and firm performance of the food processing companies in Thailand.

H3: There is a positive relationship between information management capabilities and firm performance of the food processing companies in Thailand.

H4a: Information management capabilities facilitate demand management capabilities.

H4b: Information management capabilities facilitate supply management capabilities.

H5: Demand management capabilities positively affect logistics integration capabilities.

H6: Supply management capabilities positively affect logistics integration capabilities.

H7: Information management capabilities positively affect logistics integration capabilities.

H8: Logistics integration capabilities have positive impact on performance of the food processing companies in Thailand.

4.9.1 Hypothesis H1 Testing

H1: There is a positive relationship between demand management capabilities and firm performance of the food processing companies in Thailand.

The analysis of the relationship between demand management capabilities (DMC) and firm performance (FP) indicated that there was no direct relationship between DMC and FP. The results indicated that the path coefficient between DMC and FP was low (β = 0.019), standard error was 0.176, critical ratio was 0.032 and the *p*-value was greater than 0.05. The factor loadings values for each item of the observed variables, which were effective delivery system, fulfill customer's order on time, understand customer's requirement, and customer's real time access to product information were 0.73, 0.73,0.77 and 0.74 respectively. It was found that the *p*-value which was a means to measure the evidence against the null hypothesis, whereby the smaller the *p*-value indicated stronger evidence against the null. The *p*-value for this relationship was greater than 0.05, this suggested that there was no statistical significance, therefore no direct relationship between DMC and FP which indicated that hypothesis H1 was not supported.

Considering the observed variables used for DMC construct, which were delivery reliability, timeliness, customer responsiveness, and customer information quality, all these aspects might not have direct influence with the performance of the food processing companies in Thailand, but rather these aspects might need to be leveraged or collaborated with firm's other capabilities in order to create the value and might consequently affect the firm performance.

4.9.2 Hypothesis H2 Testing

H2: There is a positive relationship between supply management capabilities and firm performance of the food processing companies in Thailand.

The analysis of the relationship between supply management capabilities (SMC) and firm performance (FP) indicated that there was no direct relationship between SMC and FP. The results indicated that the path coefficient between SMC and FP was 0.084, standard error was 0.123, critical ratio was 0.799 and the *p*-value was greater than 0.05. The factor loadings values for each item of the observed variables,

which were logistics capability based for supplier selection, supplier's involvement for strategic decision, information exchange with supplier, and supplier works as extended functions of the company were 0.69, 0.70, 0.82, and 0.79 respectively. It was found that the *p*-value which was a means to measure the evidence against the null hypothesis, whereby the smaller the *p*-value indicated stronger evidence against the null. The *p*-value for this relationship was greater than 0.05, this suggested that there was no statistical significance, therefore no direct relationship between SMC and FP which indicated that hypothesis H2 was not supported.

Considering the observed variables used for SMC construct, those were supplier selection, strategic supplier alliances, communication, and relationship, these aspects might be with similar characteristics as demand management capabilities where all these aspects may not have direct influent with the performance of the food processing companies in Thailand, but rather these aspects might need to be identified, leveraged or collaborate with firm's other capabilities in order to create firm's competitive advantage and might consequently affect the firm performance.

4.9.3Hypothesis H3 Testing

H3**:** There is a positive relationship between information management capabilities and firm performance of the food processing companies in Thailand**.**

The analysis of the relationship between information management capabilities (IMC) and firm performance (FP) indicated that there was a direct and positive relationship between IMC and FP**.** The results indicated that the path coefficient between IMC and FP was 0**.**365, standard error was 0**.**134, critical ratio was 2**.**439 and the *p*-value was lower than 0**.**05**.** The factor loadings values for each item of the observed variables, which were IT infrastructure for real data, competent IT expertise, well alignment of IT expertise and business strategy, and effective information sharing between departments were 0**.**84, 0**.**85, 0**.**91, and 0**.**81 respectively**.** It was found that the *p*-value which was a means to measure the evidence against the null hypothesis, whereby the smaller the *p*-value indicated stronger evidence against the null. The *p*-value for this relationship was lower than 0.05, this suggested that there was statistical

significance, therefore there was a direct relationship between IMC and FP which indicated that hypothesis H3 was supported.

Considering the observed variables used for IMC construct, those were IT infrastructure, Human IT resource, and Information sharing, these aspects of information management capabilities play crucial roles in strategic management, the effective use of information had both direct and indirect effect on firm performance, it was also found that better information management capabilities enabled firm to capture information about customers, improved knowledge on customer demand and allowed necessary coordination with suppliers. Technical and managerial IT skills with the information sharing capabilities improved firm's competitive advantage as well as increased the firm performance.

4.9.4 Hypothesis H4a and H4b Testing

H4a: Information management capabilities facilitate demand management capabilities.

H4b: Information management capabilities facilitate supply management capabilities.

The analysis whether information management capabilities (IMC) had a positive relationship with demand management capabilities (DMC) and supply management capabilities (SMC), the results indicated that IMC had significant direct relationship with both DMC and SMC. The path coefficient between IMC and DMC was 0.790, while the path coefficient between IMC and SMC was 0.752. The standard errors were 0.057 and 0.065 and the critical ratios were 9.965 and 9.549 for DMC and SMC respectively. The *p*-value was lower than 0.001 for both DMC and SMC indicated that relationship between IMC with DMC and SMC were statistically significant, therefore, the hypotheses H4a and H4b were supported.

Considering the observed variables used for IMC construct, which were IT infrastructure, Human IT resource, and Information sharing, the observed variables used for DMC construct, which were delivery reliability, timeliness, customer responsiveness, and customer information quality, and observed variables used for SMC construct, which were supplier selection, strategic supplier alliances, communication,

and relationship. These observed variables complemented each other which resulted with significant relationship among the three constructs.

4.9.5 Hypothesis H5 Testing

H5: Demand management capabilities positively affect logistics integration capabilities.

The analysis of the relationship between demand management capabilities (DMC) and logistics integration capabilities (LIC) indicated that there was direct relationship between DMC and LIC. The results indicated that the path coefficient between DMC and LIC was 0.384, standard error was 0.112, critical ratio was 4.544 and the *p*-value was lower than 0.001. LIC served as mediator for the model with the following items: standardized logistics with common procedures, logistical operations on standard manner, extensive utilization of cross functional work teams, integrate and reduce formal operational structure, joint effort for new market opportunity, cost information sharing with supplier, and strategic information sharing with supplier. The path coefficient and the *p*-value indicated significant relationship with between DMC and LIC, which also indicated that DMC positively affected LIC. Therefore, the hypothesis H5 was supported.

4.9.6 Hypothesis H6 Testing

H6: Supply management capabilities positively affect logistics integration capabilities.

The analysis of the relationship between supply management capabilities (SMC) and logistics integration capabilities (LIC) indicated that there was direct relationship between SMC and LIC. The results indicated that the path coefficient between DMC and LIC was 0.262, standard error was 0.081, critical ratio was 4.060 and the *p*-value was lower than 0.01. As mentioned in the earlier section that LIC served as mediator for the model with the following items: standardized logistics with common procedures, logistical operations on standard manner, extensive utilization of cross functional work teams, integrate and reduce formal operational structure, joint effort for new market opportunity, cost information sharing with supplier, and strategic information sharing with supplier. The path coefficient and the *p*-value indicated

significant direct relationship between SMC and LIC, which also indicated that SMC positively affected LIC. Therefore, the hypothesis H6 was supported.

4.9.7 Hypothesis H7 Testing

H7: Information management capabilities positively affect logistics integration capabilities.

The analysis of the relationship between information management capabilities (IMC) and logistics integration capabilities (LIC) indicated that there was direct relationship between IMC and LIC. The results indicated that the path coefficient between IMC and LIC was 0.308, standard error was 0.093, critical ratio was 2.225 and the *p*-value was lower than 0.05. The path coefficient and the *p*-value indicated significant direct relationship between IMC and LIC, which also indicated that IMC positively affected LIC. Therefore, the results suggested that hypothesis H7 was supported.

4.9.8 Hypothesis H8 Testing

H8: Logistics integration capabilities have positive impact on performance of the food processing companies in Thailand.

The analysis of the relationship between logistics integration capabilities (LIC) and firm performance (FP) indicated that there was a positive relationship between LIC and FP. The results indicated that the path coefficient between LIC and FP was 0.281, standard error was 0.158, critical ratio was 2.390 and the *p*-value was lower than 0.05. The factor loading values for each item of the observed variables, those were profitability over last three years, better competitive position than the same industry, better customer retention rate than the same industry, and lower employee's turnover rate than the same industry was 0.86, 0.80, 0.92, and 0.75 respectively. These values indicated significant positive relationship between logistics integration capabilities and firm performance and therefore, the hypothesis H8 was supported.

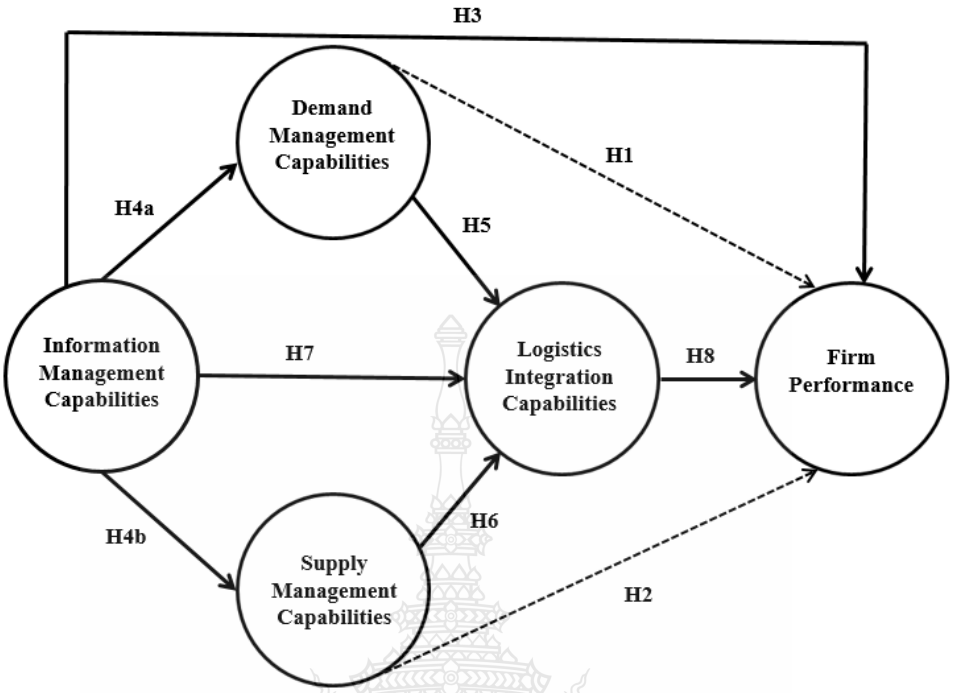
Firm performance was the dependent variable of the model, observed variables for firm performance measurement had become the greatest challenges for strategic management research due to the wide variety of concept and definition of firm performance. Observed variables used for this study were profitability, market share,

customer satisfaction, and employee satisfaction, all these aspects of firm performance had been thoroughly reviewed from the earlier relevant studies and were chosen to represent as good measurement for firm performance construct.

The summary of hypotheses testing as shown in table 4.29.

Table 4.29 Results of Hypotheses Testing

Hypothesis	Result
H1: There is a positive relationship between demand management capabilities and firm performance of the food processing companies in Thailand.	Not Supported
H2: There is a positive relationship between supply management capabilities and firm performance of the food processing companies in Thailand.	Not Supported
H3: There is a positive relationship between information management capabilities and firm performance of the food processing companies in Thailand.	Supported
H4a: Information management capabilities facilitate demand management capabilities.	Supported
H4b: Information management capabilities facilitate supply management capabilities.	Supported
H5: Demand management capabilities positively affect logistics integration capabilities.	Supported
H6: Supply management capabilities positively affect logistics integration capabilities.	Supported
H7: Information management capabilities positively affect logistics integration capabilities.	Supported
H8: Logistics integration capabilities have positive impact on performance of the food processing companies in Thailand.	Supported



Solid line indicates hypotheses supported (H3-H8)
Dashed line indicates hypotheses not supported (H1-H2)

Figure 4.7 Graphical Presentation of Tested Hypotheses

4.10 Qualitative Results

The qualitative research results through in-depth interview were to affirm the quantitative research results**.** The following were detailed descriptions through the individual interview with logistics executives and managers from 5 Thai food processing companies**.**

Table 4.30 Results of the In-Depth Interview Question 1
"What are your company most important logistics capabilities?"

Participant	Answer for the question
Logistics Manager Company 1	The ability to satisfy customers by providing the right products at the right place on the right time

Table 4.30 Results of the In-Depth Interview Question 1
"What are your company most important logistics capabilities?" (Cont.)

Participant	Answer for the question
Logistics Manager Company 2	The Vendor Management Inventory (VMI)
Logistics Manager Company 3	The flow of merchandise to fulfill customers' order in a cost effective way
Logistics Manager Company 4	High efficiency of production planning and control
Logistics Manager Company 5	Strategic supplier integration as to achieve excellence in sourcing

Table 4.31 Results of the In-Depth Interview Question 2
"What do you consider specific resources that support logistics capabilities?"

Participant	Answer for the question
Logistics Manager Company 1	A planned-approach capability right from the starting point till the point of delivery
Logistics Manager Company 2	The optimization of supply chain performance
Logistics Manager Company 3	Resource allocation and cost effectiveness
Logistics Manager Company 4	Proficient knowledge of resources scheduling and utilization
Logistics Manager Company 5	Superior supplier relationship and supplier management to enhance business performance through strategic business partners

Table 4.32 Results of the In-Depth Interview Question 3
"What competitive advantage of the company can be developed based on specific resources?"

