

**AN INVESTIGATION OF THE ANTECEDENTS AND IMPACTS OF
LOGISTICS MANAGEMENT CAPABILITIES AND LOGISTICS OUTSOURCING**

by

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This dissertation is dedicated to my family and my advisor, Nallan C. Suresh.

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ABSTRACT

Logistics costs constitute a significant portion of US economy every year. As operations become globalized and dispersed geographically, and channel power concentrated closer to the end-customer, logistics roles within companies have become more strategic. Hence, by cultivating and managing logistics capabilities efficiently and effectively, companies can achieve competitive edge. In this context, logistics outsourcing is becoming an important governance choice for acquiring required logistics capabilities, in more globalized and complex settings, requiring specialized expertise. Consequently, the market for logistics outsourcing has increased during the past few years and the magnitude of outsourced logistics is much higher than in-house logistics. This dissertation explores these issues under three essays described below.

The first essay investigates effects of logistics function on firm performance. The potential of logistics as a source of competitive advantage has traditionally not attracted much attention, because top management often has regarded logistics as a function merely to support other operations. Even though few studies identified distinctive capabilities which firms can derive from their logistics function and tested their strategic contributions to firm performance, those capabilities do not fully demonstrate the strategic potential of logistics functions because distinctive capabilities do not necessarily support the firm's competitive objectives. Therefore, this essay aims to find out the strategic value of logistics function and its effects on business performance drawing on the Theory of Production Competence. The Theory of Production Competence posits that a firm can generate improved performance by developing functional capabilities that need to be aligned with functional strategic objectives as well as the firm's overall strategic goals. The theory encompasses two different alignments: functional and strategic alignment. Adapting this theory into logistics settings, this essay defines the two alignments as

logistics competence and *strategic alignment*, respectively, and postulates that logistics competence can generate improved performance, conditional on higher strategic alignment. For testing the various hypotheses, primary data was collected from a sample of CEOs, senior managers, and mid- and upper-level supply chain and logistics managers in North American manufacturing firms. A new index to operationalize logistics competence was adopted. The results support most of the hypotheses and show that, developing logistics capabilities aligned with logistics strategic objectives, along with the firm's overall strategic goals, firms can lead to higher firm performance under many business settings.

The second essay investigates the effects of institutional pressures on the extent of logistics outsourcing based on the notions of institutional isomorphism. The essay hypothesizes that, in addition to rational efficiency, institutional pressures could be related to the stage of decisions on the extent of logistics outsourcing. In addition, firms are heterogeneous with respect to the extent of logistics outsourcing under a similar institutional environment in reality. This essay attempts to address the heterogeneity in the perspective of human agency perspective. Accordingly, this essay postulates that top management members' beliefs and behaviors mediate the impacts of institutional pressures on the extent of logistics outsourcing. The top management constitutes human agency, translating external influences into managerial actions on organizational structures, based on their perceptions and beliefs of institutional practices, providing internal institutional norms and values by which managers should engage in structuring actions related to the use of logistics outsourcing. To test the hypotheses, survey data was collected from manufacturing firms which had already outsourced parts or whole logistics functions and are North American companies. Using partial least squares (PLS) methodology, the effects of institutional pressures, rational efficiency, and top management on the extent of logistics outsourcing were tested. The

extent of logistics outsourcing was measured using two different measurement items: costs allocated to outsourced logistics activities over total logistics costs and the number of outsourced logistics activities. The results show that institutional pressures, rational efficiency have different results of their effects on the extent of logistics outsourcing depending on the measurement items. In addition, top management mediated the institutional effects on the extent of logistics outsourcing when the extent of logistics outsourcing is defined as the number of outsourced logistics activities.

The third essay presents a state-of-the-art survey of literature on logistics outsourcing and the status of logistics outsourcing in manufacturers. Based on a critical appraisal of past literature, this essay attempts to clarify and identify the major gaps for future research. In addition, this study also investigates the characteristics of logistics and logistics outsourcing by surveying the status of logistics outsourcing to derive a deeper understanding of logistics outsourcing. The survey targeted at a sample of CEO and senior managers and mid- and upper-level supply chain and logistics managers in manufacturing firms. The results are discussed at length in the essay to be topical relevance to both researchers and practitioners.

Keywords: Logistics competence, the theory of production competence, strategic alignment, firm performance, logistics outsourcing, rational efficiency, institutional isomorphism.

1 ESSAY ONE: Logistics Capabilities, Strategic Alignment and Firm Performance

1.1 INTRODUCTION

Business logistics costs constitute 7.50% of US GDP in 2016 (Kearney, 2017). Logistics management has emerged as one way for companies to gain a competitive edge. Logistics roles within companies have become more important and strategic as operations become globalized and dispersed geographically and channel power is concentrated closer to the end-customer (Bowersox, Closs, & Cooper, 2002). However, the potential of logistics as a source of competitive advantage has traditionally not attracted much attention. Top management often has regarded logistics as a function merely to support other operations. Therefore, the “needs for better understanding of the relationship between logistics function and improved firm performance” are growing (Fawcett, Smith, & Bixby Cooper, 1997).

Two research streams investigate the business performance implications of logistics functions (Fugate, Mentzer, & Stank, 2010; Lynch, Keller, & Ozment, 2000; Mentzer & Konrad, 1991). Studies in the first research stream have tried to identify distinctive logistics capabilities (Morash, Droge, & Vickery, 1996; Zhao, Dröge, & Stank, 2001). This argument’s underlying premise is that firms are competent in those identified capabilities, leading to competitive advantages and in turn generating enhanced firm performance. For example, Morash et al. (1996) identified logistics capabilities and categorized them into demand-oriented and supply-oriented capabilities. They found that those capabilities lead to improved firm performance by supporting value disciplines or strategy, such as customer closeness and operational excellence. To identify logistics capabilities that can be generalized across industries, Michigan State University (1995) investigated the world’s best firms and identified 17 world-class logistical capabilities and four competencies. These capabilities represent “the way and means of being world class” (p. 13).

However, one criticism of this approach is that distinctive capabilities do not necessarily support the firm's competitive objectives (Vickery, 1991).

The other research stream focuses on the strategic perspective of logistics functions performance implications. This perspective argues that logistics functions values should be understood based on how well they meet the firm's strategic goals. To generate enhanced business performance, logistics capabilities should be achieved according to logistics functional goals (Fugate et al., 2010). On the other hand, Lynch et al. (2000) have argued that firms should align their logistics capabilities with their business strategies because logistics capabilities are the means by which firms support their competitive objectives. However, research in this stream also has limited the performance implications into distinctive logistics capabilities.

This study's premise is that performance implications are a function of strategic alignment and functional alignment (Gonzalez-Benito, 2007; Henderson & Venkatraman, 1993; Lynch et al., 2000; Morash et al., 1996). In other words, the strategic potential of the logistics function depends on the alignment among logistics capabilities and their alignment with overall business and logistics objectives. However, to the best of my knowledge, scant studies have investigated the effect of these alignments on firm performance in logistics settings. Adapting the theory of production competence to a logistics setting, this study attempts to identify the true value of logistics functions for business performance and determine how firms develop logistics capabilities for competitive advantage.

This study expects to make theoretical and practical contributions to operations and logistics strategy literature as follows. First, it will apply the theory of production competence to logistics settings. Although the theory of production competence has been applied to various settings and identified as a useful tool to explain a function's value, research applying the theory

to logistics settings is scant. This study then refines measures for strategic alignment. Because previous studies have acknowledged the need for new means of measuring strategic alignment, this study will propose new approaches to refine the current measures for strategic alignment. Finally, this study empirically supports performance implications as a function of strategic alignment and functional alignment. For effective logistics management, this study argues that managers must pay attention to both strategic and functional alignments and configure them in a symbiotic way.

1.2 THEORY OF PRODUCTION COMPETENCE

The theory of production competence originates from the notion of the alignment-performance link within organizations, which supporting the business strategy can enhance organization performance (Baier, Hartmann, & Moser, 2008; Cleveland, Schroeder, & Anderson, 1989; Gonzalez-Benito, 2007). Ever since Skinner (1969) pointed out the importance of alignment between a firm's manufacturing function strategy and its overall strategy plans, subsequent research has aimed to identify that this alignment generates better organizational performance (Cleveland et al., 1989; Hayes & Wheelwright, 1984). For example, Hayes and Wheelwright (1984) developed a framework for the product-process matrix. The framework explains that once the product and process structures are aligned, the firm is able to generate superior performance. Criticizing the fixed attribute of this framework, however, Cleveland et al. (1989) propose a theory of production competence, which defined competence as a variable and links competence with a firm's performance within its own industry.

Cleveland et al. (1989) measured production competence by matching business strategy and manufacturing processes. For business strategy and manufacturing processes, they used Porter's generic strategies and the four process life cycle states of Hayes and Wheelwright (1984),

respectively. However, Vickery (1991) made two criticisms of the methodology to measure production competence. First, manufacturing processes (e.g., job shop, batch, etc.) are not appropriate proxies to encompass facilities, technology, and policies. Second, although manufacturing strategy formulation and implementation are the means by which the manufacturing unit actively supports the firm’s overall strategy goals, Cleveland et al. (1989) failed to link the conceptualization of production competence to manufacturing strategy formulation and implementation. Therefore, Vickery (1991) suggested an alternative conceptual framework for the production competence construct in the context of “a process model of manufacturing strategy” (p. 639).

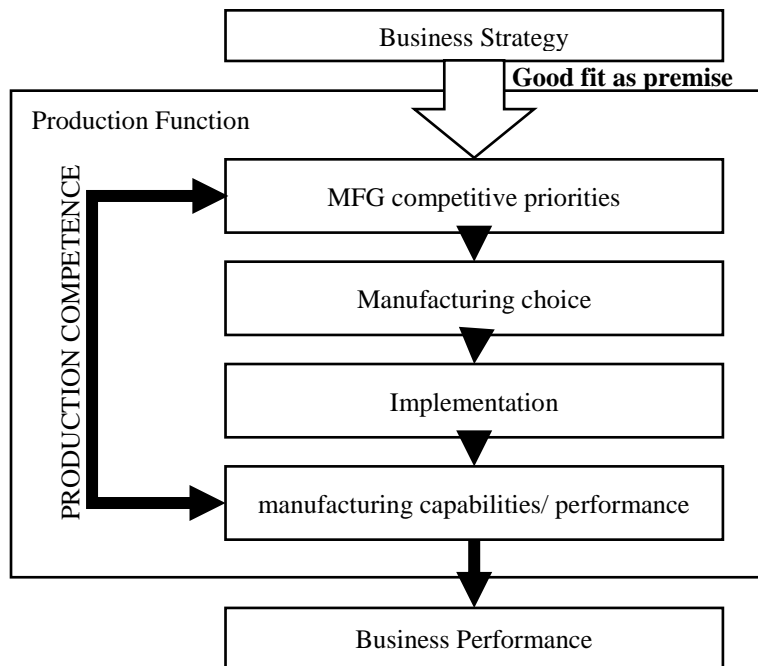


Figure 1.1. Theory of production competence (Vickery, 1991)

As shown in Figure 1.1, Vickery (1991) tried to conceptualize production competence with respect to the formulation and implementation of manufacturing strategy because these features provide means by which the manufacturing unit actively supports the firm’s overall strategic goals. Based on the premise that “manufacturing strategy is developed in the context of and

concomitantly with a firm's business strategy," the process model identifies manufacturing's strategic objectives, termed "competitive priorities" (p. 639). The firm's overall business strategy specifies comparative priorities and their relative importance. Typical comparative priorities in a manufacturing setting are cost, quality, delivery, and flexibility. After the firm sets specific numerical targets for performance measures associated with the competitive priorities, it formulates and implements manufacturing strategies to achieve the competitive priorities through strategic manufacturing decision-making on facilities, technology, and policies.