Participant	Answer for the question
Logistics Manager Company 1	Differentiate from competitors in term of delivery reliability, Implement strategies to differentiate from them to stay ahead in the intense competitive market
Logistics Manager Company 2	Well-managed inventory will benefit company in term of cost effective, utilization of space, accessibility and JIT delivery which will consequently lead into customer's loyalty
Logistics Manager Company 3	Cost leadership through low cost strategy
Logistics Manager Company 4	Analytical skills for resources utilization with accuracy
Logistics Manager Company 5	Manufacturing cost reduction and strategic business partner

Table 4.33 Results of the In-Depth Interview Question 4
"How do IT capabilities facilitate the efficiency of the company's other logistics capabilities?"

Participant	Answer for the question
Logistics Manager Company 1	IT is used to track and keep up with the supply and demand management
Logistics Manager Company 2	Vendor Management Inventory helped to foster coordination and understanding between manufacturer and the supplier through electronic data interchange
Logistics Manager Company 3	ERP plays crucial roles in supporting logistics capabilities in order to work with customers in a more cost effective approach

Table 4.33 Results of the In-Depth Interview Question 4
"How do IT capabilities facilitate the efficiency of the company's other logistics capabilities?" (Cont.)

Participant	Answer for the question
Logistics Manager Company 4	The efficiency of production planning depends on the accuracy of IT which supports both for the execution of the current plans and for future planning. IT is much helpful in term of evaluation and analysis
Logistics Manager Company 5	There are needs for effective operational information sharing with suppliers, which requires an up-to-date information to capture and maintain real time data

Table 4.34 Results of the In-Depth Interview Question 5
"How do firm's logistics capabilities influence each other?"

Participant	Answer for the question
Logistics Manager Company 1	There are interrelated activities among all logistics capabilities, in different degree and involvement
Logistics Manager Company 2	Necessary that each logistics capabilities to be well-coordinated to prevent overflowing or shortages of inventory
Logistics Manager Company 3	The collaboration networks among logistics functions assist in achieving cost effective delivery
Logistics Manager Company 4	The efficiency of work flow depends on how well each function coordinates
Logistics Manager Company 5	The new solutions in the sourcing process can be achieved through the collaboration of logistics capabilities with strategic partners. This process brings firm beyond cost savings and managing suppliers to truly partnering

Table 4.35 Results of the In-Depth Interview Question 6
"Do the firm's logistics capabilities coordinate well with each other?"

Participant	Answer for the question
Logistics Manager Company 1	This requires good inter-functional coordination between departments to track customers' requirements and provide products and services
Logistics Manager Company 2	Intra and inter-company coordination are needed in order to synchronize resource allocations, it is crucial to have strong coordination
Logistics Manager Company 3	Insufficient coordination of company assets as well as lack of collaboration among logistics functions would directly affect the revenue of the company. By optimizing the utilization of logistics functions firm can greatly improve business bottom line
Logistics Manager Company 4	The rearrangement of the production planning and control through collaboration would definitely yield high efficiency
Logistics Manager Company 5	Strategic supplier integration involves suppliers as an integral part of driving end-to-end process solutions which therefore requires strong coordination among logistics functions and company's major capabilities

Table 4.36 Results of the In-Depth Interview Question 7
"How does the integration of logistics functions of your company influence the overall performance of the company?"

Participant	Answer for the question
Logistics Manager Company 1	Full integration is necessary in order synergize all firm resources
Logistics Manager Company 2	Logistics integration improved inventory management and improve vendor-customer relationship

Table 4.36 Results of the In-Depth Interview Question 7
"How does the integration of logistics functions of your company influence the overall performance of the company?" (Cont.)

Participant	Answer for the question
Logistics Manager Company 3	Managing logistics costs is particularly important for food processing company. This is because of these costs account for 5% to 50% of the total landed cost of the product, which includes the purchase price, freight, insurance, warehousing, customs duties, and others. The effective integration of logistics functions could lower the logistics cost drastically
Logistics Manager Company 4	The efficient utilization of material resources, people and facilities requires the integration of logistics functions which enhances the planning and control in the manufacturing process
Logistics Manager Company 5	Cross-functional and inter-firm collaboration efforts are keys to success

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter presented the discussion of the empirical findings for research questions posited for this study, as well as, the discussion of the consistency and contradiction with the relevant studies and existing literature, followed by theoretical contribution and practical implications. This chapter was concluded with limitations of the study and recommendations for future research.

5.1 Summary of the Findings

This study was based on the Resource-Based View (RBV) perspective with the objectives to extend knowledge in the field of logistics management by empirically examining the relationships between firm's logistics capabilities namely demand management capabilities, supply management capabilities, information management capabilities, and logistics integration capabilities on firm performance with the emphasis on the analysis of the mediating effects of logistics integration capabilities as the mediator and its impact on firm performance of the food processing industry in Thailand.

To accomplish the study's objectives, this study deployed Structural Equation Modeling (SEM) analysis which had the capacity to address structural relationships through the estimation of the multiple and interrelated variables. The empirical findings from this study had both consistency and contradiction with relevant studies in the existing literature. The results were conformed to the RBV perspective and emphasized the importance of logistics integration capabilities. The high level of significance from this study lends high credibility to the empirical results obtained.

5.2 Research Questions and the Answers

This study had earlier raised three major research questions which were:

RQ 1: Do logistics capabilities and firm performance relate?

RQ 2: Do information management capabilities facilitate other logistics capabilities?

RQ 3: Do logistics integration capabilities mediate firm's logistics capabilities and firm performance?

The eight hypotheses were developed and tested in order to determine answers for the above research questions, the answers were shown as below:

Table 5.1 Summary of Research Questions, Tested Hypotheses and the Results

Research questions	Hypothesis	Answer for research question
RQ1	H1: There is a positive relationship between demand management capabilities and firm performance of the food processing companies in Thailand.	No
	H2**:** There is a positive relationship between supply management capabilities and firm performance of the food processing companies in Thailand**.**	No
	H3**:** There is a positive relationship between information management capabilities and firm performance of the food processing companies in Thailand**.**	Yes
RQ2	H4a: Information management capabilities facilitate demand management capabilities.	Yes
	H4b**:** Information management capabilities facilitate supply management capabilities**.**	Yes
RQ3	H5: Demand management capabilities positively affect logistics integration capabilities.	Yes
	H6: Supply management capabilities positively affect logistics integration capabilities.	Yes
	H7: Information management capabilities positively affect logistics integration capabilities.	Yes
	H8: Logistics integration capabilities have positive impact on performance of the food processing companies in Thailand.	Yes

5.3 Discussions and Conclusion of the Findings

This section provided results interpretations, discussions, and conclusion of the research questions.

5.3.1 Discussion of Research Question 1

A research question 1 was raised in order to determine the significant direct relationship between logistics capabilities and the performance of the firm. The study of J. J.-K. Cho and Ozment (2005) emphasized the important role of logistics capabilities in supporting firm's superior performance, however, this was argued by Esper et al. (2007) that the challenges were that how firms could utilize their logistics capabilities strategically especially under the changing dynamic and hypercompetitive business environment context. The 3 hypotheses were developed as to investigate the direct relationships between demand management capabilities, supply management capabilities, and information management capabilities with firm performance.

The results showed that both demand management capabilities and supply management capabilities did not have direct relationship with firm performance. Information management capabilities were the only capabilities which had direct relationship with firm performance.

As for the results on relationship between demand management capabilities and firm performance from this study, the results were consistent with the study of Lynch et al. (2000) whose study tried to examine the connection between demand management with firm performance in the US retail grocery industry, which found that value added service (which was a dimension within demand management capabilities) did not have direct relationship with firm performance. This also supported the study of Porter (1991) which discussed that despite the need for firms to adopt and secure capabilities to enhance the business success, failure in designing and implementing with adequate combination of these capabilities can cause firm a poor performance.

The results, however, were contradicted somewhat, to the findings from the study of Zhao et al. (2001) which investigated the relationship of customer-focused capabilities and information focused capabilities with firm performance, the study found that customer–focused capabilities were significantly related to firm performance. Zhao

noted that customer-focused helped firm to build distinctiveness with customers, hence, firm needed to assess their own strength in service and customer related capability.

The results from this study had been both consistent and contradicted with the relevant studies, this could be caused by the different context of demand management capabilities used for different studies. However, the results showed that demand management capabilities obviously complied with the Resource-Based View (RBV) perspective. RBV had been regarded as firm distinctive internal capabilities which had the attributes of valuable, rare, inimitable, and non-substitutable (J. Barney, 1991), RBV focuses on relationships of internal characteristics, competitive advantage and the firm performance (Spanos & Lioukas, 2001). Therefore, it could not be denied that demand management capabilities is part of firm's distinctive capabilities. Demand management capabilities is also a process within supply chain management that balances customers' requirements and the capabilities of the supply chain (Croxton et al., 2002). From the results of hypothesis testing, although there found no direct relationship between demand management capabilities and firm performance, the following hypotheses would further examine the relationship to explain whether there was indirect influence of demand management capabilities on firm performance.

Likewise, the results also suggested that there was no direct relationship between supply management capabilities and firm performance, although supply management capabilities indicated marginal positive relationship with firm performance in the model without the presence of mediator, the relationship became statistical insignificant with the presence of the mediator in the model. Despite the role of supply management capabilities in facilitating and deploying resources (Schreyögg & Kliesch-Eberl, 2007) and assisting firm to diverge strategies (Nelson, 1991), the other but as important role, is the key linking role between external and internal operations for the firm (Novack & Simco, 1991). This definitely makes supply management capabilities one of the distinctive capabilities of the firm under the RBV. However, from the results of this study, there was no direct relationship between supply management capabilities and firm performance. The results supported the study of M. Day, Lichtenstein, and Samouel (2015) which found that there was no positive relationship between supply management capabilities and firm's financial performance. The results had contradicted

with the results from the study of Sezhiyan and Nambirajan (2011) which found that all of the supply capabilities management's predictive variables positively influenced firm performance and recommended that the dimensions of supply capabilities management had to be managed with proper coordination for the full integration among them.

However, recognizing the crucial role of supply chain management under the RBV perspective, the indirect influence of supply management capabilities on firm performance would be examined and explained in the next discussion.

As for information management capabilities, the results showed that information management capabilities had direct relationship with firm performance and had been consistent with various studies such as Satchawatee and Ussahawanitchakit (2016) which reported positive relationship between firm's IT capability and firm performance, the results also supported the study of Sauvage (2003) who found that technological ability of the logistics firm improved the supply chain reactivity. The direct relationship between information management capabilities and firm performance was well-reasoned and aligned with the current business context where IT is part of every business practice, which would definitely influence the performance of the firm. Information management capabilities were undoubtedly considered distinctive resource under the RBV perspective. Besides, Clemons and Row (1991) also pointed out that the importance of information exchange as the ability of a firm to share knowledge with business partners and the effective information exchange could be considered as the one of most fundamental capabilities in the business process (Wu et al., 2006). The relationships between IT based capabilities, logistics performance and financial performance for the firm were examined by Shang and Marlow (2005) and found that IT capability had direct influence on logistics performance.

In addition, the response from the in-depth interview, the logistics managers had also affirmed that logistics capabilities that firm developed based on RBV perspective could be built into competitive advantage and consequently had an impact on firm performance. The respondents had also provided details of their firms' core logistics that could link to the supported specific resources and reflected the competitive advantage of each capabilities, which indicated the direct relationship between firm's logistics capabilities and firm performance. Bowersox et al. (2000) inferred the

potentiality of logistics capabilities as source of competitive advantage for firms to succeed. More specifically, Daugherty et al. (1998) had concluded that firms focused on the logistics capabilities as to achieve competitive advantage and differentiation.

Despite the results from Hypotheses 1 to 3 had partially answered research question 1. Further discussion of the indirect effects of each logistics capabilities on firm performance would be reviewed and discussed in the following section.

5.3.2 Discussion of Research Question 2

Research question 2 was raised in order to determine the relationship between information management capabilities and firm's other logistics capabilities which were demand management capabilities and supply management capabilities, whether information management capabilities would facilitate demand management capabilities and supply management capabilities.

Karagöz and Akgün (2015) asserted that effective use of information technologies had both direct and indirect effect on firm's functional competencies, firms could benefit from IT enabled information flows that supported different stages of the business process. Ives and Learmonth (1984) suggested that firm with better information management capabilities would have had stronger capabilities as to capture information about customers and supplier. Several empirical research works had supported the positive relationship between IT and other logistics capabilities, as well as the positive impact on firm performance. Information management capabilities enabled customer focus capabilities (Mithas et al., 2011). Reed and DeFillippi (1990) found positive opportunities for the synergy across business units which improved overall performance of the firm.

The 2 hypotheses (H4a and H4b) were developed as to investigate direct relationship between information management capabilities with demand management capabilities and supply management capabilities. The results indicated that there were positive relationships between demand management capabilities, supply management capabilities, and information management capabilities.

The results had been consistent with the earlier study of Zhao et al. (2001) which examined impact of the two core logistics: customer-focused, and information-focused capabilities and found that there were interrelated between these two logistics

capabilities on firm performance, therefore information-focused capabilities should have been leveraged through the sharing and connectivity to facilitate customer-focused capabilities.

To affirm the quantitative results with qualitative methodlogy through the interview with logistics managers, it was also found that IT capabilities facilitated the efficiency of other logistics capabilities, the synergy and combination of information technology resources with firm's other resources enabled the development of competitive advantage and provided essential support to improve the performance of the firm. Information management capability was one among other productivity tools with the power to simultaneously increasing firm capability and decreasing firm's total cost (Closs, Goldsby, & Clinton, 1997).

The results supported hypotheses as well as provided a significant answer for the research question, this supported the relevant literature that information technology facilitated the logistics integration and contributed to the supply chain success (Shang & Marlow, 2005). IT enabled customer focused capabilities (Mithas et al., 2011), and affirmed the study of Stanley E. Fawcett and Cooper (1998) that there was positive relationship between logistics capabilities and technological innovation.

5.3.3 Discussion of Research Question 3

Research question 3 was the most critical question, to seek for answer for this study. The main objective of this study was to determine the impact of mediator on firm's logistics capabilities which, in this study, were demand management capabilities, supply management capabilities, and information management capabilities with the firm performance.

Mentzer et al. (2004) emphasized the distinctive role of the integration capabilities in logistics process which improved efficiency and effectiveness and led to long term profitability and competitiveness. Logistics integration capabilities is an intervening variable that firm should utilize in order to improve their performance (Wook Kim, 2006). Frohlich and Westbrook (2001) suggested that successful company linked together their suppliers and customers into integrated networks. Andersen and Kheam (1998) described that the combined capabilities were based on collaborative relationships and were related to the firm's strategies.

The 4 hypotheses were developed as to investigate direct relationships, indirect relationships between demand management capabilities, supply management capabilities, information management capabilities, logistics integration capabilities and firm performance. This had been emphasized through the analysis of the mediating effect of logistics integration capabilities.

The results showed that there were positive relationships between: demand management capabilities and logistics integration capabilities; supply management capabilities and logistics integration capabilities; and information management capabilities and logistics integration capabilities. These results indicated that logistics integration capabilities had been affected by all these three capabilities.

As for the relationship between logistics integration capabilities and firm performance, the results also showed positive relationship and indicated that logistics integration capabilities had an influence on firm performance.

Furthermore, the response from the in-depth interview had affirmed that integration brought about the mediating effect and influenced logistics capabilities with the positive impact on firm performance. In the practical business world, inter-functional, collaboration or integration appeared to be part of any business and need an attention as the performance of the firm can be improved with an appropriate integration of the firm's different functional areas.

The comparison of the two structural models, with and without the presence of logistics integration capabilities had proved the mediating effect of logistics integration capabilities, in other words, logistics integration capabilities mediated demand management capabilities, supply management capabilities and information management capabilities and consequently had an influence on firm performance.

These results supported the empirical investigation of M. Gligor and Holcomb (2014) which examined the mediating effect of integrated logistics capabilities on logistics demand management interface capabilities, logistics information management capabilities, and supply chain agility. The study found that all variables had been fully mediated by integrated logistics capabilities. This was also consistent with the study of Alam et al. (2014) which analyzed the relationship between logistics capabilities, the use of IT and firm's supply chain performance with logistics integration as the

mediator. The results showed that logistics capabilities did not have significant direct impact on supply chain performance but rather, logistics integration capabilities had a very significant mediating effect on supply chain performance. Additionally, M. Beheshti et al. (2014) suggested the findings that manufacturing firms with more level of integration had higher level of firm's financial performance.

According to RBV, firms that were able to accumulate resources and capabilities that were rare, valuable, non-substitutable, and difficult to imitate, would achieve competitive advantage over competing firms (J. Barney, 1991). This implied that logistics capabilities that meet these criteria can help to enhance the firm's performance through its distinctive combination of assets, skills, capabilities, and intangibles of an organization (Divandri & Yousefi, 2011; M. Gligor & Holcomb, 2014), in other words, the main objectives for firms applying RBV perspective were to identify their resources and capabilities in order to develop these resources and capabilities further into competitive advantage (G. S. Day, 1994).

5.4 Theoretical Contributions

The results of the study had the implication for theory in several ways. First and most importantly, the study provided further evidence that supported the Resource-Based View of the firm perspective. As it has been well accepted that RBV is the basis for successful firm to develop their distinctive and unique capabilities, more specifically, Wernerfelt (1984) asserted that RBV was an efficiency-based of the firm performance. If firms were equal in term of resources, there would not be profitability advantage. RBV explained performance difference for firms. The hypotheses testing of the empirical data had proved that performance between firms could be different with the implementation of logistics integration. The logistics integration had created superior firm performance through the integration of firm internal capabilities.

This supported J. Barney (1991) that firms with ability to accumulate resources and capabilities that are rare, valuable, non-substitutable, and difficult to imitate (VRIN), would achieve competitive advantage over competing firms. The logistics integration was considered source of VRIN as it involved value creating of firm capabilities. Firm had to identify resources with VRIN and implemented these

resources. It was interesting enough that the characteristics of the food processing industry in Thailand had been well aligned with the RBV perspective, this showed strong support to the important role of logistics integration capabilities to collaborate and integrate firm's logistics capabilities and resources. The results from this study indicated positive relationship between firm's logistics capabilities and logistics integration, as well as, the positive relationship between logistics integration capabilities and firm performance, which had affirmed the studies of Ellinger et al. (2000), Frohlich and Westbrook (2001), and Kahn and Mentzer (1996) that integration of logistics was a means to increase firm performance.

The results where demand management capabilities and supply management capabilities by themselves did not directly support the firm performance (as there were no direct relationship between them) indicated that firm cannot rely on their logistics capabilities alone but rather, firm needs to collaborate and integrate logistics capabilities together in order fully utilize them. As for information management capabilities which showed direct relationship with firm performance. This has implied that IT had become an important part of all businesses and would be difficult to separate, this was also a reason why information management capabilities still had direct relationship with firm performance even without the presence of logistics integration capabilities.

The results had also been consistent and supported Andraski and Novack (1996) who asserted that superior logistics performance could only be achieved when all relevant functional areas worked closely together. Firm needs to develop effective integration within and beyond its boundaries as to maximize the potential in converting capabilities into competitive advantage, then firm performance and profitability (Dyer & Singh, 1998).

5.5 Managerial Implications

The findings of this study had some important implications for managerial practice. The study had also identified some significant enablers for the business. Under the current world economy and the challenging competitive environment, it is necessary for the entrepreneurs to adjust the way they operate their business. The Resource-Base View of the firm implies that firm should leverage their resources and capabilities to

create the value in order to acquire and maintain superior performance (Shang & Marlow, 2005).

The managers must recognize the potential of internal capabilities as the critical factors which helps firm to achieve superior performance. The fundamentals of Resource-Based View perspective which are valuable, rare, inimitable, and non-substitutable, have provided a theoretical lens (Divandri & Yousefi, 2011), therefore managers should evaluate their internal capabilities within the organization through this theoretical lens. It is the preliminary for the firms wishing to achieve superior performance to identify their capabilities. Resource-Based View perspective could also be defined as an inside-out process where firm must, first of all, be able to understand their internal capabilities and strength.

This study had examined relationships among capabilities and firm performance within logistics context of the food processing industry. The effective logistics management was a major source of competitive advantage and provided a multitude of ways to increase efficiency and productivity in the food processing industry, as well as contributed to the costs reduction. The results suggested that logistics capabilities were the area that could provide foundation where superior firm performance could be generated. The logistics capabilities which had been identified from this study, comprised of demand management capabilities, supply management capabilities, and information management capabilities.

Demand management capabilities as the abilities to combine customers' needs with firm's logistics capabilities in order to fulfill customer's satisfaction. This includes products and services differentiation, the distinctiveness through service enhancement and unique value added activities to meet or exceed customers' satisfaction. It is crucial that the managers understand customers' needs and identify own logistics capabilities in order to meet their requirements, these capabilities include delivery reliability, timeliness, responsiveness, and the quality of the information for the customer.

Supply management capabilities are the abilities that firm can effectively manage the supply partnership. Managers must be able to evaluate, plan, and implement sourcing strategy, this involves the total cost minimization, effective inventory management to eliminate wasted capital and inventory, response to demand fluctuations

with the order cycle process effectively. The components under these capabilities are supplier selection, strategic supplier alliances, supplier communication, and the relationship with the supplier.

Information management capabilities are other important capabilities which managers should have paid attention. Information management capabilities refers to the abilities to acquire, deploy and leverage IT assets, the appropriately usage of the data, as well as adapting to the changing needs of the new technological direction. The effective distribution of tactical and strategic information both inside and outside the firm through the IT capabilities will enhance information flow and facilitate decisions for the business. These capabilities include of firm's IT infrastructure, Human IT resources and information sharing within and outside of the organization.

However, Resource-Based View perspective could assist in identifying firm's internal resources and capabilities and to develop them further into competitive advantage, additionally, Tan et al. (1998) asserted that logistics integration allows all partners to act as single entity which results in improving performance, therefore, managers should consider logistics capabilities in an appropriate combination rather than just separate capabilities.

The results of this study indicated that logistics integration capabilities were also underlying resources of the firm and served as the most significant enablers for the business. Firms which had high levels of integration achieved higher performance than those firms with lower levels of integration (Gimenez & Ventura, 2005). Logistics capabilities had demonstrated their crucial roles in improving firm performance. Mentzer et al. (2004) asserted that single capabilities are not sufficient for firm to achieve sustainable competitive advantage. Integration was the process of coordination which crated the capabilities that most competitors cannot easily replicate (Anderson & Katz, 1998). Therefore, it is important also, that managers must have recognized the potential of logistics integration capabilities as part of firm resources.

Logistics integration capabilities assisted in improving firm performance. Managers, therefore, must have had good understanding of the integration process since firms' success strongly be depending on integration of their capabilities. Firm should create and strengthen the role of logistics integration of their business, it was well

evident that logistics integration created performance improvement in the areas of profitability, market share, employee and customer satisfaction.

Firm's interdepartmental effort and coordination should have as well, been adopted. The integration of firm's internal capabilities has also assisted in reduction of redundant works. The importance of logistics integration is manifested in work procedure standardization, departmental cross functional integration, work flow integration with customers and suppliers which provide connection and collaboration of the logistics capabilities. The focus of standardization, cross functional integration could improve firm's internal capabilities while the focus on customer integration and supplier integration improve external capabilities. The logistics integration strategy create value for the firm by combining customers and suppliers into the process of value creation (Tan et al., 1998; Vickery et al., 2003).

Furthermore, the management could encourage the employee to work more collaborative across the functions, the findings from this study indicated that the benefit of logistic integration did not only benefit firms but also benefitted employees. The results showed that employee's satisfaction level could be improved through the clear work instruction, common agreement on company policy, and standardization of work procedure and logistics practices. By implementing logistics integration, managers could establish a competitive advantage based on Resource–Based View perspective which consequently improves the firm performance.

For the policy maker, the implication from the results of this study could be extended to support the policy of the Thai government's Thailand 4.0 or "Value-Based Economy" economic model. The Thailand 4.0 model that aimed at promoting and supporting Thai food industry sector, which is considered one of the five "Engines of Growth" of the country, in order to improve the efficiency to strengthen the competitiveness of Thai food industry, especially with the SMEs which accounted for about 96% of the whole industry to grow and benefit from the growth of this sector. The effective logistics management is a measure to address the challenges of an inefficiency and ineffectiveness practices faced in the industry. Logistics is perceived as a key measure to balance the demand and supply of the industry and a linkage for "Farms to Tables" that help to create value-addition for food and agricultural products.

The improvement of logistics management of the food processing industry would play an important role to support this policy as well as assist in increasing the overall industry's efficiency significantly, whereby the quality of the country's logistics capabilities would be improved comprehensively, and as well as encourage the value chain improvement and move up competitive advantage of the industry.

The government could consider the 2 stages of implementation. The first stage of implementation, the government could emphasize the development of logistics capabilities in the food processing industry as a prerequisite for businesses to stay competitive through differentiated products and services. The framework of the logistics integration from this study could be scaled up and put into industrial level practice, this would create and enhance long term competitive capabilities of the entrepreneurs in the food processing industry. The government could be key driver to support this transformation by eliminating the complication and the redundancy in the process, as well as facilitating the infrastructure to shape the development of logistics integration to the full efficiency. The implementation should be closely monitored through the plan–do–check–adjust. This would drastically improve logistics efficiency through the integration, as well as collaborating firms' resources and capabilities of the country's food processing industry.

As for the second stage or long term implementation, this could be done by engaging related industries and supporting industries as parts of the food processing supply chain and develop the framework of food processing industry supply chain integration. Development of food processing clustering will also improve the efficiency of the supply chain integration. In order to close the loop, government should also provide knowledge support on both trade and technical e.g., through training and financial assistance for the business for setting up and upgrading the food processing logistics and supply chain as needed.

This would definitely improve the collaboration among the logistics and supply chain partners, develop the synergy and secure the competitiveness in the market for the Thai food processing industry. To realize the full potential of this effort, the cooperation between the government and private sector must be emphasized in order to bring about the joint efforts, expedite the implementation plan and maximize the

potential of the food processing industry. As for the private sector, the effort needed are from both intra-company and inter-company, for the individual company level, it is necessary to enhance the integration across functions e.g. customer service, marketing, production, transportation. As for the collaboration across the firms, the cooperative structure with effective communications among entrepreneurs must be developed where the synergy benefit can be achieved.

5.6 Limitations of the Study

It is necessary to address certain limitations of this study to help advance future research.

The first limitation involved the items used for each observed variables, despite the thorough review of the relevant literature but due to the comprehensive and broad classification of logistics capabilities and as well, the assumption that the items were equally weighted in each logistics capabilities construct, there might be chances that context and definitions of the items selected and used in the data collection instrument and in the model, might not be good representatives for the observed variables which might yield some bias results.