In the next stage of implementation, the firm uses projects and programs to carry out the strategic decisions successfully, and in the final stage, the firm measures and assesses manufacturing performance, identifying manufacturing strengths and weaknesses. The firm then computes production competence by subtracting the information from the final stage from the specified importance of the competitive priorities. Correcting and modifying the method to measure production competence, Vickery (1991) argued that strategic manufacturing decision-making and implementation provide a more accurate lens through which to view the role a manufacturing unit plays in actively supporting a firm's business strategy. Consequently, the construct of production competence can be valuable for understanding the contribution of manufacturing to performance.

Subsequent research raises the possibility that strategy at a given functional level may not be consistent with business strategy. According to Vickery (1991), functional strategic objectives are assumed to be well aligned with the firm's business strategy because functional strategy "should not be developed independently of business strategy" (p. 639). However, Gonzalez-Benito (2007) applied the theory of production competence in purchasing settings and pointed out that purchasing managers may not fully understand the business strategy but purchasing strategic

objectives, because managers might be excluded from the business strategic planning process. He argued that Vickery's (1991) conceptualization of a competence can only capture a functional attribute and that functional strategic objectives "must be compared to determine fit" with external environments (p. 904). Gonzalez-Benito (2007) criticized Vickery's (1991) premise and extended the theory of production competence, cautioning that Vickery's premise might not fit reality, especially when the competence concept is applied to a supporting functional setting such as purchasing. Even Vickery, Droge, and Markland (1993) admit that production competence may affect business performance more for certain strategies than for others. They provide empirical evidence that production competence generates higher performance in firms with a differentiation strategy than in firms with a mixed differentiation/cost strategy. These results imply that the true value of a function cannot be explained fully unless the function is well aligned with the firm's business strategy (Gonzalez-Benito, 2007). Hence, applying the theory of production competence to other functional settings, strategic alignment of the functional strategic objectives with the firm's business strategy or its business environment should be considered (Gonzalez-Benito, 2007; Vickery, 1991).

Gonzalez-Benito (2007) suggests that performance implications are functions of strategic alignment and functional alignment. He argued that the contribution of the purchasing function to business performance can be determined when purchasing strategic objectives are aligned with business strategy. It is common that a firm does not develop its purchasing strategy concomitantly with its business strategy because purchasing managers might not be fully aware or have a clear understanding of the business's strategy, especially if they do not participate directly in the business strategic management process. Baier et al. (2008) also agreed that lack of alignment of

purchasing strategic objectives with a firm's overall strategy can impede the firm's ability to generate the full value-creation potential of the purchasing function.

Applying the theory of production competence to other functional areas engenders methodological challenges (Gonzalez-Benito, 2007). First, designing comparable measures of objectives and capabilities is necessary to operationalize a competence for the function. The comparable measures must enable the researcher to create numerical indices quantifying the fit between the objectives and the capabilities. In addition to the competence construct operationalization, the operationalization of strategic alignment is also challenging. Previous research has captured strategic alignment based on the concept of fit. For example, Baier et al. (2008) used the 'fit as profile deviation' approach to capture strategic alignment in purchasing settings. However, measuring strategic alignment based on the concept of fit has limitations. First, identifying a comprehensive yet parsimonious list of business strategies and functional strategy components is difficult (Vickery et al., 1993). Furthermore, the measure should be able to determine the correct configuration of those components (Papke-Shields & Malhotra, 2001). Therefore, an alternative measure should be considered (Papke-Shields & Malhotra, 2001).

Gonzalez-Benito (2007) suggested to capture strategic alignment with the concept of strategic integration. He argued that the measures for the strategic alignment can capture the fit on a continuous basis, rather than only being a static snapshot of the fit. However, one criticism of Gonzalez-Benito's approach is that strategic integration provides the means to achieve alignment but does not capture the fit itself. In particular, one strategic integration element, the participation and involvement of purchasing department managers in the strategic planning process, is a concept distinct from that of strategic alignment and an antecedent to achieving alignment rather than the alignment itself (Papke-Shields & Malhotra, 2001). Therefore, despite research supporting the

conceptualization's validity, Gonzalez-Benito (2007) also called for an alternative measure for strategic alignment to provide more precise results.

The simplicity of conceptual adaptation has enabled application of the theory of production competence to many settings, including manufacturing (Cleveland et al., 1989; Vickery, 1991; Vickery et al., 1993), purchasing (Baier et al., 2008; Gonzalez-Benito, 2007), and marketing (Dröge, Vickery, & Markland, 1994). However, the theory of production competence has not yet been adapted to the context of logistics. In applying the theory of production competence to logistics settings, this study argues that logistics strategies and capabilities should support business strategy requirements to better understand the strategic contribution of logistics functions. Although Morash et al. (1996) implicitly acknowledged the importance of the alignment between strategic logistics objectives and capabilities, they did not test the alignment's effects on firm performance, which is essential for identifying the logistics function's potential contribution to business performance.

1.3 HYPOTHESIS DEVELOPMENT

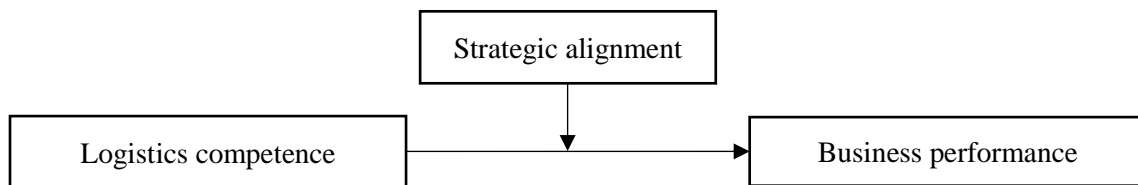


Figure 1.2. Proposed model

Applying the theory of production competence to the logistics function, business performance is postulated as a function of strategic alignment and logistics competence as shown in Figure 1.2. Logistics competence refers to the alignment between a firm's strategic logistics objectives and its capabilities. Logistics competence represents the capability of the logistics function to support their functional strategic objectives. Strategic alignment is defined as the degree of understanding

and agreement between top management and managers at logistics functions on organizational goals and the role of logistics in supporting the firm's strategic direction (Papke-Shields & Malhotra, 2001). Because logistics managers might not be fully aware of or have a clear understanding of the business's strategy, strategic alignment which is the fit between business strategy and logistics strategic objectives varies across firms. Therefore, this study argues that logistics' contribution to business performance depends on the degree to which strategic logistics objectives are aligned with the firm's business strategy.

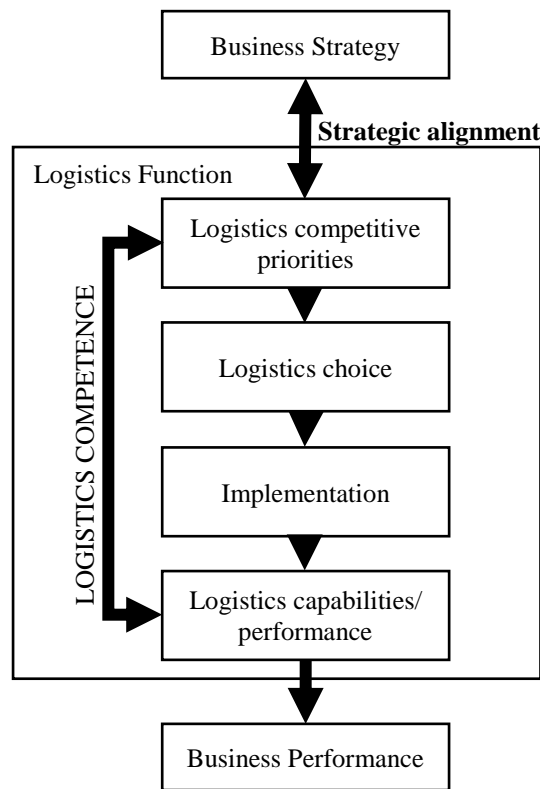


Figure 1.3. Application of the theory of production competence in logistics setting

To explain the alignment between strategic logistics objectives and logistics capabilities and its effect on business performance, Figure 1.3 reproduces the strategic process model in Vickery (1991) in the context of the logistics function. A firm identifies strategic logistics objectives (logistics competitive priorities: e.g., cost, quality, reliability, responsiveness, asset

usage, and geographical coverage) and prioritizes them according to its business strategy. Then, logistics aims to support its competitive priorities by formulating and implementing logistics strategies. First, the firm makes decisions about how best to achieve the strategic logistics objectives, including sourcing (in-house vs outsourcing), facilities (e.g., warehouses, distribution centers, transportation), technology (e.g., an integrated system of information exchange), and policies (e.g., centralized logistics' organizational control and the firm's measurement system design). The firm selects and implements projects and programs to carry out these strategic decisions successfully. According to Vickery (1991), the firm should evaluate projects and programs regularly to measure progress. In the end, the firm identifies strengths and weaknesses by measuring logistics performance and formulate a numerical measure based on the difference between the performance and the importance assigned to the logistics competitive priorities. The difference represents the degree to which logistics performance achieves competitive priorities.

The theory of production competence supports the positive influence of logistics competence on business performance. Vickery (1991) argued that production competence is “closely tied to the development and implementation of manufacturing strategy” (p. 641), which provides the means by which manufacturing actively supports the firm's overall strategic goals and enhances business performance. In the same vein, higher logistics competence can support the functional strategic objectives and, in turn, firm's overall strategic goals.

Arguably, because logistics competence represents a functional attribute, logistics competence alone is not enough to contribute to performance, especially when strategic logistics objectives are not aligned with business strategy. However, even when the alignment of strategic logistics objectives with business strategy is low, firms with higher logistics competence might generate better performance, or at least perform at the same level of strategic alignment. Studies

investigating the performance effects of logistics capabilities and practices may support this argument. Therefore, this study makes the following hypothesis.