Secondly, logistics integration was multidimensional construct which could consist of various components, in this study the relationship among selected variables might be positively and strongly impacting firm performance, however, further research to examine other dimensions of logistics integration and their influences on firm performance is advisable. This would provide a better understanding of the relationships of the other logistics integration dimensions and the firm performance.

Thirdly, the food processing industry is large industry that covers a diverse range of product segments which many of them are having completely different characteristics in term of the nature of products, manufacturing process and the logistics and supply chain activities involved. Despite the results from this study provided the overall picture of the food processing industry, an in-depth study to drill down into specific processed food segment would give specific insight for each specific food processing segment.

Fourthly, despite the affirmation from the results of this study for the benefit of logistics integration capabilities on the performance of the firm, however, the different of organizational structure as well as hierarchical chain of command e.g. centralized and decentralized structure of the organization, might come into play and could have an impact on the mediating effect of logistics integration capabilities and cross functional collaboration which in this study, had yet to explore.

Finally, the logistics manager and director as target respondent were expected to represent as good informant from each corresponding company. However, although the use of one informant from each responding company might be justified, the future researcher might need to consider an average score from more than one respondent of the same responding company in order to render more accurate information and reduce bias that could cause from the response.

5.7 Suggestions for Future Research

Since this study was grounded on Resource-Based View of the firm perspective, there are numerous avenues for future research to be pursued. While the results of this study supported the literature review that firm's competitiveness and superior performance could be achieved through the implementation of their internal capabilities, especially through the integration of logistics integration capabilities. It would be interesting for future researchers to explore further into logistics capabilities with the presence of other capabilities such as production capabilities, marketing capabilities, this might provide different perspective, and as well as, the cross functional integration effects, the collaboration of firm's unique capabilities and the impact on firm performance. The future research might as well, extend the study to the mediating effect and the influences with firm's other capabilities.

Further, the firm with different organizational structure such as functional, divisional, matrix structures as well as the hierarchical chain of command or authority structure of the organization e.g. centralized or decentralized structures would either help or hinder the progress of collaboration or integration of firm's capabilities, as well as, an impact on the performance of the firm. Future studies may look into the

interaction of the different organizational structures and the mediating effects of logistics integration and the impact on firm performance.

The scope of this study was limited to one industry, the food processing industry. It was also suggested to consider other industry which might have different nature and characteristics, the comparison of the results of the study between different industries might yield different insight from the study results.

Although logistics integration capabilities were proved to have mediating effect on logistics capabilities such as demand management, supply management and information management capabilities with the performance of the firm in this study, another avenue for future research would be to examine the relationship of firm's resources or capabilities on the functional areas such as human resource, quality assurance, purchasing or manufacturing as to analyze the impact of specific functional areas on the firm performance.

The theoretical contribution of empirical study could also be done with thorough and a more focus with an in-depth qualitative research, which would provide contribution with different perspectives from the results of the quantitative–based research.

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APPENDICES

APPENDIX A

Cover Letter and Questionnaire (Thai)

ที่ ศธ 0578.06/1543

คณะบริหารธุรกิจ
มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี
ตำบลคลองหก อำเภอธัญบุรี
จังหวัดปทุมธานี 12110

28 กุมภาพันธ์ 2560

เรื่อง ขอความอนุเคราะห์ตอบแบบสอบถาม เพื่อประกอบการทำวิจัย

เรียน ผู้บริหารแผนกโลจิสติกส์และซัพพลายเชน บริษัท วิคเตอร์ อิมเม็กซ์ จำกัด

ด้วยคณะบริหารธุรกิจ มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี ได้เปิดสอนระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาบริหารธุรกิจ ตั้งแต่ปีการศึกษา 2551 แล้วนั้น ขอรับรองว่า รายนายณรงค์ชัย กิจรังสิกุล รหัสนักศึกษา 125690509004-6 เป็นนักศึกษาหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาบริหารธุรกิจ วิชาเอกบริหารธุรกิจระหว่างประเทศ เป็นผู้จัดทำวิทยานิพนธ์ เรื่อง A RESOURCE-BASED VIEW APPROACH ON MEDIATING EFFECT OF LOGISTICS INTEGRATION CAPABILITIES ON FIRM PERFORMANCE: AN EMPIRICAL STUDY WITH THE FOOD PROCESSING INDUSTRY IN THAILAND

จึงเรียนมาเพื่อโปรดให้ความอนุเคราะห์หน่วยงานของท่าน ให้ข้อมูลประกอบการทำวิจัย ให้เกิดความสำเร็จเพื่อเผยแพร่ผลงานวิจัยที่เป็นคุณูปการแก่องค์กรและผู้สนใจต่อไป

ขอแสดงความนับถือ

(ดร.อุมาวสี ศรีบุญลือ)
ผู้ช่วยคณบดีฝ่ายบัณฑิตศึกษา ปฏิบัติราชการแทน
คณบดีคณะบริหารธุรกิจ

โครงการปริญญาเอก
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ข้อแนะนำทั่วไปในการตอบแบบสอบถาม

บุคลากรขององค์กรของท่านที่สามารถตอบแบบสอบถามนี้จะเป็นผู้ที่มีส่วนเกี่ยวข้องกับงานด้านโลจิสติกส์ ซึ่งอาจเป็นเจ้าของกิจการ, ผู้บริหารองค์กร, ผู้อำนวยการ หรือผู้จัดการ หรือผู้ที่เกี่ยวข้องกับการจัดการปฏิบัติการบริหารซัพพลายเชนและโลจิสติกส์

กรุณาตอบแบบสอบถามทุกข้อโดยยึดตามความเข้าใจหรือความคิดเห็นที่ท่านมีต่อคำถามในแต่ละข้อ หากท่านต้องการเปลี่ยนคำตอบ กรุณาขีดฆ่าคำตอบเดิมและเลือกคำตอบใหม่ได้ทันที

เมื่อท่านได้ตอบแบบสอบถามเรียบร้อยแล้ว กรุณาใส่ในซองจดหมายที่แนบมา ซองจดหมายที่แนบมาจ่าหน้าซองและติดแสตมป์เพื่อการส่งกลับเรียบร้อยแล้ว
หรือ ท่านอาจส่งแบบสอบถามทางแฟ็กซ์กลับมาที่

แฟ็กซ์ 02-960-0600

ท่านสามารถเลือกการตอบแบบสอบถามผ่านช่องทางออนไลน์โดยผ่านเว็บไซต์ www.bus.rmutt.ac.th/narongchai/
หรือ โดยใช้โทรศัพท์มือถือของท่านสแกน QR Code
(โดยใช้ QR Code Reader ของ LINE, WeChat หรือโปรแกรมอ่าน QR Code ในเครื่องของท่าน)

แบบสอบถามนี้ใช้เวลาตอบจนแล้วเสร็จภายในเวลา 7 นาที

ชุดที่

แบบสอบถามความคิดเห็นต่อความสามารถทางด้านโลจิสติกส์ขององค์กร

เรื่อง แนวคิดมุมมองบนพื้นฐานของทรัพยากรต่อการเป็นตัวแปรส่งผ่านของการบูรณาการความสามารถด้านโลจิสติกส์ที่ส่งผลต่อผลการดำเนินงานขององค์กร: การศึกษาเชิงประจักษ์สำหรับอุตสาหกรรมอาหารแปรรูปในประเทศไทย

คำชี้แจง : โปรดใส่เครื่องหมาย √ ลงในช่องที่ท่านเลือก

ส่วนที่ 1 ความสามารถในการจัดการด้านอุปสงค์ (Demand Management Capabilities)

กรุณาระบุระดับของความคิดเห็นของท่านต่อความสามารถทางด้านโลจิสติกส์<u>ในการจัดการความต้องการของลูกค้า</u>ขององค์กรของท่าน ตามระดับของความคิดเห็นดังนี้

1= ไม่เห็นด้วยอย่างยิ่ง 2= ไม่เห็นด้วย 3= ค่อนข้างไม่เห็นด้วย 4= ปานกลาง 5= ค่อนข้างเห็นด้วย 6= เห็นด้วย 7= เห็นด้วยอย่างยิ่ง

คำถาม	ระดับของความคิดเห็น						
	1	2	3	4	5	6	7
ความน่าเชื่อถือของการส่งมอบ Delivery Reliability							
1.กิจการของท่าน<u>**มีกระบวนการด้านโลจิสติกส์**</u>ที่ช่วยทำให้การจัดส่งสินค้าเป็นไปอย่างมีประสิทธิภาพ	1	2	3	4	5	6	7
2.กิจการของท่าน<u>**มีระบบตรวจสอบและติดตามการจัดส่ง**</u>ที่ทำให้อัตราความผิดพลาดจากการจัดส่งสินค้าอยู่ในระดับต่ำ	1	2	3	4	5	6	7
ความตรงต่อเวลา Timeliness							
3.กิจการของท่านสามารถ<u>**แก้ปัญหาเฉพาะหน้าได้อย่างทันท่วงที**</u>เพื่อทำให้การส่งมอบเป็นไปตามกำหนด	1	2	3	4	5	6	7
4.ประสิทธิภาพด้าน<u>**ความรวดเร็วในการจัดส่งสินค้าเป็นปัจจัยหลัก**</u>ของคุณภาพด้านการบริการของกิจการของท่าน	1	2	3	4	5	6	7
การสนองตอบต่อลูกค้า Customer Responsiveness							
5.กิจการของท่านสามารถ<u>**สนองตอบต่อการเปลี่ยนแปลงข้อกำหนดของลูกค้า**</u>ของท่านอย่างทันท่วงที	1	2	3	4	5	6	7
6.กิจการของท่าน<u>**มีนโยบายที่ยืดหยุ่นในการสนองตอบต่อความต้องการ**</u>ที่แตกต่างและหลากหลายของลูกค้า	1	2	3	4	5	6	7
คุณภาพของข้อมูลสำหรับลูกค้า Customer Information Quality							
7.กิจการของท่านให้ความสำคัญต่อ<u>**การเข้าถึงและได้รับข้อมูลด้านสินค้าของลูกค้า**</u>ตลอดเวลา	1	2	3	4	5	6	7
8.กิจการของท่านให้ความสำคัญต่อ<u>**การปรับปรุงข้อมูลด้านสินค้าให้ถูกต้อง**</u>พร้อมต่อการให้บริการลูกค้าตลอดเวลา	1	2	3	4	5	6	7

ส่วนที่ 2 ความสามารถในการจัดการด้านอุปทาน (Supply Management Capabilities)

กรุณาระบุระดับของความคิดเห็นของท่านต่อความสามารถทางด้านโลจิสติกส์ในการจัดการการจัดหาจากซัพพลายเออร์ขององค์กรของท่าน ตามระดับของความคิดเห็นดังนี้

1= ไม่เห็นด้วยอย่างยิ่ง 2= ไม่เห็นด้วย 3= ค่อนข้างไม่เห็นด้วย 4= ปานกลาง 5= ค่อนข้างเห็นด้วย 6= เห็นด้วย 7= เห็นด้วยอย่างยิ่ง

คำถาม	ระดับของความคิดเห็น						
	1	2	3	4	5	6	7
การคัดเลือกซัพพลายเออร์ Supplier Selection							
9.กิจการของท่านให้ความสำคัญต่อการคัดเลือกซัพพลายเออร์โดยพิจารณาจากความสามารถทางด้านโลจิสติกส์	1	2	3	4	5	6	7
10.กิจการของท่านให้ความสำคัญในการคัดเลือกซัพพลายเออร์เพื่อลดจำนวนและคงไว้เฉพาะรายสำคัญ	1	2	3	4	5	6	7
การเป็นพันธมิตรเชิงกลยุทธ์ Strategic Supplier							
11.กิจการของท่านให้ความสำคัญในการตัดสินใจด้านกลยุทธ์ทางธุรกิจร่วมกับซัพพลายเออร์รายสำคัญ	1	2	3	4	5	6	7
12.กิจการของท่านใช้นโยบายการร่วมรับความเสี่ยงและแบ่งปันผลประโยชน์ร่วมกันกับซัพพลายเออร์รายสำคัญ	1	2	3	4	5	6	7
การสื่อสาร Communication							
13.กิจการของท่านให้ความสำคัญในการสื่อสารและแลกเปลี่ยนข้อมูลกับซัพพลายเออร์รายสำคัญอย่างสม่ำเสมอ	1	2	3	4	5	6	7
14.กิจการของท่านสามารถสื่อสารอย่างมีประสิทธิภาพกับซัพพลายเออร์รายสำคัญในการตอบสนองต่อเหตุการณ์หรือการเปลี่ยนแปลงที่อาจส่งผลกระทบต่อทั้งสองฝ่าย	1	2	3	4	5	6	7
ความสัมพันธ์กับซัพพลายเออร์ Relationship							
15.กิจการของท่านให้ความสำคัญต่อซัพพลายเออร์รายสำคัญเป็นเสมือนหน่วยงานหนึ่งในองค์กรของท่าน	1	2	3	4	5	6	7
16.กิจการของท่านให้ความสำคัญในความเป็นพันธมิตรที่ยั่งยืนในในการทำงานร่วมกับซัพพลายเออร์รายสำคัญ	1	2	3	4	5	6	7

ส่วนที่ 3 ความสามารถในการจัดการด้านสารสนเทศ (Information Management Capabilities)

กรุณาระบุระดับของความคิดเห็นของท่านต่อความสามารถทางด้านโลจิสติกส์<u>ในการจัดการด้านสารสนเทศ</u>ขององค์กรของท่าน ตามระดับของความคิดเห็นดังนี้

1= ไม่เห็นด้วยอย่างยิ่ง 2= ไม่เห็นด้วย 3= ค่อนข้างไม่เห็นด้วย 4= ปานกลาง 5= ค่อนข้างเห็นด้วย 6= เห็นด้วย 7= เห็นด้วยอย่างยิ่ง

คำถาม	ระดับของความคิดเห็น						
	1	2	3	4	5	6	7
โครงสร้างพื้นฐานด้านสารสนเทศขององค์กร IT Infrastructure							
17.กิจการของท่านให้ความสำคัญกับการใช้เทคโนโลยีสารสนเทศเพื่อตอบสนอง**<u>การใช้ข้อมูลแบบทันทีตามเวลาแท้จริง</u>**) real time data)	1	2	3	4	5	6	7
18.ระบบเทคโนโลยีสารสนเทศของกิจการของท่าน**<u>สามารถแลกเปลี่ยนข้อมูลบนระบบที่แตกต่างกันกับลูกค้า</u>**ของท่าน	1	2	3	4	5	6	7
ทรัพยากรบุคลากรด้านสารสนเทศ Human IT Resource							
19.กิจการของท่านให้ความสำคัญกับการมี**บุคลากรที่มีความชำนาญด้านเทคโนโลยีสารสนเทศ**	1	2	3	4	5	6	7
20.ความชำนาญด้าน**<u>การจัดการเทคโนโลยีสารสนเทศ</u>**ของกิจการของท่าน**<u>ส่งเสริมแผนกลยุทธ์ทางธุรกิจ</u>**ของท่าน	1	2	3	4	5	6	7
การใช้ข้อมูลร่วมกัน Information Sharing							
21.กิจการของท่านให้ความสำคัญใน**<u>การแบ่งปันและใช้ข้อมูลด้านการปฏิบัติงานร่วมกันระหว่างหน่วยงานภายใน</u>**	1	2	3	4	5	6	7
22.กิจการของท่านให้ความสำคัญใน**<u>การแบ่งปันและใช้ข้อมูลด้านการปฏิบัติงานร่วมกับลูกค้าและซัพพลายเออร์รายสำคัญ</u>**	1	2	3	4	5	6	7

ส่วนที่ 4 การบูรณาการความสามารถด้านโลจิสติกส์ (Logistics Integration Capabilities)

กรุณาระบุระดับของความคิดเห็นของท่านต่อ<u>การบูรณาการความสามารถด้านโลจิสติกส์</u>ขององค์กรของท่าน ตามระดับของความคิดเห็นดังนี้

1= ไม่เห็นด้วยอย่างยิ่ง 2= ไม่เห็นด้วย 3= ค่อนข้างไม่เห็นด้วย 4= ปานกลาง 5= ค่อนข้างเห็นด้วย 6= เห็นด้วย 7= เห็นด้วยอย่างยิ่ง

คำถาม	ระดับของความคิดเห็น						
	1	2	3	4	5	6	7
การกำหนดมาตรฐานเดียวกัน Standardization							
23.กิจการของท่านให้ความสำคัญในการ**<u>กำหนดนโยบายและรูปแบบวิธีปฏิบัติที่เป็นแบบแผนเดียวกันในการปฏิบัติงานด้านโลจิสติกส์</u>**	1	2	3	4	5	6	7
24.กิจการของท่านมีการ**<u>กำหนดมาตรฐานเดียวกันเพื่อใช้สำหรับการปฏิบัติงานด้านโลจิสติกส์</u>**ครอบคลุมทั่วทั้งบริษัท	1	2	3	4	5	6	7
การบูรณาการการทำงานข้ามหน่วยงาน Cross-functional Integration							
25.กิจการของท่านให้ความสำคัญใน**<u>การบูรณาการการทำงาน</u>**ร่วมกันของหน่วยงาน**<u>เพื่อเพิ่มประสิทธิภาพ</u>**ในการปฏิบัติงาน	1	2	3	4	5	6	7
26.กิจการของท่านให้ความสำคัญใน**<u>การบูรณาการการทำงาน</u>**ร่วมกันของหน่วยงาน**<u>เพื่อลดขั้นตอนของการปฏิบัติงาน</u>**ที่ซ้ำซ้อน	1	2	3	4	5	6	7
การบูรณาการการทำงานกับลูกค้า Customer Integration							
27.กิจการของท่านและลูกค้าของท่าน**<u>มีการทำงานร่วมกันเพื่อพัฒนาสินค้าใหม่ๆ</u>**	1	2	3	4	5	6	7
28.กิจการของท่านและลูกค้าของท่าน**<u>มีการทำงานร่วมกันเพื่อมองหาโอกาสใหม่ๆทางการตลาด</u>**	1	2	3	4	5	6	7
การบูรณาการการทำงานกับซัพพลายเออร์ Supplier Integration							
29.กิจการของท่านและซัพพลายเออร์รายสำคัญ**<u>มีการแลกเปลี่ยนข้อมูลทางด้านต้นทุนร่วมกัน</u>**	1	2	3	4	5	6	7
30.กิจการของท่านและซัพพลายเออร์รายสำคัญ**<u>มีการแลกเปลี่ยนข้อมูลทางด้านกลยุทธ์ร่วมกัน</u>**	1	2	3	4	5	6	7

ส่วนที่ 5 ผลการดำเนินงานขององค์กร (Firm Performance)

กรุณาระบุระดับของความคิดเห็นของท่านต่อผลการดำเนินงานขององค์กรของท่าน ตามระดับของความคิดเห็นดังนี้

1= ไม่เห็นด้วยอย่างยิ่ง 2= ไม่เห็นด้วย 3= ค่อนข้างไม่เห็นด้วย 4= ปานกลาง 5= ค่อนข้างเห็นด้วย 6= เห็นด้วย 7= เห็นด้วยอย่างยิ่ง

คำถาม	ระดับของความคิดเห็น						
	1	2	3	4	5	6	7
ผลกำไรขององค์กร Profitability							
31.กิจการของท่านมี**ผลกำไรสูงขึ้น**กว่าระยะเวลา 3 ปีที่ผ่านมา	1	2	3	4	5	6	7
32.กิจการของท่าน**มีผลประกอบการด้านการเงินดีกว่าคู่แข่ง**รายสำคัญในอุตสาหกรรมเดียวกัน	1	2	3	4	5	6	7
ส่วนแบ่งทางการตลาดของกิจการ Market Share							
33.กิจการของท่านมี**ส่วนแบ่งทางการตลาดสูงขึ้น**กว่าระยะเวลา 3 ปีที่ผ่านมา	1	2	3	4	5	6	7
34.กิจการของท่าน**มีสถานภาพทางการแข่งขันที่เข้มแข็งกว่าคู่แข่ง**รายสำคัญในอุตสาหกรรมเดียวกัน	1	2	3	4	5	6	7
ความพึงพอใจของลูกค้า Customer Satisfaction							
35.**ระดับความพึงพอใจจากลูกค้า**ต่อผลิตภัณฑ์และบริการจากกิจการของท่านเป็นไปตามเป้าหมาย	1	2	3	4	5	6	7
36.**อัตราการคงอยู่ของลูกค้าของกิจการของท่านสูงกว่าคู่แข่ง**รายสำคัญในอุตสาหกรรมเดียวกัน	1	2	3	4	5	6	7
ความพึงพอใจของพนักงานขององค์กร Employee Satisfaction							
37.กิจการของท่าน**มีแนวทางและวิธีการปฏิบัติงานที่ชัดเจนสำหรับพนักงาน**ในการปฏิบัติงานของบริษัท	1	2	3	4	5	6	7
38.**อัตราการลาออกของพนักงานขององค์กรของท่านต่ำกว่าคู่แข่ง**รายสำคัญในอุตสาหกรรมเดียวกัน	1	2	3	4	5	6	7

ส่วนที่ 6 ข้อมูลส่วนบุคคลและข้อมูลกิจการของผู้ตอบแบบสอบถาม

39. อายุ

☐ อายุต่ำกว่า 31ปี ☐ 31-40 ปี

☐ 41-50 ปี ☐ อายุมากกว่า 50 ปี

40. ระดับการศึกษา

☐ อาชีวศึกษา/ประกาศนียบัตรวิชาชีพ ☐ ต่ำกว่าระดับปริญญาตรี

☐ ระดับปริญญาตรี ☐ สูงกว่าระดับปริญญาตรี

41. ประสบการณ์การทำงานด้านโลจิสติกส์

☐ 1-5 ปี ☐ 6-10 ปี

☐ 11-15 ปี ☐ มากกว่า 15 ปี

42. หน้าที่และความรับผิดชอบ

☐ ระดับผู้บริหารองค์กร ☐ ผู้จัดการฝ่าย

☐ หัวหน้าแผนก ☐ อื่นๆ โปรดระบุ_____

43. ประเภทของการลงทุนของบริษัทของท่าน

☐ บริษัทของคนไทย ☐ บริษัทต่างชาติ

44. จำนวนพนักงานในบริษัทของท่าน

☐ น้อยกว่า100 คน ☐ 100-500 คน

☐ 501-1,000 คน ☐ มากกว่า1,000 คน

45. จำนวนทุนจดทะเบียนของบริษัทของท่าน

☐ น้อยกว่า10 ล้านบาท ☐ 10-50 ล้านบาท

☐ 51-100 ล้านบาท ☐ มากกว่า100 ล้านบาท

----- ขอขอบพระคุณอย่างสูงในความร่วมมือกรุณาตอบแบบสอบถามของท่าน -----

APPENDIX B

Questionnaire

Questionnaire No.

Questionnaire survey on the opinion towards logistics capabilities and firm performance

Title: "A Resource-Based View Approach on Mediating Effect of Logistics Integration Capabilities on Firm Performance: An Empirical Study on the Food Processing Industry in Thailand"

Instruction: Please indicate your input √ in an appropriate box

Section 1: Demand Management Capabilities

Please indicate your level of agreement with the below statements

Your company's demand management capabilities have the following attributes:

1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree

Statement	Level of agreement						
	1	2	3	4	5	6	7
Delivery Reliability							
1.Your company has logistics processes that facilitate an effective delivery.	1	2	3	4	5	6	7
2.Your company has the tracking and tracing system that promotes the low delivery discrepancy rate.	1	2	3	4	5	6	7
Timeliness							
3.Your company fulfills your customers' orders within specified time.	1	2	3	4	5	6	7
4.Your company focuses on speed performance as key service quality.	1	2	3	4	5	6	7
Customer Responsiveness							
5.Your company responds to customers' special requests promptly.	1	2	3	4	5	6	7
6.Your company responds to customers' various requirements in a flexible manner.	1	2	3	4	5	6	7

Customer Information Quality							
7.Your customers have an access in real time about the availability of products.	1	2	3	4	5	6	7
8.Your company provides accurate and reliable information for the customers.	1	2	3	4	5	6	7

Section 2: Supply Management Capabilities

Please indicate your level of agreement with the below statements

Your company's supply management capabilities have the following attributes:

1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree

Statement	Level of agreement						
	1	2	3	4	5	6	7
Supplier Selection							
9.Your company uses logistics capabilities as a basis for suppliers selection.	1	2	3	4	5	6	7
10.Your company focuses on working with small number of selected suppliers.	1	2	3	4	5	6	7
Strategic Supplier							
11.Your company involves selected suppliers in the strategic decisions.	1	2	3	4	5	6	7
12.Your company has an arrangement with selected suppliers to operate under principles of shared risks and rewards.	1	2	3	4	5	6	7
Communication							
13.Your company communicate to exchange information with selected suppliers on frequently, formally, and timely basis.	1	2	3	4	5	6	7
14.Your company communicates with selected suppliers to keep each other informed about events or changes that may affect the other party.	1	2	3	4	5	6	7

Relationship							
15. Your company treats selected suppliers as an extension of your company.	1	2	3	4	5	6	7
16. The selected suppliers see our relationship as long term alliance.	1	2	3	4	5	6	7

Section 3: Information Management Capabilities

Please indicate your level of agreement with the below statements

Your company's information management capabilities have the following attributes:

1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree

Statement	Level of agreement						
	1	2	3	4	5	6	7
IT Infrastructure							
17. Your company's IT infrastructure captures and maintains real time data.	1	2	3	4	5	6	7
18. Your company's IT system works across multiple platforms for data exchange with customers.	1	2	3	4	5	6	7
Human IT Resource							
19. Your company has IT expertise.	1	2	3	4	5	6	7
20. Your company's IT expertise and business strategies are well aligned.	1	2	3	4	5	6	7
Information Sharing							
21. Your company effectively shares operational information between departments.	1	2	3	4	5	6	7
22. Your company effectively shares operational information externally with suppliers and customers.	1	2	3	4	5	6	7

Section 4: Logistics Integration Capabilities

Please indicate your level of agreement with the below statements

Your company's logistics integration capabilities have the following attributes:

1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree

Statement	Level of agreement						
	1	2	3	4	5	6	7
Standardization							
23. Your company has common, agreed to policies and procedures to standardize logistics practices and operations.	1	2	3	4	5	6	7
24. Logistical operations throughout my company are performed in a standard manner.	1	2	3	4	5	6	7
Cross-functional Integration							
25. Your company extensively utilizes cross functional work teams for managing day-to-day operations.	1	2	3	4	5	6	7
26. Your company has reduced formal operational structure to more fully integrate operation.	1	2	3	4	5	6	7
Customer Integration							
27. Your company and the customers do jointly development of new products	1	2	3	4	5	6	7
28. Your company and the customers do jointly identify opportunities for new markets	1	2	3	4	5	6	7
Supplier Integration							
29. Your company shares cost information with the selected suppliers.	1	2	3	4	5	6	7
30. Your company shares strategic information with selected suppliers.	1	2	3	4	5	6	7