H1: Logistics competence has a positive effect on business performance.

Strategic alignment refers to the degree of understanding and agreement between top management and managers at the logistics function on (a) organizational goals and the logistics function and (b) the ways in which logistics support the firm's strategic direction. This study posits that to generate extra business performance, the effect of logistics competence depends on its strategic alignment. Previous studies have paid attention to the role of strategic alignment in competence construct conceptualization (Baier et al., 2008; Gonzalez-Benito, 2007), arguing that to fully contribute to business performance, functional strategic objectives should be aligned with business strategy . Reviewing literature on the performance effects of a competence, for example, Vickery et al. (1993) pointed out that “production competence may be more important for certain strategies than for others with respect to its effect on business performance” (p. 436). Based on this notion, Vickery et al. (1993) expanded Vickery's (1991) previous model and explained business performance as a function of the interaction between product competence and a specific business strategy. In addition, pointing out the reality that purchasing managers might not be fully aware of business strategy, Gonzalez-Benito (2007) separated strategic alignment from the functional alignment of the purchasing department. Given that purchasing competence is a function of purchasing efficacy (functional alignment) and strategic alignment, Gonzalez-Benito (2007) argued that business performance can be fully explained by purchasing efficacy only if the purchasing strategic objectives are fully aligned with business strategy.

This study argues that business performance is a function of logistics competence and its strategic alignment. According to the process model reproduced above in Figure 1.3. Application

of the theory of production competence in logistics setting, business strategy is realized by formulating and implementing logistic competitive priorities. Aligning the goals and objectives between the overall business and the logistics function, a firm can generate adequate logistics capabilities to support its strategic direction. When strategic logistics objectives are closely aligned with the firm's business strategy, the firm allocates resources to the logistics function so that the logistics function can deliver increased value to the customer through capabilities, including lower costs and reliable, no-damage, and timely delivery (Papke-Shields & Malhotra, 2001; Skinner, 1969). However, strategic alignment itself might not be sufficient to lead to enhanced performance, considering that only strategic alignment can underestimate the difficulty or risks of designing business processes and configuring logistics capabilities according to its functional strategic objectives (Henderson, 1993). Alternatively, only considering logistics competence separately would be dysfunctional. Therefore, strategic alignment and logistics competence should be balanced for effective logistics management. Hence, firms can then achieve greater market share and sales and ultimately improve business performance. Therefore, this study postulates the following hypothesis.

H2: Strategic alignment strengthens the performance effects of logistics competence.

1.4 DATA AND METHODOLOGIES

1.4.1 Data Collection and Sampling

To verify our hypotheses, we developed and sent a questionnaire to three logistics and supply chain managers for reviewing readability, ambiguity, and completeness (Dillman, 2000). In addition, three academics reviewed survey items for content validity and ambiguity. After the review process, we made minor changes. Using Qualtrics, we sent the edited questionnaire to manufacturing firms registered in the *NY Manufacturer Register Directory 2016* for a pilot test,

using the data to test reliability and validity for measurement. The pilot test also checked whether data was collected properly through Qualtrics.

For a large-scale survey, we compiled the sample frame from the *Dunn and Bradstreet 4000 US Manufacturer Register*. The survey targeted a sample of CEOs, senior managers, and mid- and upper-level supply chain and logistics managers at North American manufacturing firms. We conducted an e-mail validation exercise that resulted in a final mailing list of firms (4000 → 3167). In accordance with Dillman (2000), an additional three e-mail reminders followed the initial e-mail blast, resulting in 185 responses (5.84%).

Table 1.1 shows a detailed demographic breakdown of the survey respondents. Most respondents were C-level executives (11.89%), directors, or department heads, mainly in supply chain management, logistics, and operations (14.59%), and logistics and supply chain managers (51.89%). Even though some of the respondents did not include “logistics” and “supply chain” in their job titles, they held positions overseeing logistics and supply chain functions.

Because this research targeted manufacturing firms, the first two digit codes of the SIC ranged from 20 to 39. Over 30% of respondents worked in metal, machinery, or electronic equipment-related industries. The other respondents were scattered across industries. The median amount of the firms’ annual sales was located in \$20–100 million, and the number of employees ranged from 51 to 200. The distributions of annual sales and the number of employees shows that the sample is heterogeneous. The range and size of the firms and the diversity of industries represented suggest that any systematic bias can be excluded.

Table 1.1. Demographic description

		No.	%
SIC Code	20 Food and Kindred Products	13	7.03
	22 Textile Mill Products	1	0.54
	23 Apparel and other Finished Products	3	1.62
	24 Lumber and Wood Products, except Furniture	2	1.08
	25 Furniture and Fixtures	4	2.16
	26 Paper and Allied Products	4	2.16
	27 Printing, Publishing, and Allied Industries	4	2.16
	28 Chemicals and Allied Products	11	5.95
	29 Petroleum Refining and Related Industries	4	2.16
	30 Rubber and Miscellaneous Plastics Products	8	4.32
	31 Leather and Leather Products	1	0.54
	32 Stone, Clay, Glass, and Concrete Products	9	4.86
	33 Primary Metal Industries	14	7.57
	34 Fabricated Metal Products	14	7.57
	35 Industrial and Commercial Machinery and Computer Equipment	16	8.65
	36 Electronic and other Electrical Equipment and Components	17	9.19
	37 Transportation Equipment	13	7.03
	38 Measuring, Analyzing, and Controlling Instruments	6	3.24
	39 Miscellaneous Manufacturing Industries	4	2.16
Missing	37	20.00	
No of Employees	≤ 10	20	10.81
	11 to 50	36	19.46
	51 to 200	62	33.51
	201 to 1000	38	20.54
	More than 1000	19	10.27
	Missing	10	5.41
Sales	≤ 5M	22	11.89
	5 to 20M	26	14.05
	20 to 100M	51	27.57
	100M to 1B	31	16.76
	>1B	16	8.65
	Missing	39	21.08
Titles	CEO, Owner, General VP/Director	22	11.89
	VP/Director Operations, Planning	8	4.32
	Operations, Planning Manager	10	5.41
	VP/Director Logistics, Supply Chain	27	14.59
	Logistics, Supply Chain Manager	96	51.89
	VP/Director Account, Marketing, Purchasing	1	0.54
	Account, Marketing, Purchasing Manager	10	5.41
	Missing	11	5.95

1.4.2 Nonresponse Bias

We checked nonresponse bias with t-tests comparing earlier respondents and later respondents using demographic variables (Armstrong & Overton, 1977). We found no significant difference between operating environments ($\chi^2=2.854$, $p=0.415$), numbers of employees ($\chi^2=2.076$, $p=0.722$), or sales ($\chi^2=4.629$, $p=0.328$). These values imply that results were not subject to nonresponse bias.

1.4.3 Measurements

This study posits that business performance is a function of logistics competence and strategic alignment. It lists measurement items for logistics competence and describes the measurement of logistics competence. It also provides lists of measurement items for strategic alignment and business performance.

1.4.3.1 Logistics Competence

Logistics competence reflects a functional alignment and is defined as the fit between strategic logistics objectives and logistics capabilities. Following Gonzalez-Benito's (2007) procedure, this study identified six priorities for logistics from the logistics literature and broke them down into 19 easier-to-assess objectives. The objectives are listed in Table 1.2. To measure strategic logistics objectives and logistics capabilities, we asked respondents to rate the strategic importance or weight, and performance or strengths, of strategic logistics objectives with respect to cost, quality, reliability, responsiveness, asset utilization, and geographical coverage on seven Likert scales.

We adopted the measurement items for the strategic logistics objectives from prior research on logistics, primarily using three studies to identify strategic logistics objectives. Fawcett et al. (1997) investigated the role of measurement activities in operational performance and emphasized their alignment with strategic priorities. Morash et al. (1996) attempted to identify the performance

implications of distinctive logistics capabilities. *World Class Excellence* (Michigan State University, 1995), which identified logistics capabilities, attempted to generalize logistics capabilities to achieve and sustain world-class excellence and identified 17 capabilities and four competencies. We also referred to other previous works to identify strategic logistics objectives.

Table 1.2. Measurement items for each priority

<u>Construct</u>	<u>Measurement</u>	<u>Literature</u>
Cost	The total cost of distribution Inventory costs (raw materials, finished goods, and pipeline) Transportation costs Logistics labor productivity Labor cost associated with the distribution/warehousing	Fawcett et al. (1997); Morash et al. (1996)
Quality & Reliability	Ability to not damage product during handling Ability to track shipments Ability to deliver expedited shipments Delivery lead time for goods shipped On-time delivery performance	Fawcett et al. (1997)
Responsive- ness	Ability to accommodate special or non-routine requests Ability to handle unexpected events Ability to provide rapid response to customer requests	Fawcett et al. (1997)
Innovation	Aggressiveness in increasing the value-added content of logistics activities Aggressiveness in reducing order cycle time (i.e., logistics cycle time) Ability to provide new and better logistics activities	Fawcett et al. (1997)
Geographical locations	Geographical locations to the firm's distribution model Ability to effectively provide widespread and/or intensive distribution coverage Ability to effectively target selective/exclusive distribution outlets	Morash et al. (1996)

From the literature, we compiled and categorized strategic logistics objectives based on competitive priorities such as cost, quality, delivery, flexibility, asset utilization, and geographical coverage. Cost refers to the ability to minimize the total cost of distribution. Quality refers to the ability to distribute products or materials in conformance with customer requirements and

standards. Quality also involves the ability to deliver products, materials, and services without errors, defects, mistakes, or other departures from customers' expectations, where "customers" were both internal and external. Delivery dimensions involve two subdimensions, including reliability and speed. Delivery reliability is defined as the ability to exactly meet quoted or anticipated delivery dates and quantities. Delivery speed refers to the ability to reduce the time between order taking and customer delivery to as close to zero as possible (Morash et al., 1996).

Responsiveness is defined as flexibility and responsiveness in satisfying changing customer requirements and demands, thus demonstrating the firm's ability to respond to the needs and wants of the firm's target market(s). Asset utilization measures operational efficiency with respect to asset efficiency (K.-H. Lai, Ngai, & Cheng, 2004). Asset efficiency is measured to (a) improve the rate of utilization of facilities/equipment/manpower in providing the services, (b) improve the cash to cash cycle time, and (c) improve net asset returns. Geographical coverage involves two subdimensions, including widespread distribution coverage (availability) and selective distribution coverage. Widespread distribution coverage (availability) refers to the ability to effectively provide widespread and/or intensive distribution coverage. Selective distribution coverage is defined as the ability to effectively target selective or exclusive distribution outlets.