Section 5: Firm Performance

Please indicate your level of agreement with the below statements

Your company's logistics integration capabilities have an impact on firm performance on the following areas:

1 = Strongly Disagree, 2 = Quite Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Quite Agree, and 7 = Strongly Agree

Statement	Level of agreement						
	1	2	3	4	5	6	7
Profitability							
31. Your company's profitability has increased over the past three years.	1	2	3	4	5	6	7
32. Your company's financial results is better than those of your competitors in the same industry.	1	2	3	4	5	6	7
Market Share							
33. Your company has gained more market share over the past three years.	1	2	3	4	5	6	7
34. Your company has a better competitive position than those of your competitors in the same industry.	1	2	3	4	5	6	7
Customer Satisfaction							
35. The customers are satisfied with your products and services.	1	2	3	4	5	6	7
36. Your customer retention rate is better than those of your competitors in the same industry.	1	2	3	4	5	6	7
Employee Satisfaction							
37. Your company has clear work instructions and guidelines for employee to follow.	1	2	3	4	5	6	7
38. Your company has a lower turnover rate than those of your competitors in the same industry.	1	2	3	4	5	6	7

Section 6: Demographic and background characteristics of the surveyed respondent

39. Age

- □ Less than 31 years old
- □ 31-40 years old
- □ 41-50 years old
- □ Over 50 years old

40. Educational qualification

- □ Vocational/Technical Certificate
- □ Secondary education
- □ Undergraduate degree
- □ Postgraduate degree

41. Working experiences in the logistics functions

- □ 1-5 years
- □ 6-10 years
- □ 11-15 years
- □ More than 15 years

42. Position / Responsibility

- □ Executives
- □ Departmental manager
- □ Divisional supervisor
- □ Other, please specify_____

43. Nature of Investment

- □ Local company
- □ Foreign Direct Investment

44. Size of the Business (number of employee)

- □ Less than 100
- □ 100-500
- □ 501-1,000
- □ More than 1,000

45. Business Registered Capital (Baht)

- □ Less than 10 million
- □ 10-50 million
- □ 51-100 million
- □ More than 100 million

-----Thank you for your kind participation-----

APPENDIX C

Index of Item-Objective Congruence (IOC) Assessment

Index of Item-Objective Congruence (IOC) Assessment

Variable	Item	Subject-Matter Expert						Item Average Score	Variable's Average Score
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6		
Delivery Reliability	Delv1	1	1	1	1	0	0	0.67	0.83
	Delv2	1	1	1	1	1	1	1.00	
Timeliness	Time1	1	1	1	1	1	1	1.00	1.00
	Time2	1	1	1	1	1	1	1.00	
Customer Responsiveness	Rpsiv1	1	0	1	1	1	0	0.67	0.83
	Rpsiv2	1	1	1	1	1	1	1.00	
Customer Information Quality	InfQ1	1	1	1	1	1	1	1.00	1.00
	InfQ2	1	1	1	1	1	1	1.00	
Supplier Selection	SSel1	1	1	1	1	1	1	1.00	0.67
	SSel2	1	0	0	1	0	0	0.33	
Strategic Supplier Alliances	SAli1	1	1	1	1	1	1	1.00	1.00
	SAli2	1	1	1	1	1	1	1.00	
Communication	SCom1	1	1	1	1	1	1	1.00	1.00
	SCom2	1	1	1	1	1	1	1.00	
Relationship	CRel1	1	1	1	1	1	1	1.00	1.00
	CRel2	1	1	1	1	1	1	1.00	
IT Infrastructure	ITInfr1	1	1	1	1	1	1	1.00	1.00
	ITInfr2	1	1	1	1	1	1	1.00	
Human IT Resource	HumIT1	1	1	1	1	1	1	1.00	0.92
	HumIT2	1	1	1	0	1	1	0.83	

Index of Item-Objective Congruence (IOC) Assessment (Cont.)

Variable	Item	Subject-Matter Expert						Item Average Score	Variable's Average Score
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6		
Information Sharing	InfSh1	1	1	1	0	1	1	0.83	0.92
	InfSh2	1	1	1	1	1	1	1.00	
Standardization	Std1	1	1	1	1	1	1	1.00	1.00
	Std2	1	1	1	1	1	1	1.00	
Cross-functional Integration	Crssfn1	1	1	1	1	1	1	1.00	1.00
	Crssfn2	1	1	1	1	1	1	1.00	
Customer Integration	CIntg1	1	0	1	1	1	1	0.83	0.92
	Cintg2	1	1	1	1	1	1	1.00	
Supplier Integration	SIntg1	1	1	1	1	1	1	1.00	0.92
	SIntg2	1	1	1	0	1	1	0.83	
Profitability	Proft1	1	1	1	0	1	0	0.67	0.75
	Proft2	1	1	1	1	1	0	0.83	
Market Share	MkShr1	1	1	1	1	1	-1	0.67	0.83
	MkShr2	1	1	1	1	1	1	1.00	
Customer Satisfaction	CStf1	1	1	0	0	1	-1	0.33	0.42
	CStf2	1	1	1	0	1	-1	0.50	
Employee Satisfaction	EStf1	1	1	1	0	1	1	0.83	0.58
	EStf2	1	0	1	0	1	-1	0.33	
Average IOC score									0.87

APPENDIX D

Abbreviation of Constructs, Observed Variables and Items

Abbreviation of Constructs, Observed Variables and Items

Construct/ Observed Variable	Item	Abbreviation	Type of variable
Demand Management Capabilities (DMC)			
Delivery Reliability (Delv)	Effective delivery system	Delv1	Independent Variable
	Low delivery discrepancy	Delv2	
Timeliness (Time)	Fulfill customer's order on time	Time1	
	Focus on speed performance	Time2	
Customer Responsiveness (Rpsiv)	Understanding customer's requirement	Rpsiv1	
	Flexible response to special request	Rpsiv2	
Customer Information Quality (InfQ)	Real time access on product information	InfQ1	
	Accurate and reliable information	InfQ2	
Supply Management Capabilities (SMC)			
Supplier Selection (SSel)	Logistics capabilities based selection	SSel1	Independent Variable
	Work with small number of key suppliers	SSel2	
Strategic Supplier Alliances (SAli)	Involvement for strategic decisions	SAli1	
	Risks and rewards sharing	SAli2	
Communication (SCom)	Information exchange with supplier	SCom1	
	Effective communication on changes	SCom2	
Relationship (SRel)	Treat suppliers as extended functions	SRel1	
	Long term alliance relationship	SRel2	
Information Management Capabilities (IMC)			
IT Infrastructure (ITInfr)	IT infrastructure for maintaining real time data	ITInfr1	Independent Variable
	IT system for multiple platforms data exchange	ITInfr2	
Human IT Resource (HumIT)	Competent IT expertise	HumIT1	
	Well alignment of IT expertise and business	HumIT2	

Abbreviation of Constructs, Observed Variables and Items (Cont.)

Construct/ Observed Variable	Item	Abbreviation	Type of variable
Information Sharing (InfSh)	Effective information sharing between departments	InfSh1	
	Effective information sharing with supplier and customer	InfSh2	
Logistics Integration Capabilities (LIC)			
Standardization (Std)	Standardized logistics with common procedures	Std1	Mediating Variable
	Logistical operations on standard manner	Std2	
Cross-functional Integration (Crssfn)	Extensive utilization of cross functional work teams	Crssfn1	
	Integrate and reduce formal operational structure	Crssfn2	
Customer Integration (CIntg)	Joint effort for new product development	CIntg1	
	Joint effort for new market opportunity	CIntg2	
Supplier Integration (SIntg)	Cost information sharing with supplier	SIntg1	
	Strategic information sharing with supplier	SIntg2	
Firm Performance (FP)			
Profitability (Proft)	Better profitability over last 3 years	Proft1	Dependent Variable
	Better financial results than the same industry	Proft2	
Market Share (MkShr)	More market share over last 3 years	MkShr1	
	Better competitive position than the same industry	MkShr2	
Customer Satisfaction (CStf)	Customers are satisfied with products and services	CStf1	
	Better customer retention rate than the same industry	CStf2	
Employee Satisfaction (EStf)	Clear work instructions and guidelines for employee	EStf1	
	Lower employee's turnover rate than the same industry	EStf2	

APPENDIX E

Descriptive Statistics

Descriptive Statistics

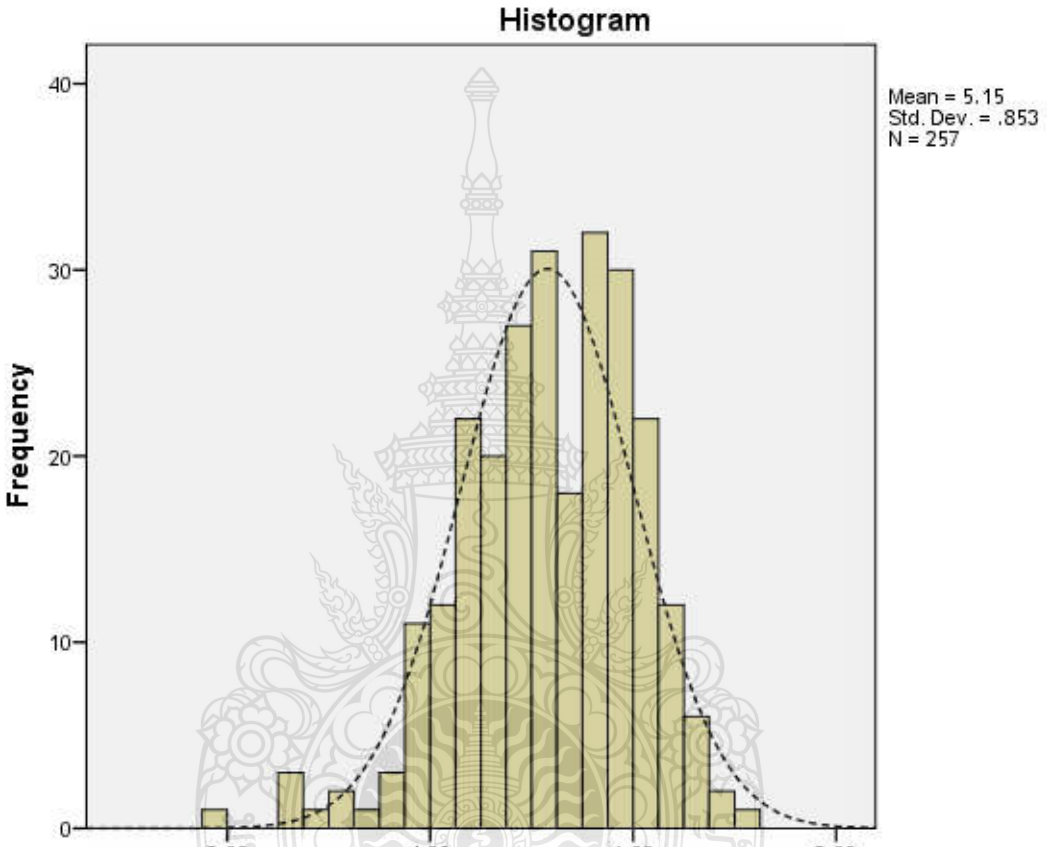
	N	Min	Max	Mean	Std. Dev.	Skewness		Kurtosis	
						Statistic	Std. Err.	Statistic	Std. Err.
Delv1	**257**	**2.00**	**7.00**	**5.4708**	**1.15588**	**-.487**	**.152**	**-.636**	**.303**
Delv2	**257**	**1.00**	**7.00**	**5.2840**	**1.30543**	**-.932**	**.152**	**.719**	**.303**
Time1	**257**	**2.00**	**7.00**	**5.5253**	**1.11468**	**-.635**	**.152**	**-.113**	**.303**
Time2	**257**	**1.00**	**7.00**	**5.7354**	**1.14224**	**-.814**	**.152**	**.498**	**.303**
Rpsiv1	**257**	**2.00**	**7.00**	**5.4436**	**1.08871**	**-.550**	**.152**	**-.185**	**.303**
Rpsiv2	**257**	**2.00**	**7.00**	**5.5447**	**1.17549**	**-.610**	**.152**	**-.393**	**.303**
InfQ1	**257**	**1.00**	**7.00**	**5.4591**	**1.24345**	**-.668**	**.152**	**.251**	**.303**
InfQ2	**257**	**1.00**	**7.00**	**5.6576**	**1.20524**	**-1.043**	**.152**	**1.296**	**.303**
SSel1	**257**	**2.00**	**7.00**	**5.4397**	**1.17479**	**-.386**	**.152**	**-.569**	**.303**
SSel2	**257**	**1.00**	**7.00**	**5.0973**	**1.37581**	**-.693**	**.152**	**.020**	**.303**
SAli1	**257**	**1.00**	**7.00**	**5.0934**	**1.33721**	**-.557**	**.152**	**.084**	**.303**
SAli2	**257**	**1.00**	**7.00**	**4.7004**	**1.43332**	**-.328**	**.152**	**-.381**	**.303**
SCom1	**257**	**1.00**	**7.00**	**5.2724**	**1.14040**	**-.327**	**.152**	**-.140**	**.303**
SCom2	**257**	**1.00**	**7.00**	**5.4475**	**1.10669**	**-.711**	**.152**	**.570**	**.303**
SRel1	**257**	**1.00**	**7.00**	**5.3074**	**1.18703**	**-.360**	**.152**	**-.219**	**.303**
SRel2	**257**	**1.00**	**7.00**	**5.5603**	**1.14106**	**-.714**	**.152**	**.599**	**.303**
ITInfr1	**257**	**1.00**	**7.00**	**5.3307**	**1.30637**	**-.611**	**.152**	**.173**	**.303**
ITInfr2	**257**	**1.00**	**7.00**	**4.7121**	**1.35597**	**-.252**	**.152**	**-.238**	**.303**
HumIT1	**257**	**1.00**	**7.00**	**5.0467**	**1.26157**	**-.430**	**.152**	**-.081**	**.303**
HumIT2	**257**	**1.00**	**7.00**	**5.0700**	**1.29714**	**-.445**	**.152**	**-.193**	**.303**
InfSh1	**257**	**1.00**	**7.00**	**5.3930**	**1.28286**	**-.756**	**.152**	**.144**	**.303**
InfSh2	**257**	**1.00**	**7.00**	**4.9144**	**1.36376**	**-.673**	**.152**	**.276**	**.303**
Std1	**257**	**2.00**	**7.00**	**5.1401**	**1.18414**	**-.160**	**.152**	**-.693**	**.303**
Std2	**257**	**1.00**	**7.00**	**5.1868**	**1.24536**	**-.432**	**.152**	**-.320**	**.303**
Crssfn1	**257**	**1.00**	**7.00**	**5.3307**	**1.22934**	**-.551**	**.152**	**-.013**	**.303**
Crssfn2	**257**	**1.00**	**7.00**	**5.2918**	**1.30670**	**-.554**	**.152**	**-.072**	**.303**

Descriptive Statistics (Cont.)

	N	Min	Max	Mean	Std. Dev.	Skewness Statistic	Skewness Std. Err.	Kurtosis Statistic	Kurtosis Std. Err.
CIntg1	**257**	**1.00**	**7.00**	**5.0817**	**1.36828**	**-.490**	**.152**	**-.213**	**.303**
CIntg2	**257**	**1.00**	**7.00**	**5.2412**	**1.37648**	**-.632**	**.152**	**-.146**	**.303**
SIntg1	**257**	**1.00**	**7.00**	**4.5058**	**1.43647**	**-.243**	**.152**	**-.417**	**.303**
SIntg2	**257**	**1.00**	**7.00**	**4.6693**	**1.46427**	**-.383**	**.152**	**-.121**	**.303**
Proft1	**257**	**1.00**	**7.00**	**4.6770**	**1.62523**	**-.524**	**.152**	**-.411**	**.303**
Proft2	**257**	**1.00**	**7.00**	**4.4475**	**1.47841**	**-.511**	**.152**	**-.298**	**.303**
MkShr1	**257**	**1.00**	**7.00**	**4.6770**	**1.45800**	**-.553**	**.152**	**-.103**	**.303**
MkShr2	**257**	**1.00**	**7.00**	**4.7432**	**1.45914**	**-.496**	**.152**	**-.196**	**.303**
CStf1	**257**	**2.00**	**7.00**	**5.3852**	**1.16402**	**-.745**	**.152**	**.133**	**.303**
CStf2	**257**	**1.00**	**7.00**	**5.0428**	**1.31180**	**-.550**	**.152**	**-.056**	**.303**
EStf1	**257**	**1.00**	**7.00**	**5.2918**	**1.27339**	**-.928**	**.152**	**1.051**	**.303**
EStf2	**257**	**1.00**	**7.00**	**4.6498**	**1.42039**	**-.550**	**.152**	**.041**	**.303**
Valid N (listwise)	**257**								

Descriptive Statistics (Cont.)

Histogram of Data Set of All Items



APPENDIX F

Reliability Statistics

Reliability Statistics

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	**257**	**100.0**
	Excluded[a]	**0**	**0.0**
	Total	**257**	**100.0**

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.965	**.966**	**38**

Summary Item Statistics

	Mean	Min	Max	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	**.424**	**.130**	**.854**	**.724**	**6.555**	**.014**	**38**

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Delv1	**190.3969**	**1002.850**	**.621**	**.644**	**.964**
Delv2	**190.5837**	**1003.119**	**.542**	**.578**	**.964**
Time1	**190.3424**	**1005.968**	**.600**	**.627**	**.964**
Time2	**190.1323**	**1008.389**	**.551**	**.509**	**.964**
Rpsiv1	**190.4241**	**1009.769**	**.559**	**.600**	**.964**
Rpsiv2	**190.3230**	**1000.993**	**.635**	**.701**	**.964**
InfQ1	**190.4086**	**998.375**	**.633**	**.664**	**.964**
InfQ2	**190.2101**	**995.268**	**.696**	**.726**	**.963**
SSel1	**190.4280**	**1000.722**	**.639**	**.634**	**.964**
SSel2	**190.7704**	**1002.990**	**.513**	**.523**	**.964**
SAli1	**190.7743**	**998.152**	**.588**	**.726**	**.964**
SAli2	**191.1673**	**998.554**	**.541**	**.688**	**.964**
SCom1	**190.5953**	**999.109**	**.683**	**.736**	**.964**
SCom2	**190.4202**	**995.338**	**.760**	**.790**	**.963**
SRel1	**190.5603**	**996.427**	**.691**	**.775**	**.963**
SRel2	**190.3074**	**998.550**	**.690**	**.742**	**.963**
ITInfr1	**190.5370**	**990.921**	**.693**	**.769**	**.963**
ITInfr2	**191.1556**	**987.569**	**.707**	**.772**	**.963**
HumIT1	**190.8210**	**992.851**	**.694**	**.759**	**.963**
HumIT2	**190.7977**	**987.342**	**.743**	**.804**	**.963**
InfSh1	**190.4747**	**987.086**	**.755**	**.738**	**.963**
InfSh2	**190.9533**	**990.138**	**.672**	**.695**	**.964**
Std1	**190.7276**	**998.933**	**.659**	**.738**	**.964**
Std2	**190.6809**	**992.124**	**.713**	**.789**	**.963**

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Crssfn1	**190.5370**	**993.078**	**.710**	**.792**	**.963**
Crssfn2	**190.5759**	**990.691**	**.696**	**.824**	**.963**
CIntg1	**190.7860**	**991.380**	**.654**	**.714**	**.964**
CIntg2	**190.6265**	**987.196**	**.700**	**.771**	**.963**
SIntg1	**191.3619**	**989.208**	**.646**	**.799**	**.964**
SIntg2	**191.1984**	**982.792**	**.705**	**.808**	**.963**
Proft1	**191.1907**	**992.358**	**.534**	**.674**	**.964**
Proft2	**191.4202**	**993.448**	**.579**	**.775**	**.964**
MkShr1	**191.1907**	**994.725**	**.574**	**.733**	**.964**
MkShr2	**191.1245**	**987.375**	**.656**	**.830**	**.964**
CStf1	**190.4825**	**1008.587**	**.537**	**.605**	**.964**
CStf2	**190.8249**	**996.215**	**.624**	**.709**	**.964**
EStf1	**190.5759**	**999.464**	**.603**	**.644**	**.964**
EStf2	**191.2179**	**1002.429**	**.502**	**.485**	**.964**

APPENDIX G

Collinearity Statistics

Collinearity Statistics

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1												
(Constant)	**.518**	**.356**		**1.455**	**.147**	**-.183**	**1.219**					
Delv2	**.218**	**.053**	**.246**	**4.112**	**.000**	**.113**	**.322**	**.592**	**.268**	**.166**	**.455**	**2.200**
Time1	**.210**	**.067**	**.202**	**3.134**	**.002**	**.078**	**.342**	**.571**	**.207**	**.126**	**.390**	**2.566**
Time2	**.083**	**.058**	**.082**	**1.429**	**.154**	**-.031**	**.197**	**.482**	**.096**	**.058**	**.496**	**2.016**
Rpsiv1	**-.011**	**.068**	**-.010**	**-.160**	**.873**	**-.144**	**.123**	**.473**	**-.011**	**-.006**	**.400**	**2.502**
Rpsiv2	**.113**	**.072**	**.115**	**1.567**	**.119**	**-.029**	**.255**	**.538**	**.105**	**.063**	**.303**	**3.303**
InfQ1	**-.058**	**.065**	**-.062**	**-.898**	**.370**	**-.185**	**.069**	**.447**	**-.061**	**-.036**	**.337**	**2.965**
InfQ2	**.144**	**.073**	**.150**	**1.973**	**.050**	**.000**	**.288**	**.540**	**.132**	**.080**	**.279**	**3.582**
SSel1	**.090**	**.065**	**.091**	**1.372**	**.171**	**-.039**	**.218**	**.477**	**.092**	**.055**	**.369**	**2.711**
SSel2	**.078**	**.049**	**.092**	**1.592**	**.113**	**-.018**	**.174**	**.379**	**.107**	**.064**	**.482**	**2.074**

Collinearity Statistics (Cont.)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1												
SAli1	**-.142**	**.066**	**-.164**	**-2.156**	**.032**	**-.272**	**-.012**	**.333**	**-.144**	**-.087**	**.280**	**3.571**
SAli2	**.159**	**.057**	**.197**	**2.782**	**.006**	**.046**	**.272**	**.352**	**.185**	**.112**	**.323**	**3.100**
SCom1	**-.026**	**.079**	**-.026**	**-.330**	**.742**	**-.183**	**.130**	**.376**	**-.022**	**-.013**	**.264**	**3.786**
SCom2	**-.179**	**.091**	**-.172**	**-1.968**	**.050**	**-.359**	**.000**	**.418**	**-.132**	**-.079**	**.214**	**4.678**
SRel1	**.094**	**.082**	**.096**	**1.136**	**.257**	**-.069**	**.256**	**.358**	**.077**	**.046**	**.227**	**4.413**
SRel2	**-.194**	**.079**	**-.192**	**-2.450**	**.015**	**-.351**	**-.038**	**.356**	**-.163**	**-.099**	**.265**	**3.777**
ITInfr1	**.123**	**.074**	**.139**	**1.666**	**.097**	**-.022**	**.268**	**.520**	**.112**	**.067**	**.234**	**4.269**
ITInfr2	**.097**	**.072**	**.114**	**1.350**	**.178**	**-.045**	**.238**	**.451**	**.091**	**.054**	**.230**	**4.356**
HumIT1	**.126**	**.075**	**.137**	**1.683**	**.094**	**-.022**	**.273**	**.454**	**.113**	**.068**	**.244**	**4.101**
HumIT2	**-.192**	**.080**	**-.215**	**-2.395**	**.017**	**-.349**	**-.034**	**.421**	**-.160**	**-.097**	**.202**	**4.960**

Collinearity Statistics (Cont.)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1												
InfSh1	**.189**	**.070**	**.210**	**2.713**	**.007**	**.052**	**.327**	**.515**	**.180**	**.109**	**.271**	**3.688**
InfSh2	**-.105**	**.061**	**-.124**	**-1.714**	**.088**	**-.227**	**.016**	**.326**	**-.115**	**-.069**	**.309**	**3.239**
Std1	**.002**	**.077**	**.002**	**.029**	**.977**	**-.149**	**.154**	**.508**	**.002**	**.001**	**.262**	**3.814**
Std2	**.179**	**.081**	**.193**	**2.221**	**.027**	**.020**	**.338**	**.579**	**.148**	**.089**	**.216**	**4.639**
Crssfn1	**-.045**	**.083**	**-.048**	**-.541**	**.589**	**-.209**	**.119**	**.465**	**-.037**	**-.022**	**.208**	**4.804**
Crssfn2	**-.004**	**.085**	**-.005**	**-.052**	**.959**	**-.172**	**.163**	**.457**	**-.004**	**-.002**	**.176**	**5.676**
CIntg1	**-.046**	**.064**	**-.054**	**-.717**	**.474**	**-.171**	**.080**	**.381**	**-.048**	**-.029**	**.287**	**3.485**
CIntg2	**-.053**	**.071**	**-.063**	**-.750**	**.454**	**-.192**	**.086**	**.375**	**-.051**	**-.030**	**.229**	**4.363**
SIntg1	**.092**	**.072**	**.114**	**1.278**	**.203**	**-.050**	**.234**	**.343**	**.086**	**.051**	**.203**	**4.931**
SIntg2	**-.026**	**.073**	**-.033**	**-.363**	**.717**	**-.169**	**.117**	**.395**	**-.025**	**-.015**	**.192**	**5.208**