1.4.4 Measuring Logistics Competence

This study, in line with the multidimensional approach (Safizadeh, Ritzman, & Mallick, 2000), adopts a measure for the fit from Gonzalez-Benito (2007). We named an equation of the measure for logistics competence LC as follows:

$$LC = \sum_{i=1}^{19} (7 - |W_i - P_i|)$$

where, W_i is a weight, and P_i is performance.

In the equation, LC is defined as the absolute difference between the weight and the achieved performance for each objective. LC has two distinct characteristics to capture the fit between strategic logistics objectives and logistics capabilities. First, because the key to success is prioritizing rather than generating logistics capabilities, “strength in an irrelevant aspect reflects a waste and is as unfavorable as weakness in a relevant aspect” (p. 908). In addition, LC is also compatible with the tradeoffs concept because it is not artificially inflated when the company pursues and/or achieves a wide portfolio of objectives.

Furthermore, the LC index addresses sources of common method variance. Collecting data in this study from self-reports could have caused common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). For example, some respondents might be prone to assign higher or lower values to all items in a questionnaire through acquiescence, the so-called “acquiescence biases” (p. 882). Other respondents, however, may tend to respond to the items more as a result of their social acceptability than their true feelings, “social desirability” (p.882). However, because LC is based on the differences between weights and strengths rather than on the absolute values given to these two parameters, the sources of common method variance do not affect it (Gonzalez-Benito, 2007).

In addition, propensity for respondents to agree (or disagree) with questionnaire items independent of their content could cause another common method variance in the hypotheses analysis because, along with the other measures, business performance measures could be systematically overvalued or undervalued, potentially leading to artificial covariance between LC and business performance (Gonzalez-Benito, 2007; Podsakoff et al., 2003). However, LC, unaffected by the source of common method variance, can limit common method bias.

However, a source of common method variance should be addressed during the LC calculation (Gonzalez-Benito, 2007). Respondents might be prone to maintain consistency in their responses to questions of weights (W_i) and strengths (P_i). This tendency is called consistency motif, which can inflate LC. To assess the extent to which consistency motif is a problem, we adapted Harman's single-factor test described by Podsakoff and Organ (1986).

1.4.4.1 Strategic Alignment

Strategic alignment refers to the degree of understanding and agreement between top management and the logistics function regarding (a) organizational goals and the logistics function and (b) how logistics can support the firm's strategic direction. This definition is based on the notion that alignment may manifest through logistics managers' understanding of organizational objectives, a perceived need to change logistics objectives in light of changes in business strategy, and mutual understanding between top management and logistics managers. Segars and Grover (1998) developed a measure for strategic alignment in the information systems management context. Like Papke-Shields and Malhotra (2001), who adapted the concept to the manufacturing context, this study adapts the measure to the logistics context, as shown in Table 1.3, comparing measurement items of strategic alignment and measurement items from Gonzalez-Benito (2007).

1.4.4.2 Business Performance

To measure business performance, we adopted both sales growth and financial measures (Venkatraman & Ramanujam, 1986). Financial measures include profits as percent of sales, return on investment (ROI), return on assets (ROA), Growth in ROI, and Growth in ROA. Vickery (1991) suggested that sales growth and financial performance measures should be appropriate to measure business performance because manufacturing performance measurements should overlap with competitive priorities (Gonzalez-Benito, 2007).

Table 1.3. Measurement items for strategic alignment and business performance

<u>Construct</u>	<u>Items</u>	<u>Measurement</u>	<u>Literature</u>
Strategic alignment	SA01	Understanding the strategic priorities of top management	Papke-Shields and Malhotra (2001)
	SA02	Aligning logistics strategies with the organization's strategic plan	
	SA03	Adapting the goals/objectives of the logistics function to the changing goals/objectives of the firm	
	SA04	Maintaining a mutual understanding with top management on the role of the logistics function in supporting organizational strategy	
	SA05	Educating top management on the importance of logistics functions	
Business performance	Perf01	Sales growth (of main product)	Gonzalez-Benito (2007); Venkatraman (1986)
	Perf02	Profits as percent of sales	
	Perf03	Return on investment (ROI)	
	Perf04	Return on assets (ROA)	
	Perf05	Growth in return on investment (growth in ROI)	
	Perf06	Return on sales (ROS)	

1.4.5 Moderated Multiple Regression

To test direct performance effects of logistics competence, this study set a simple regression model to regress business performance on logistics competence index. In addition, the moderating effect of strategic alignment on the relationship between logistics competence and business performance was tested using moderated multiple regression, one of the most common techniques in strategy and operations studies for testing moderation when moderator variables are continuous (Aguinis, Edwards, & Bradley, 2016; Aiken, West, & Reno, 1991).

To test the moderation effects of strategic alignment, we added strategic alignment after testing simple regression, then added a product term of strategic alignment and logistics competence. The regression coefficient for the product term from which X and Z have been partialled out indicates the strategic alignment's presence and magnitude. According to Sharma, Durand, and Gur-Arie (1981), the moderator can be distinguished based on whether it is a predictor

of the dependent variable. If strategic alignment is not a predictor of business performance, strategic alignment is a *pure moderator*. However, if strategic alignment is a predictor, it can be defined as a *quasi moderator* (Sharma et al., 1981). Once we tested the moderation statistically, we plotted the interaction to clarify its meaning (Aiken et al., 1991).

1.5 RESULTS

1.5.1 Measurement Reliability and Construct Validity

We assessed the reliability and validity of constructs and their underlying items to validate measurements for strategic alignment and business performance (Gonzalez-Benito, 2007) using confirmative factor analysis (CFA) (Bagozzi, Yi, & Phillips, 1991). Before the CFA assessment, we conducted Little's MCAR test to examine whether missing cases were missing completely at random (MCAR) because variables for business performance include missing cases. If the test result is not significant, the data are assumed to be MCAR, which means that the data's absence "does not depend on the observed data values nor on the missing data values" (Little & Rubin, 2014; Newman, 2014; Schafer & Graham, 2002). Because the p values of Little's MCAR test for business performance are not significant, the missing values are MCAR and can be imputed using the expectation-maximization (EM) algorithm (Newman, 2014). The EM algorithm is one of the maximum-likelihood (ML) approach procedures for missing value imputation. The algorithm is recommended for calculating a correlation matrix, means, and standard deviations (Newman, 2014). After the data imputation procedure, we conducted CFA using AMOS 22. Table 1.4 presents the results.

The CFA results and Cronbach's α provide evidence of measurement construct validity and reliability. The Cronbach's α for each constructs and items' loadings on their corresponding

constructs show internal consistency. The CFA results indicate an acceptable fit ($\chi^2/d.f.= 1.697$, RMSEA = 0.062; GFI= 0.927; TLI= 0.972; CFI= 0.978) (Hair, 2010; Steiger, 2007).

For convergent and discriminant validity, Cronbach's α , composite reliability, and average variance extracted (AVE) were calculated and the correlation between the constructs and squared AVE (0.778, 0.832 for strategic alignment and business performance, respectively) were compared, as shown in the Table 1.4.

Table 1.4. CFA results of strategic alignment and business performance

<u>Construct</u>	<u>Indicators</u>	<u>Mean (S.D.)</u>	<u>Strategic alignment</u>	<u>Business performance</u>	<u>Cronbach's α</u>	<u>C.R.</u>	<u>AVE</u>
Strategic alignment	SA01	4.62 (1.315)	0.676***		0.874	0.883	0.606
	SA02	4.47 (1.282)	0.878***				
	SA03	4.55 (1.164)	0.864***				
	SA04	4.45 (1.121)	0.810***				
	SA05	4.53 (1.160)	0.631***				
Business performance	Perf01	4.49 (1.136)		0.625***	0.925	0.930	0.691
	Perf02	5.05 (1.212)		0.822***			
	Perf03	4.97 (1.143)		0.894***			
	Perf04	4.92 (1.048)		0.871***			
	Perf05	4.87 (1.177)		0.906***			
	Perf06	4.53 (1.329)		0.839***			

χ^2 (p-value) = 72.979 (0.003), $\chi^2/d.f.= 1.697$, RMSEA = 0.062; GFI= 0.927; TLI= 0.972; CFI= 0.978

Correlation between factors: .093

*** $p < 0.001$

1.5.2 Common Method Bias

Measurement errors could trouble the validity of the conclusions. Measurement error constitutes a systematic component and a random component (Bagozzi et al., 1991). Unlike the random component, the systematic component engenders serious problems because it might provide an alternative explanation about the relationships being studied (Podsakoff et al., 2003). Method bias is one of the main sources of measurement error. Common method variance is defined as “variance that is attributable to the measurement method rather than to the construct of interest” (Podsakoff et al., 2003, p. 879). Because common method bias inflates or deflates observed relationships among variables, checking for the existence of systematic error variance is critical. Collecting data for this study from a single respondent within a single firm may have exposed this study to the possibility of method variances (Podsakoff et al., 2003). Mainly, the consistency motif could cause common method bias in this study. Consistency motif refers to the propensity for respondents to try to maintain consistency in their responses to questions (Podsakoff et al., 2003). Therefore, the self-reported data for both independent and dependent variables may demonstrate common method bias, which inflates or deflates observed relationships among variables (Siemsen, Roth, & Oliveira, 2010). To address the possible biases, this study adopts several procedural and statistical remedies.

First, we considered procedural remedies before distributing questionnaires to respondents. Before data collection, practitioners and academic professionals reviewed the questionnaires to eliminate item ambiguity. In addition, we made temporal separations to alleviate consistency motif between weights and strengths of strategic logistics priorities and the social desirability of other variables with business performance.

We also controlled statistically for potential common method variances. Gonzalez-Benito (2007) identified as a concern a consistency motif from the comparable measures of the weights

and strengths of strategic logistics priorities. Managers are prone to rate the weight (W_i) and strength (P_i) of an objective in the same way to appear consistent, possibly inflating the index of logistics competence. Following Gonzalez-Benito (2007), we conducted Harman's single factor analysis to examine bias (Podsakoff & Organ, 1986). If this study had a serious issue in terms of common method variance, we expected a single factor to emerge from the factor analysis. Otherwise, one general factor could account for most of the covariance in the variables we tested (Podsakoff & Organ, 1986). Because we had five categories of strategic logistics objectives, we performed five difference principle component analyses with un-rotation were performed. Except for innovation, we extracted more than one factor with Eigen values greater than one for each basic competitive priority. Moreover, no general factor was apparent in the unrotated factor structure. Therefore, respondents had clearly distinguished between weights and strengths.

To control for other possible common method variances between independent and dependent variables, we adopted the technique of controlling for the effects of an unmeasured latent methods factor (Podsakoff et al., 2003). This technique uses a latent variable approach that adds a first-order factor with all the measures as indicators of the theoretical model. This technique can control for any systematic variance among items that are independent of the covariance because of the construct of interest. In addition, this technique does not require the researcher to identify and measure the specific factor responsible for method effects; nor does it require that the effects of the method factor on each measure be equal (Podsakoff et al., 2003). In accordance with (Podsakoff et al., 2003), we added an extra factor called "common method variance" linked to all relevant indicators of strategic alignment and business performance. We separately ran models with and without the factor and extracted standardized regression coefficients for each item. We compared each coefficient with its counterpart in the other model. All coefficients for both models

were significant, and we found no significant difference with every difference less than 0.2, implying that no common method variance existed. Thus, both the questionnaire design and the post hoc test suggest that the common method variance was not of great concern.

1.5.3 Hypothesis 1

Table 1.5. Predictive power of logistics competence for business performance

	Standardized β	Adjusted R^2	F(p)
BP = $\alpha + \beta$ LC	0.237	0.050	9.839***

Notes: BP= Business performance; LC= logistics competence index; *p<.1 **p<.5 ***p<.01

The Table 1.5 shows the results of the direct effect of logistics competence on business performance. The results show that positive effects of logistics competence on business performance is significant at the 99% level. Even though the predictive power (R^2) values of the models are relatively low, the low value is not uncommon because business performance depends on many other factors (Gonzalez-Benito, 2007).

1.5.4 Hypothesis 2

Table 1.6. Predictive power for business performance

Model	LC	SA	LC*SA	Adjusted R^2	F	F-test for ΔR^2 (p)
1	0.237***			5.0%	9.839	0.002
2	0.231***	0.038		4.6%	5.023	0.617
3	-0.460	-1.353*	1.653*	5.8%	4.414	0.082

Notes: LC= logistics competence; SA= strategic alignment; *p<.1, **p<05, ***p<01

This study applied a moderated regression analysis to investigate the moderating effects. Table 1.6 presents the results. Following Gonzalez-Benito (2007), we tested three models in a stepwise manner. First, we included the LC index as an independent variable, then added the mean value of strategic alignment. For the interaction, we included a product term of logistics competence and strategic alignment. To check H2, we examined the significance of the interaction term's coefficient and the f-test for R^2 (Aguinis et al., 2016; Aiken et al., 1991).

Table 1.7. Results of Chow test

		<u>Non</u>	<u>Aligned</u>
Sample size	n	54	56
Standard error	LC	.012	.015
Path coefficient	LC	.008	.045
Standardized coefficient	LC	.090	.383
t	LC	1.940	

The results indicate a significant interaction effect on business performance. Conditional on the level of strategic alignment, logistics competence affects business performance differentially ($\beta=1.653$, $t=1.752$). The values for R^2 and adjusted R^2 are 0.075 and 0.058, respectively. Because strategic alignment does not directly or significantly affect business performance, we identified strategic alignment as a *pure moderator*. In addition, we conducted a subgroup analysis and tested the difference of coefficients between logistics competence and business performance using a Chow test. To group the sample based on strategic alignment, we calculated a factor score for strategic alignment. We grouped the top third as an “aligned” group and the bottom third as a “nonaligned” group. Table 1.7 shows coefficients and sample sizes for both groups and the Chow test results. The groups’ coefficients differ significantly.

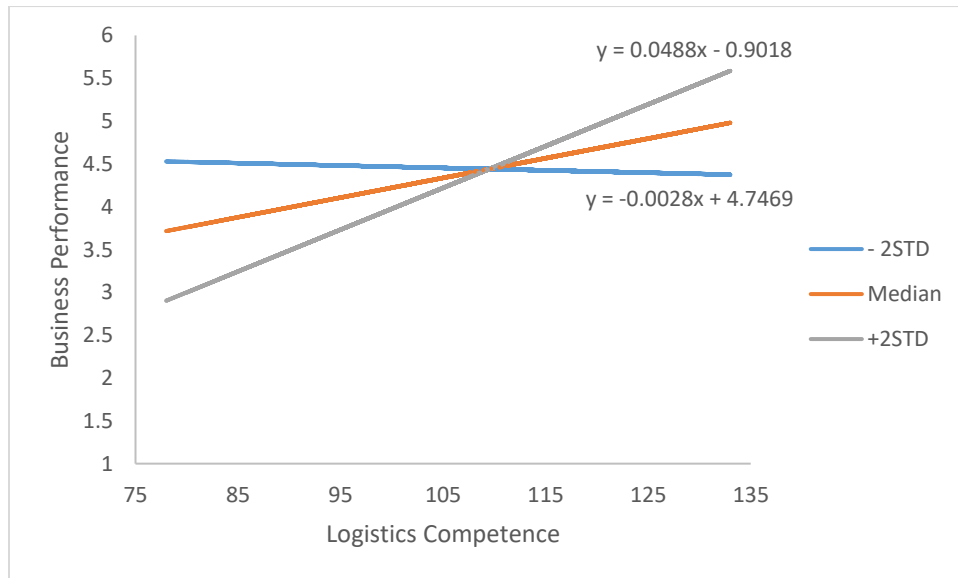


Figure 1.4. Logistics competence and strategic alignment interaction

Because we obtained a significant interaction result, we plotted the interaction to improve our understanding of it, as Figure 1.4 shows. This study has determined that logistics competence performance effects are contingent on the level of strategic alignment. Thus, the Figure 1.4 displays three different simple regression lines based on three values of strategic integration: median, two standard deviations above the median, and two standard deviations below the median (Aiken et al., 1991). The Figure 1.4 and its simple regression equations for two standard deviations above and below the median show a complex pattern of regression of business performance on logistics competence depending on the level of strategic alignment. The equations indicate positive regression of business performance on logistics competence for two standard deviations above the median and negative regression of business performance on logistics competence for two standard deviations below the median.

1.5.5 Post Hoc Analysis

After plotting the interaction, we needed to address two questions (Aiken et al., 1991): (a) Does the slope of the simple regression line differ significantly from zero? (b) Do the slopes of a pair of simple regression lines differ from one another?

To answer the first question, we had to calculate the standard error of the simple slope for each group. Using SPSS regression procedure, we extracted the variance-covariance matrix of regression coefficients. The equation for the standard error of the simple slope is as follows:

$$s_b = \sqrt{s_{11} + 2Zs_{13} + Z^2s_{33}}$$

where s_b is the standard error of the simple slope; s_{11} is the variance of the coefficient of logistics competence; s_{13} is the covariance between the coefficients of logistics competence and the interaction term; s_{33} is the variance of the coefficient of the interaction term; and Z refers to strategic alignment values.

By dividing the value of the simple slope by its standard error with (n-k-1) degrees of freedom, we generated t-test results to determine whether the simple slope differed from zero. Table 1.8 shows the results that the positive regressions of business performance on logistics competence at medium and high strategic alignment differ from zero. However, the negative regression of business performance on logistics competence at low strategic alignment does not differ from zero.

Table 1.8. Standard errors and t-tests for simple slopes

	<u>Strategic alignment</u>	<u>b</u>	<u>S_b</u>	<u>t</u>
Low	3.067	-0.002806	0.015846	-0.177040
Medium	5.000	0.022985	0.007254	3.168462**
Large	6.933	0.048776	0.016953	2.877158**

** $p < .01$; * $p < .05$; b = coefficient of simple slope

In addition, we addressed the question of whether the slopes of a pair of simple regression lines differ from one another. This study is particularly interested in the slope difference of a pair of simple regression lines at low and high strategic alignments. The equation of the t-test for the difference between the slopes is as follows:

$$t = \frac{(Z_H - Z_L)b_3}{\sqrt{(Z_H - Z_L)^2 s_{33}}}$$

where Z_H is a high strategic alignment value; Z_L is a low strategic alignment value; b_3 is the coefficient of the interaction term; and s_{33} is the variance of the coefficient of the interaction term.

We calculated the value of t and identified it as 1.752, which is significant at the 90% level. According to Aiken et al. (1991), the result should be identical to the that of the t-test for the significance of the b_3 coefficient in the overall analysis. The result was identical to the t-test value for the interaction coefficient in the suggested model analysis. Given that the moderator is a

continuous variable, the regression varies across the Z values, so no further test was required for the difference of coefficients in different groups.

1.6 DISCUSSION

This study attempted to investigate the performance implications of the logistics function and ways to develop logistics capabilities. By adapting the theory of production competence to a logistics setting, this study demonstrates that the logistics function actively supports business performance. Aligning strategic logistics objectives with business strategy can strengthen logistics competence performance implications.

1.6.1 Theoretical Implications

This study has several theoretical implications. The study applied the theory of production competence to logistics settings and empirically tested the theory of production competence in logistics settings and the effects of logistics competence on firm performance. The results can enhance our understanding of the value of the logistics function for business. Vickery (1991) suggested that the theory of production competence can be easily translated into other functions because competence is a valuable construct for understanding a function's contribution to performance. Moreover, a large sample is necessary to prove the theory of production competence, and the theory must also be proven in other contexts. As far as we understand, the theory has not been applied to the logistics function.

Second, the study refined the measures for strategic alignment in logistics settings. By adapting the theory of production competence into purchasing settings, Gonzalez-Benito (2007) argued that performance implications are functions of functional alignment and strategic alignment. He conceptualized strategic alignment with strategic integration measures. However, he acknowledged that measurement for strategic alignment needs refinement because strategic

integration does not capture the degree of alignment between a function and business strategy. Instead, strategic integration could provide the means to achieve such alignment (Carr & Pearson, 1999; Gonzalez-Benito, 2007; Papke-Shields & Malhotra, 2001). Adapting strategic alignment measures from Papke-Shields and Malhotra (2001) for logistics settings enables strategic alignment to capture precisely the degree of alignment between business strategy and strategic logistics objectives. The measures are particularly useful for researchers attempting to develop methods to assess alignment between two strategies (Papke-Shields & Malhotra, 2001).

Third, this study verifies that performance implications are a function of strategic alignment and functional alignment. In operations strategy literature, studies have focused on and tested one of the alignments for business performance implications. For example, Vickery (1991) focused on a functional attribute and tested the contribution of production function to business performance. Wagner, Grosse-Ruyken, and Erhun (2012) investigated the performance implications of a strategic alignment between supply and demand uncertainty and supply chain design. However, effective management of a function requires balancing strategic alignment and functional alignment (Henderson & Venkatraman, 1993). While only considering strategic alignment could cause one to underestimate the difficulty of business process configuration, only considering functional alignment could be dysfunctional. This supports the argument that functional alignment should be balanced with strategic alignment.