Collinearity Statistics (Cont.)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1												
Proft1	**.030**	**.050**	**.042**	**.595**	**.552**	**-.069**	**.129**	**.293**	**.040**	**.024**	**.327**	**3.061**
Proft2	**-.038**	**.066**	**-.048**	**-.569**	**.570**	**-.169**	**.093**	**.288**	**-.038**	**-.023**	**.225**	**4.441**
MkShr1	**-.021**	**.062**	**-.027**	**-.346**	**.730**	**-.143**	**.101**	**.274**	**-.023**	**-.014**	**.267**	**3.749**
MkShr2	**.061**	**.077**	**.077**	**.784**	**.434**	**-.092**	**.213**	**.345**	**.053**	**.032**	**.170**	**5.873**
CStf1	**.067**	**.064**	**.068**	**1.057**	**.292**	**-.058**	**.192**	**.370**	**.071**	**.043**	**.397**	**2.522**
CStf2	**-.102**	**.066**	**-.116**	**-1.563**	**.119**	**-.231**	**.027**	**.322**	**-.105**	**-.063**	**.294**	**3.402**
EStf1	**.071**	**.061**	**.078**	**1.156**	**.249**	**-.050**	**.191**	**.395**	**.078**	**.047**	**.358**	**2.791**
EStf2	**-.048**	**.046**	**-.059**	**-1.050**	**.295**	**-.138**	**.042**	**.225**	**-.071**	**-.042**	**.518**	**1.931**

a. Dependent Variable: Delv1

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Delv2	Time1	Time2
1	1	36.672	1.000	.00	.00	.00	.00
	2	.216	13.025	.00	.00	.00	.00
	3	.138	16.303	.00	.00	.00	.00
	4	.121	17.414	.00	.01	.00	.01
	5	.097	19.412	.00	.00	.00	.00
	6	.068	23.209	.00	.00	.02	.01
	7	.067	23.423	.00	.01	.00	.00
	8	.052	26.504	.00	.12	.00	.00
	9	.048	27.767	.00	.01	.00	.00
	10	.045	28.453	.00	.04	.00	.00
	11	.044	28.958	.00	.01	.00	.02
	12	.036	31.715	.00	.02	.00	.00
	13	.034	32.678	.00	.00	.03	.00
	14	.029	35.355	.04	.00	.00	.02
	15	.027	37.060	.00	.04	.00	.03
	16	.025	38.633	.01	.06	.00	.03
	17	.024	39.341	.09	.18	.01	.01
	18	.022	40.673	.04	.08	.00	.05
	19	.021	41.804	.25	.02	.02	.24
	20	.019	43.709	.04	.00	.08	.02
	21	.018	45.495	.01	.01	.01	.00
	22	.017	46.291	.00	.02	.05	.00
	23	.016	48.176	.00	.01	.00	.12
	24	.014	50.930	.00	.04	.00	.00
	25	.013	52.347	.03	.05	.00	.05
	26	.013	53.672	.01	.00	.33	.08
	27	.012	54.278	.00	.05	.03	.06
	28	.012	54.481	.03	.01	.04	.00
	29	.011	59.046	.01	.00	.16	.01
	30	.010	59.429	.01	.00	.02	.01
	31	.009	62.908	.00	.00	.01	.01
	32	.009	63.872	.01	.00	.00	.02
	33	.008	66.672	.27	.01	.02	.05
	34	.008	69.009	.02	.00	.01	.04
	35	.007	73.147	.03	.03	.04	.06
	36	.006	79.238	.03	.00	.02	.00
	37	.006	80.335	.03	.15	.01	.02
	38	.005	87.906	.00	.00	.06	.00

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions						
		Rpsiv1	Rpsiv2	InfQ1	InfQ2	SSel1	SSel2	SAli1
1	1	.00	.00	.00	.00	.00	.00	.00
	2	.00	.00	.00	.00	.00	.00	.00
	3	.00	.00	.00	.00	.00	.01	.01
	4	.00	.00	.00	.00	.00	.02	.01
	5	.00	.00	.00	.00	.00	.00	.00
	6	.01	.01	.00	.00	.01	.06	.01
	7	.00	.00	.00	.00	.00	.01	.00
	8	.00	.00	.00	.00	.00	.04	.00
	9	.00	.00	.05	.01	.00	.01	.00
	10	.00	.00	.00	.00	.01	.15	.00
	11	.01	.00	.00	.00	.00	.03	.03
	12	.00	.01	.03	.02	.01	.00	.00
	13	.01	.00	.11	.03	.00	.06	.00
	14	.00	.01	.02	.01	.05	.01	.01
	15	.01	.02	.01	.00	.00	.12	.00
	16	.05	.00	.00	.00	.02	.11	.00
	17	.00	.00	.01	.00	.00	.02	.01
	18	.03	.08	.00	.01	.00	.00	.04
	19	.02	.00	.01	.02	.04	.00	.00
	20	.00	.02	.00	.04	.05	.01	.01
	21	.07	.01	.03	.00	.02	.05	.00
	22	.06	.02	.00	.02	.01	.01	.09
	23	.06	.01	.01	.01	.16	.09	.12
	24	.05	.08	.02	.02	.01	.00	.07
	25	.03	.00	.00	.02	.17	.01	.24
	26	.11	.00	.00	.01	.01	.01	.00
	27	.00	.09	.03	.01	.09	.01	.04
	28	.01	.00	.05	.00	.02	.02	.03
	29	.02	.03	.04	.01	.06	.02	.00
	30	.12	.11	.00	.00	.02	.03	.01
	31	.00	.01	.02	.04	.02	.00	.00
	32	.01	.04	.04	.02	.02	.02	.02
	33	.05	.01	.23	.15	.04	.02	.02
	34	.05	.01	.20	.45	.00	.03	.16
	35	.08	.11	.00	.01	.07	.00	.00
	36	.01	.05	.00	.01	.01	.00	.01
	37	.01	.00	.06	.06	.03	.02	.04
	38	.11	.25	.01	.02	.04	.00	.00

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions						
		SAli2	SCom1	SCom2	SRel1	SRel2	ITInfr1	ITInfr2
1	1	.00	.00	.00	.00	.00	.00	.00
	2	.00	.00	.00	.00	.00	.00	.00
	3	.04	.00	.00	.00	.00	.00	.00
	4	.02	.00	.00	.00	.00	.00	.01
	5	.00	.00	.00	.00	.00	.01	.02
	6	.00	.00	.00	.00	.00	.00	.00
	7	.00	.00	.00	.00	.00	.00	.00
	8	.01	.01	.00	.02	.01	.00	.01
	9	.00	.00	.00	.01	.00	.00	.00
	10	.00	.00	.00	.01	.00	.00	.01
	11	.04	.00	.00	.00	.00	.01	.00
	12	.02	.00	.00	.00	.00	.02	.00
	13	.01	.00	.00	.01	.00	.00	.04
	14	.07	.02	.01	.00	.00	.00	.00
	15	.10	.01	.00	.01	.00	.00	.00
	16	.13	.03	.01	.03	.02	.00	.01
	17	.02	.00	.01	.00	.01	.01	.00
	18	.03	.03	.01	.00	.03	.00	.01
	19	.00	.01	.00	.00	.01	.00	.01
	20	.07	.03	.00	.00	.00	.00	.04
	21	.00	.03	.00	.01	.03	.02	.18
	22	.01	.05	.01	.04	.01	.02	.02
	23	.06	.01	.01	.00	.00	.03	.00
	24	.01	.02	.07	.00	.01	.04	.02
	25	.08	.04	.01	.02	.04	.01	.02
	26	.00	.01	.02	.00	.03	.00	.05
	27	.00	.01	.04	.02	.00	.10	.03
	28	.04	.02	.02	.09	.04	.19	.06
	29	.05	.03	.00	.00	.00	.01	.00
	30	.01	.00	.01	.00	.01	.06	.01
	31	.03	.01	.01	.01	.01	.02	.04
	32	.05	.01	.03	.02	.12	.03	.13
	33	.02	.07	.01	.00	.05	.05	.14
	34	.02	.01	.01	.00	.01	.02	.01
	35	.03	.03	.00	.00	.03	.02	.02
	36	.00	.34	.14	.22	.31	.30	.08
	37	.02	.03	.03	.30	.12	.01	.00
	38	.01	.13	.52	.16	.07	.00	.02

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions						
		HumIT1	HumIT2	InfSh1	InfSh2	Std1	Std2	Crssfn1
1	1	.00	.00	.00	.00	.00	.00	.00
	2	.00	.00	.00	.00	.00	.00	.00
	3	.00	.00	.00	.00	.00	.00	.00
	4	.00	.00	.00	.01	.00	.00	.00
	5	.02	.01	.00	.01	.00	.00	.00
	6	.00	.00	.00	.00	.01	.01	.01
	7	.00	.00	.00	.01	.02	.01	.00
	8	.00	.00	.00	.00	.00	.00	.00
	9	.00	.00	.00	.00	.04	.02	.00
	10	.00	.00	.00	.01	.00	.00	.00
	11	.00	.01	.01	.04	.01	.00	.00
	12	.00	.00	.00	.06	.00	.00	.00
	13	.00	.01	.05	.09	.00	.00	.00
	14	.02	.00	.00	.12	.01	.01	.00
	15	.00	.00	.00	.09	.01	.02	.01
	16	.02	.00	.00	.00	.01	.00	.00
	17	.00	.00	.04	.00	.03	.00	.02
	18	.00	.00	.05	.01	.00	.00	.00
	19	.01	.00	.01	.04	.00	.00	.01
	20	.02	.01	.05	.02	.00	.03	.01
	21	.04	.04	.02	.01	.01	.02	.02
	22	.06	.02	.00	.00	.00	.01	.00
	23	.00	.01	.00	.00	.01	.01	.00
	24	.02	.01	.08	.02	.00	.04	.03
	25	.00	.01	.04	.01	.00	.01	.01
	26	.14	.02	.00	.00	.04	.02	.01
	27	.05	.01	.11	.01	.02	.01	.00
	28	.04	.04	.05	.04	.01	.00	.00
	29	.06	.02	.00	.02	.04	.00	.03
	30	.02	.08	.00	.01	.09	.00	.15
	31	.17	.31	.17	.05	.04	.01	.00
	32	.05	.21	.03	.02	.07	.02	.00
	33	.07	.01	.13	.05	.02	.01	.03
	34	.00	.00	.00	.01	.00	.00	.14
	35	.04	.00	.00	.04	.46	.65	.00
	36	.03	.07	.00	.09	.03	.03	.03
	37	.01	.01	.00	.01	.00	.00	.36
	38	.10	.09	.12	.12	.03	.05	.10

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions						
		Crssfn2	CIntg1	CIntg2	SIntg1	SIntg2	Proft1	Proft2
1	1	.00	.00	.00	.00	.00	.00	.00
	2	.00	.00	.00	.00	.00	.03	.02
	3	.00	.00	.00	.02	.02	.00	.01
	4	.00	.01	.01	.02	.01	.01	.00
	5	.00	.01	.01	.01	.01	.00	.00
	6	.01	.00	.00	.00	.00	.03	.01
	7	.00	.00	.00	.00	.00	.05	.02
	8	.01	.02	.02	.01	.02	.00	.00
	9	.00	.06	.03	.00	.00	.07	.01
	10	.00	.01	.00	.01	.03	.08	.06
	11	.00	.02	.00	.01	.00	.02	.01
	12	.00	.01	.01	.01	.01	.06	.00
	13	.00	.00	.00	.00	.00	.02	.02
	14	.00	.05	.00	.01	.00	.05	.02
	15	.01	.05	.00	.03	.02	.01	.03
	16	.01	.00	.01	.00	.00	.01	.00
	17	.01	.01	.00	.00	.01	.01	.04
	18	.00	.00	.02	.02	.01	.11	.00
	19	.00	.00	.00	.00	.04	.01	.02
	20	.00	.00	.00	.00	.01	.05	.09
	21	.02	.03	.04	.03	.00	.08	.00
	22	.00	.01	.01	.00	.04	.01	.00
	23	.01	.03	.00	.06	.06	.03	.00
	24	.02	.04	.01	.01	.00	.02	.02
	25	.00	.04	.03	.03	.02	.05	.02
	26	.00	.02	.00	.03	.02	.00	.05
	27	.00	.02	.05	.00	.00	.03	.05
	28	.01	.00	.04	.01	.01	.02	.00
	29	.13	.33	.16	.03	.03	.02	.04
	30	.00	.02	.28	.08	.08	.00	.00
	31	.00	.01	.00	.14	.16	.00	.15
	32	.01	.09	.02	.11	.08	.06	.08
	33	.01	.00	.01	.01	.02	.04	.08
	34	.04	.05	.06	.23	.20	.00	.01
	35	.00	.01	.00	.01	.01	.01	.01
	36	.11	.02	.01	.03	.00	.00	.00
	37	.38	.03	.09	.02	.06	.01	.08
	38	.18	.02	.09	.00	.02	.01	.01

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions					
		MkShr1	MkShr2	CStf1	CStf2	EStf1	EStf2
1	1	.00	.00	.00	.00	.00	.00
	2	.02	.01	.00	.00	.00	.01
	3	.00	.00	.01	.00	.00	.00
	4	.00	.00	.00	.00	.00	.00
	5	.00	.00	.00	.00	.00	.00
	6	.00	.01	.00	.00	.00	.03
	7	.01	.00	.01	.01	.03	.23
	8	.02	.00	.00	.01	.01	.00
	9	.01	.00	.02	.00	.00	.00
	10	.02	.04	.00	.01	.00	.05
	11	.00	.00	.01	.07	.02	.11
	12	.03	.00	.03	.01	.02	.26
	13	.00	.00	.00	.00	.00	.03
	14	.03	.02	.00	.00	.00	.00
	15	.07	.00	.01	.01	.05	.00
	16	.02	.00	.04	.01	.10	.01
	17	.13	.00	.01	.00	.08	.05
	18	.06	.01	.02	.00	.02	.02
	19	.00	.03	.01	.01	.01	.00
	20	.00	.00	.01	.15	.03	.01
	21	.01	.00	.00	.00	.06	.01
	22	.08	.00	.16	.05	.04	.00
	23	.01	.01	.01	.16	.01	.03
	24	.05	.02	.15	.05	.02	.01
	25	.13	.07	.00	.01	.00	.00
	26	.06	.00	.04	.01	.06	.02
	27	.02	.11	.01	.08	.03	.01
	28	.00	.03	.21	.01	.00	.02
	29	.00	.01	.01	.03	.08	.00
	30	.00	.01	.06	.06	.04	.01
	31	.00	.14	.01	.02	.03	.00
	32	.11	.12	.02	.00	.03	.01
	33	.02	.06	.10	.02	.03	.00
	34	.04	.03	.00	.02	.00	.01
	35	.00	.08	.00	.05	.02	.02
	36	.01	.02	.02	.03	.04	.00
	37	.02	.15	.00	.00	.10	.00
	38	.01	.00	.03	.09	.02	.02

a. Dependent Variable: Delv1

Biography

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Declaration

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