1.6.2 Managerial Implications

This study's results also have managerial implications. First, in the literature, one common approach for investigating logistics performance implications is to identify key logistics capabilities that can deliver value to the firm and that other firms would find difficult to copy (J. Barney, 1991; Wernerfelt, 1984). In adapting the theory of production competence to a logistics

setting, however, this study suggests that a firm should align logistics capabilities with its strategic objectives. Rather than replicating logistics practices that have benefitted other companies, managers should strive to assess the capabilities that such practices can generate and check whether they fit with their strategic logistics objectives (Gonzalez-Benito, 2007; Vickery, 1991).

In addition, in logistics settings, priorities might be slightly different from typical competitive priorities. In operations, cost, quality, delivery, flexibility, and innovation are identified as typical competitive priorities. This study identified cost, quality, delivery, flexibility, asset utilization, and geographical coverage.

This study's adaptation of measurement items also has managerial implications for measuring strategic alignment. Promoting different initiatives is necessary for evaluating strategic alignment: Logistics managers should understand the strategic priorities of top management; logistics strategies should be aligned with the organization's strategic plan; the logistic function's goals and objectives should adapt to the firm's changing goals and objectives; logistics managers should maintain a mutual understanding with top management regarding the role of the logistics function in supporting the organizational strategy; and managers should educate top management on the importance of logistics functions.

In addition, this study provides evidence that strategic alignment and functional alignment should be balanced. Figure 1.4 and Table 1.8 show that the performance effects of logistics competence might not be significant when the level of strategic alignment is low. Supporting the firm's business strategy can achieve performance implications. This implies that logistics competence may not provide the means by which the logistics function supports business strategy unless the firm develops and sets strategic logistics objectives concomitantly with its business strategy. However, achieving strategic alignment is not sufficient to enhance firm performance.

Functional alignment should also be considered for business performance implications. Typically, in operations strategy, strategic alignment could generate business implications. The logic underlying this argument is that a function can support the firm's business strategy when its objectives are aligned with business goals. This study shows that for performance implications, firms must not only align functional goals with their business goals but also ensure that functions possess the appropriate capabilities to support the goals.

1.6.3 Limitations and Future Research

This study's limitations can provide directions for future research. First, we collected data through respondent self-reports. Although using managerial perceptions for measures is a common procedure in operations research, using objective measures could improve the results' validity. Moreover, data were collected from a single informant. Even though this study addressed the issues of survey design and common method bias, common method variance may still occur. Including financial data in the questionnaire also improved these common method variance issues. Second, we collected data at a certain point. Lack of logistics competence does not appear overnight but evolves over time. Longitudinal studies can improve the results to describe the dynamics of the alignment. Third, this study verified that business implication is a function of strategic alignment and logistics functional alignment. However, business implication can be stronger when business strategy is set along with its environment. Vickery (1991) suggested that alignment of production competence with external environment can lead to theoretical contributions to the theory of production competence. In logistics settings, the alignment between uncertainty for a product and supply chain design can be considered (Wagner et al., 2012).

2 ESSAY TWO: Factors of the Extent of Logistics Outsourcing

2.1 INTRODUCTION

Two consistent observations brought to light with respect to the extent of logistics outsourcing throughout the 20 years of annual third-party logistics studies (Langley & Capgemini, 2015). Some shippers will report increases in their use of outsourced logistics services, and others will indicate returns to insourcing some or all of these same services. The former list the benefits of logistics outsourcing (Boyson, Corsi, Dresner, & Rabinovich, 1999). For example, 70% of third-party logistics (3PL) users and 85% of third party logistics (3PL) providers agree that the use of 3PLs has contributed to reducing overall logistics costs (Langley & Capgemini, 2015). In addition, 83% of 3PL users and 94% of 3PL providers have agreed that the use of 3PLs has contributed to improving services to the customers. The latter observations report concerns and failures of logistics outsourcing. For instance, Dapiran, Lieb, Millen, and Sohal (1996) surveyed concerns regarding logistics outsourcing. They found that the most common concerns are potential loss of direct control of logistics activities, uncertainties about the capabilities of the logistics service providers, costs of outsourcing, and deployment of company personnel. These concerns engender the firms to decide to retain outsourced logistics functions in-house (Fernie, 1999). In spite of the two different observations, the 2016 Third-Party Logistics Study reported that 73% of shippers are increasing their use of outsourced logistics services in 2016, compared to the 68% reported in 2015. However, little research has empirically investigated what factors increase the extent of logistics outsourcing.

Among other causes, the need for efficiency has been identified as the primary determinant of the extent of logistics outsourcing. Bhatnagar, Sohal, and Millen (1999) found that firms use logistics service providers because their services affect logistics costs, customer satisfaction, and

internal logistics system performance. Dapiran et al. (1996) argued that outsourced logistics services may also have a positive impact on customer satisfaction and employee morale. Once firms experience positive impacts from outsourced logistics services, they are willing to change the level and nature of their involvement with the logistics service providers (Bhatnagar et al., 1999).

Meanwhile, researchers have attempted to find attributes of rational and efficient behaviors for logistics outsourcing by drawing on theories from other disciplines. In logistics research, transaction cost economics (TCE) and resource-based views (RBV) are commonly applied to identify factors that influence the extent of logistics outsourcing (Hsiao, Van der Vorst, Kemp, & Omta, 2010; Rabinovich, Knemeyer, & Mayer, 2007). Underlying arguments based on the theories have been that firms increase the extent of logistics outsourcing because they aim to economize costs or to achieve sustainable competitive advantages (J. Barney, 1991; Williamson, 1975). Hence, seeking idiosyncratic resources and discriminating characteristics of transactions have been identified as reasons for logistics outsourcing (Hsiao et al., 2010; Rabinovich et al., 2007).

In addition to the need for efficiency, social relations seem to affect firms' decision-making (Abrahamson & Rosenkopf, 1993; Frohlich & Westbrook, 2002). However, the role of social relations in logistics outsourcing decisions has been neglected in previous research. Because TCE and RBV, commonly used in logistics outsourcing literature, are based on neoclassic economics, *markets* are conceptualized as being under-socialized in these two theories (Granovetter, 1985). Even though external social relations were not considered in investigations of the extent of logistics outsourcing, surveys have provided evidence of the important role of social relations in logistics outsourcing decisions. For example, managers consult professional networks when they decide to outsource logistics (Boyson et al., 1999). They may also choose logistics service

providers according to the suggestions of suppliers and buyers, organizations on which firms depend (Mohammed Sadiq Sohail & Saad Al-Abdali, 2005). Yet the effects of social relations on logistics outsourcing decisions have not been tested empirically with a sufficiently large sample. Therefore, this study will investigate the effects of social relations and rational efficiency on logistics outsourcing decisions.

In Section 2, rational efficiency, institutional isomorphism, and the role of top management in logistics outsourcing decision-making processes will be reviewed and comments will be provided on the interest of adapting the theories to logistics function. In addition, the research hypotheses and theoretical arguments for the effects of institutional pressures on the extent of logistics outsourcing and the mediating role of top management championship in the effects will be presented. In the third section, the methodology used to test the hypotheses will be explained. Section 4 will provide the results and their main implications. The elements of the survey instrument will be shown in Appendix.

2.2 CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

In a decision-making process, there is theoretical support that firms consider the roles of rational efficiency and external pressures in decision-making (Abrahamson & Rosenkopf, 1993; Frohlich & Westbrook, 2002). As shown in Figure 2.1, this study posits that institutional pressures, as well as rational efficiency, are positively associated with the extent of logistics outsourcing. In addition, top management championship mediates the effects of external institutional pressures on the extent of logistics.

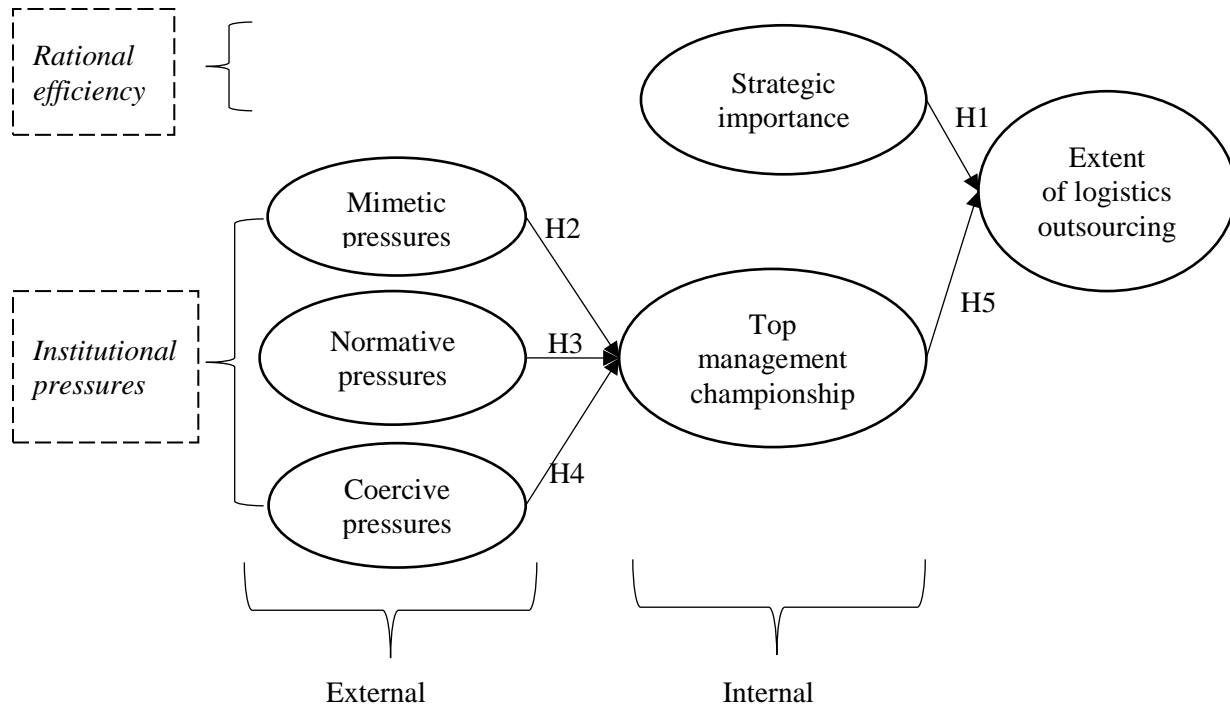


Figure 2.1 Proposed model

2.2.1 Strategic Importance of Outsourced Logistics Activities

One of the main reasons for logistics outsourcing is to seek rational efficiency (Abrahamson, 1996; Bhatnagar et al., 1999). According to rational efficiency theory, the process of adopting and assimilating a new practice creates new knowledge about the practice’s efficiency and benefits (Frohlich & Westbrook, 2002). Rational efficiency implies that the implementation of logistics outsourcing results in increased logistics performance and firm performance. The belief that logistics services provided by external providers improve the firms’ performance can be found in the logistics outsourcing literature. Bhatnagar et al. (1999), for example, found that firms use logistics service providers because the services from the providers affect logistics costs, customer satisfaction, and internal logistics system performance. Dapiran et al. (1996) argued that outsourced logistics services can also benefit customer satisfaction and employee morale. Once firms have experienced the positive impacts of outsourced logistics services, they are more willing

to change the level and nature of their involvement with logistics service providers (Bhatnagar et al., 1999).

The rational approach to logistics outsourcing assumes that there is room for logistics functions to improve and that logistics outsourcing will fill up the room and lead to improvements in cost, quality, reliability, responsiveness, and flexibility of logistics functions. Rational efficiency in logistics outsourcing have strategic importance regarding outsourced logistics activities. Strategic importance represents the degree to which customers or outsourcing firms believe that the outsourced business activity is valuable and has a meaningful impact on the achievement of organizational objectives (Handley & Benton, 2012). Once customer firms believe in performance improvement through logistics outsourcing, they increase the extent of logistics outsourcing because they anticipate future performance improvement (Abrahamson, 1996; Bhatnagar et al., 1999). Therefore, this study postulates:

H1: The higher strategic importance of logistics outsourcing is positively associated with the extent of logistics outsourcing.

2.2.2 Institutional Pressures

Another reason for logistics outsourcing is institutional pressure, which develops from institutional isomorphism approaches (DiMaggio & Powell, 1983; Teo, Wei, & Benbasat, 2003). *Isomorphism* refers to the homogenization process of organizational forms and practices by which a firm resembles other firms in similar environments (Ang & Cummings, 1997; DiMaggio & Powell, 1983; Hawley, 1968). The forms and practices of organizations become similar as organizations seek not only resources and customers but also political power and institutional legitimacy. Institutional isomorphism explains a homogenization processes by which organizations are forced to conform to legitimacy or social fitness once organizational fields are established (Aldrich, 2008).

Organizational fields are defined as “organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products” (DiMaggio & Powell, 1983, p.148). Meyer and Rowan (1977) referred to organizational fields as networks of social and exchange (relational) organizations. Organizational fields also encompass interconnectedness and structural equivalence, where *interconnectedness* is defined as inter-organizational relations (relational networks and social relations) characterized by the existence of transactions tying organizations to one another (DiMaggio & Powell, 1983). *Structural equivalence* refers to the occupying of a similar position in an inter-organizational network (DiMaggio & Powell, 1983). In operations literature, supply chains and social organizations might constitute an area of organizational fields. Due to higher competition and technology obsolescence, the supply chains become more complex (i.e., more organizations become involved) and firms seek information on intellectual and technology trends in the market (Winter, 2000).

Organizational fields evolve through the process of institutional definition, or “structuration” (DiMaggio & Powell, 1983). The process involves four parts: (1) an increase in the extent of interaction among organizations in the field; (2) the emergence of sharply defined inter-organizational structures of domination and patterns of coalition; (3) an increase in the information load with which organizations in a field must contend; and (4) the development of a mutual awareness among participants in a set of organizations in which they are involved in a common enterprise (DiMaggio & Powell, 1983). As organizational fields are established, organizations are subject to more pressures to be isomorphic with their environments (Kostova, Roth, & Dacin, 2008).

The institutional approach has been applied to explain the importance of institutional environments to organizational forms and practices (Bhakoo & Choi, 2013). In operations, the approach is mainly used to explain why firms adopt new practices in the settings of total quality management adoption, innovative manufacturing practices adoption, and e-supply chain management adoption (Choi & Eboch, 1998; Ketokivi & Schroeder, 2004; Liu, Ke, Wei, Gu, & Chen, 2010). In addition, Cai, Jun, and Yang (2010) investigated the effects of institutional pressures on the development of information integration between suppliers and buyers. As they argued, information integration is a type of transaction-specific investment, so institutional pressures may affect investment decisions partially through building trust, which safeguards firms from exchange hazards and reduces transaction costs. However, to my knowledge, there is no research on the predicted relationships between institutional variables and the corresponding logistics of outsourcing decisions.

To my knowledge, institutional theory has not been applied in the context of logistics outsourcing. This study argues that the effects of institutional pressures can be retained in the postadoption stage of logistics outsourcing, affecting decisions regarding the extent of logistics outsourcing. Requiring technical skills and daily decisions and details, logistics outsourcing is identified as uncertain and complex in many firms, so the firms remain acquiescent to institutional pressures, including mimetic, normative, and coercive pressures. There are significant indications in survey studies that external social relations are significant in the logistics outsourcing decision process. For example, logistics professional networks are among the most common information sources for logistics outsourcing decisions (Dapiran et al., 1996; Lieb, 1992). Vendors and industry conferences also play significant roles in the logistics outsourcing decision process, as do recommendations from their direct stakeholders, including suppliers and customers (Bhatnagar et

al., 1999; Boyson et al., 1999; Mohammed Sadiq Sohail & Saad Al-Abdali, 2005). Hence, institutional theory is useful in understanding the extent of logistics outsourcing.

2.2.3 Link Institutional Pressures to Top Management Championship

No firm shows the same extent of logistics outsourcing as another firm. Firms are heterogeneous with respect to the extent of logistics outsourcing even within a similar institutional environment. This study attempts to address this heterogeneity using a human agency perspective. Top management constitutes the primary human agency that mediates institutional pressures' effects on managerial decision-making (Liang, Saraf, Hu, & Xue, 2007). This study employs a concept of top management championship to explain the role of top management on the extent of logistics outsourcing. *Top management championship* is defined as a firm's top executives' beliefs in logistics outsourcing and their active involvement (Chatterjee & Tsai, 2002; Liu et al., 2010). Compared to top management *support*, championship reflects more active roles of top management and emphasizes their proactive leadership in logistics outsourcing (Liu et al., 2010). In a firm with higher levels of top management championship, top management might be actively involved in strategy formulation, participate in establishing goals and standards, and support a clear vision for the logistics outsourcing (Liu et al., 2010). Accordingly, this study postulates that top management members' beliefs and behaviors mediate the impacts of mimetic, coercive, and normative pressures on the extent of logistics outsourcing. Top management translates external influences into managerial actions within the firm, based on such managers' perceptions and beliefs of institutional practices, providing internal institutional norms and values by which managers should engage in structuring actions related to the use of logistics outsourcing (Purvis, Sambamurthy, & Zmud, 2001).

DiMaggio and Powell (1983) classified institutional pressures into the coercive, mimetic, and normative. Among these three pressures to which a firm might be exposed, coercive and normative pressures normally operate through interconnected relations. Conversely, mimetic pressures act through structural equivalence. Mimetic pressures are organizational sources that mimic other organizations' behavior under uncertainty (DiMaggio & Powell, 1983; Teo et al., 2003). Thus, *mimetic pressures* for logistics outsourcing decisions refer to institutional sources that change firms over time to become more like other organizations in their environment. According to DiMaggio and Powell (1983), uncertainty is a powerful force that encourages the imitation process. Firms tend to mimic other organizations when they confront ambiguous causes or unclear solutions because the mimetic process is an inexpensive form of "problemistic search" in an uncertain environment. This process can economize search costs, minimize experimentation costs, and avoid risks that first-movers have identified (Cyert & March, 1963; DiMaggio & Powell, 1983; Levitt & March, 1988; Lieberman, 1988). Logistics outsourcing decisions involve implementation of the logistics alliance (Sink & Langley, 1997). This requires "a structured, approach, and a formal transition plan," as well as training to support the changes (p.180). The decisions present uncertainties in beneficial outcomes of logistics outsourcing. According to Haveman (1993), firms may model themselves on other organizations when a practice is prevalent in their industries or when they perceive other organizations' success as resulting from the adoption of the practice.

This study posits that mimetic pressures influence top management championship. Mimetic pressures can affect both top management beliefs and behaviors (Liang et al., 2007). Organizations that reportedly adopt and implement an innovation successfully may accordingly serve as exemplars for prospective adopters (Swanson & Ramiller, 1997). Top management may

participate in the decision-making process to implement the logistics outsourcing simply because a success story of competitors makes top management take the outsourcing for granted. In contrast, when an organizational practice is poorly understood, it is a rational response to uncertainty that the firm develop beliefs about the benefits of the practice by perceiving other successful organizations' practice (Swanson & Ramiller, 1997). For example, Ye, Zhao, Prahinski, and Li (2013) explored the role of top management in the implementation of reverse logistics in China. Successful implementation of a key competitor could benefit the attitude of top management in other organizations toward the implementation of reverse logistics. Therefore, this study postulates:

H2: Higher levels of mimetic pressures lead to top management championship on the logistics outsourcing.

Normative pressures are the extent to which members of the dyadic relational channels have adopted a new practice and the extent to which government and industry agencies promote the use of the new practice (Liang et al., 2007). Normative pressures originate from *professionalization*, which refers to the collective struggle of members of an occupation to define the conditions and methods of their work to control “the production of producers” and to establish a cognitive base and legitimation for their occupational autonomy (DiMaggio & Powell, 1983, p.152). The role of the inter-organizational community is important to professionalization (DiMaggio & Powell, 1983). Once a new practice or organizational form is introduced to the industry, professionals participating in an inter-organizational community collectively evaluate and provide knowledge, shaping institutional norms (Swanson & Ramiller, 1997). DiMaggio and Powell (1983) identified university specialists and professional networks that exemplify the inter-organizational community. In logistics settings, for example, the Council of Supply Chain Management Professionals (CSCMP) is an inter-organizational community in which supply chain

professionals from heterogeneous industries can share their ideas and knowledge to develop and improve their logistics and supply chain management skills (Langley & Capgemini, 2015). Management and consequences of logistics outsourcing have been evaluated and discussed in CSCMP. Since the members of the community have been holding conferences and publishing reports such as “The State of Logistics Outsourcing,” collective knowledge from the community seems to have been affecting its development and diffusion of logistics outsourcing practices.

I believe that institutional norms regarding logistics outsourcing can generate positive attitudes and the active participation of top managers on logistics outsourcing decision-making. The institutional norms are outcomes of inter-organizational community collective efforts, in which professionals and university specialists collectively endeavor to evaluate opportunities and risks involved in logistics outsourcing (Swanson & Ramiller, 1997). Therefore, institutional norms from the inter-organization community serve as powerful signals to the rest of the managerial community regarding the importance placed on logistics outsourcing (Chatterjee & Tsai, 2002). Even though the collective understanding from the inter-organizational community does not apply to all organizations, the knowledge may, at least, guide top managers in making decisions to mitigate outcome uncertainties, such as establishing appropriate performance levels and specific costs for the services they are outsourcing (Liang et al., 2007). Therefore, the institutional norm might be able to legitimize the willingness of managers to devote their time and energy to making sense of logistics outsourcing. Hence, this study argues:

H3: Higher levels of normative pressures lead to higher levels of top management championship in the logistics outsourcing process.

Coercive pressures refers to both formal and informal pressures exerted on organizations by other organizations on which they depend and by cultural expectations in the society within

which organizations function (DiMaggio & Powell, 1983; Liang et al., 2007). The pressures may be felt as force, persuasion, or invitations to join in collusion. Various sources of coercive pressures have been identified, including suppliers and customers, government mandate or legal environment, and parent firms (Ang & Cummings, 1997; Cai et al., 2010; Ketokivi & Schroeder, 2004; Teo et al., 2003; Zsidisin, Melnyk, & Ragatz, 2005). In logistics outsourcing settings, a source of coercive pressures could be a firm's parent company. Bhatnagar et al. (1999) reported that recommendations from head offices are information sources by which firms become aware of logistics providers. Another source for coercive pressures in logistics outsourcing origin comes from dominant suppliers and customers because of the role of logistics as a boundary among business partners in a supply chain (Morash et al., 1996; M Sadiq Sohail, Bhatnagar, & Sohail, 2006). Recommendations from suppliers and customers are sources of information for logistics outsourcing decisions (M Sadiq Sohail et al., 2006).

Coercive pressures are sources to legitimize the implementation of a practice by satisfying stakeholders (DiMaggio & Powell, 1983). Such legitimacy leads top management to participate actively in logistics outsourcing activities and influences their attitude toward logistics outsourcing (Ye et al., 2013). Therefore, recommendations from parent firms, suppliers, and customers might legitimize top management when they are involved in strategy formulation, establishing goals and standards, and supporting logistics managers with a clear vision for logistics outsourcing. Hence, the following hypothesis is postulated:

H4: Higher levels of coercive pressures lead to higher levels of top management championship in the logistics outsourcing process.

2.2.4 Link Top Management Championship to the Extent of Logistics Outsourcing

This study postulates that top management championship mediates the effects of institutional pressures on the extent of logistics outsourcing. The role of top management has attracted attention with respect to initiating and implementing a practice in an organization (Liang et al., 2007; Liu et al., 2010; Ye et al., 2013). Top management championship within a firm can define internal institutional norms and values to engage managers in structuring actions for implementation of a practice (Barki & Hartwick, 1989; Jarvenpaa & Ives, 1991). In addition, supportive attitudes and behaviors of top management lead to the financial and human resources required to support structural and infrastructural change (Ye et al., 2013). Once top management places importance on logistics outsourcing, this importance involves the relative allocation and prioritization of other organizational resources to logistics outsourcing. (Liu et al., 2010; Novack, Rinehart, & Langley Jr, 1996). In addition, top management is more likely to realize and understand the strategic and operational importance of collaborating with logistics service providers (Liu et al., 2010). Frequent information sharing, and joint operational planning of supply chain activities with logistics service providers are more likely to happen (Chen et al. 2010). Thus, the logistics department is likely to have more authority to collaborate with logistics service providers and, if necessary, bring collaboration to a more intensive level (Sandberg, 2007). Indeed, Gunasekaran and Ngai (2003) stated that lack of top management involvement is a key barrier to developing appropriate logistics strategies.

Top management championship refers to a firm's top executives' belief and their active involvement in logistics outsourcing (Chatterjee & Tsai, 2002; Liu et al., 2010). With higher levels of top management championship, top management might actively be involved in strategy formulation, participate in establishing goals and standards, and support a clear vision for the

logistics outsourcing (Liu et al., 2010). These explicit activities by top management might lend legitimacy to implementing logistics outsourcing, thus alleviating resistance to the changes of logistics sourcing by managers and employees. This might even increase the extent of logistics outsourcing. According to Bhatnagar et al. (1999), involvement of organizational elements, including employees and managers from other departments, for the logistics outsourcing decision might increase the further usage of logistics outsourcing. Therefore, this study postulates:

H5: Higher levels of top management championship in the logistics outsourcing process is positively associated with a higher extent of logistics outsourcing.

2.3 DATA & METHODS

2.3.1 Data Collection and Sampling

The sample frame of this study was compiled from 4,000 Dunn and Bradstreet U.S. Manufacturers. The targeted manufacturing firms were North American and had outsourced parts or whole logistics functions. A survey was distributed to a sample of CEOs and senior managers and mid- and upper-level supply chain and logistics managers in manufacturing firms. Respondents were C-level executives (11.89%), directors, department heads mainly in supply chain management, logistics, and operations (14.59%), and logistics and supply chain managers (51.89%). Even though some of the respondents did not include “logistics” and “supply chain” in their job titles, they were in positions in charge of logistics and supply chain functions.

Table 2.1 shows demographic descriptions of the sample. Because this research targets manufacturing firms, the first two-digit codes of the SIC run from 20–39. Over 30% of respondents worked in metal, machinery, or electronic equipment-related industries. The other respondents were scattered across industries. The median of employee population was from 51–200. The distribution of the number of employees shows that the sample is heterogeneous. The range and

size of the firms and the diversity of industries represented suggest that any systematic bias can be excluded.

Table 2.1. Demographic description

<u>SIC</u>	<u>Industry</u>	<u>No.</u>	<u>%</u>
20	Food and Kindred Products	11	8.6
22	Textile Mill Products	1	.8
23	Apparel and other Finished Products Made from Fabrics and Similar Materials	3	2.3
24	Lumber and Wood Products, except Furniture	1	.8
25	Furniture and Fixtures	4	3.1
26	Paper and Allied Products	3	2.3
27	Printing, Publishing, and Allied Industries	1	.8
28	Chemicals and Allied Products	10	7.8
29	Petroleum Refining and Related Industries	3	2.3
30	Rubber and Miscellaneous Plastics Products	8	6.3
31	Leather and Leather Products	1	.8
32	Stone, Clay, Glass, and Concrete Products	7	5.5
33	Primary Metal Industries	13	10.2
34	Fabricated Metal Products, except Machinery and Transportation Equipment	12	9.4
35	Industrial and Commercial Machinery and Computer Equipment	14	10.9
36	Electronic and other Electrical Equipment and Components, except Computer Equipment	15	11.7
37	Transportation Equipment	11	8.6
38	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks	6	4.7
39	Miscellaneous Manufacturing Industries	4	3.1
-1	Missing	27	
	Total	155	
<u>Size (Number of Employees)</u>		<u>No</u>	<u>%</u>
	≤ 10	14	9.5
	11 to 50	32	21.8
	51 to 200	49	33.3
	201 to 1000	34	23.1
	More than 1000	18	12.2
	Missing	8	
	Total	155	

2.3.2 Measurements

Table 2.2 shows the measurement items for each construct. For the extent of logistics outsourcing, this study uses two measures: (1) funds expended on outsourced logistics services or the

percentage of overall logistics spent represented by outsourcing and (2) the number of logistics activities outsourced out of 18 logistics activities for outsourcing (CSCMP, 2016, p. 12). As stated above, top management championship is a firm's top executives' belief in logistics outsourcing and active involvement, participation, and leadership in the outsourcing activities. We adapted the measurements from Liu et al. (2010) into logistics outsourcing setting.

Table 2.2. Measurement items

<u>Construct</u>	<u>Measurement</u>	<u>Literature</u>
Coercive	Our main customers who matter to us believe that we should outsource logistics Our main suppliers who matter to us believe that we should outsource logistics Our suppliers who are crucial to us hope we would outsource logistics	Teo et al. (2003); Liang et al. (2007)
Mimetic	<i>My main competitors who have outsourced logistics:</i> are perceived favorably by others in the same industry are perceived favorably by suppliers are perceived favorably by customers	Teo et al. (2003); Liang et al. (2007)
Normative	Logistics functions has been widely outsourced by our suppliers currently Logistics functions has been widely outsourced by our customers currently Logistics functions has been widely outsourced by our competitors currently	Teo et al. (2003); Liang et al. (2007)
Strategic importance	The services provided by provider are valuable to our organization Provider provides services that are crucial to our organization The services rendered by provider are very important to achieving our goals	Handley and Benton (2012)
Top Management Championship	Top management actively participates in formulating a strategy for logistics outsourcing Top management actively participates in establishing goals and standards to monitor the logistics outsourcing Top management has a clear vision for the logistics outsourcing	Liu et al. (2010)
Extent	% of fund for outsourced logistics functions The number of outsourced logistics activities	Langley and Capgemini (2015)

Mimetic pressures mainly come from a firm's perceived success of a competitor's actions or the extent of logistics outsourcing by a firm's competitors (Liu et al., 2010; Teo et al., 2003).

Mimetic pressures will be measured by three items regarding perceived success of competitors who had outsourced logistics functions.

Normative pressures refers to sources of isomorphic organizational change that could stem primarily from professionalization (DiMaggio & Powell, 1983). *Professionalization* refers to the collective struggle of members of an occupation to define the conditions and methods of their work and establish a cognitive base and legitimation for their occupational autonomy. Therefore, normative pressures are operationalized as a multi-dimensional construct with two subcontracts: (a) participation in professional, trade, and business bodies that promote and disseminate information on logistics outsourcing and (b) perceived dominance of the logistics outsourcing usage in organizational fields. Based on DiMaggio and Powell (1983), two aspects of professionalization are drivers in isomorphic changes: a cognitive base produced by university specialists or professional networks. Along with universities and professional training institutions, professional associations are vehicles for the definition and promulgation of normative rules about organizational and professional behavior.

In addition, this study defines *coercive pressures* as formal or informal pressures exerted on organizations by other organizations upon which they depend and by cultural expectations in the society within which organizations function. This study operationalizes coercive pressures with conformity with parent corporations, main suppliers, and buyers' requirements. DiMaggio and Powell (1983) posited that coercive pressures result from "both formal and informal pressures exerted on organizations by other organizations upon which they are dependent" (p. 150). Applying institutional isomorphism notions into a supply chain setting, Liu et al. (2010) referred to coercive pressures as requirements raised by constituents including suppliers and customers,

and thus, “As an important knowledge source for its partners, a powerful firm can exert pressures on these partners by raising requirements (p. 374).”

2.3.3 Control Variables

Decision-making processes

Decision-making processes involve the organizational level and involvement of other functional areas. The survey respondents were asked to specify the organizational level at which the introduction of contract logistics was to be made. Managers were also asked to indicate the functional areas involved with the decision to outsource logistics services. Firm size, inter-organizational factors (Kitokivi, 2004), and innovativeness (other functional types of outsourcing) were controlled to cancel out their effects on innovation adoption.

Number of available logistics service providers

The number of available logistics service providers accounts for the effect made by shifts in bargaining power due to the number of available suppliers on firms’ making or buying decisions (Pisano, 1990; Williamson, 1985). This measure was obtained from the number of available logistics service providers to the firm (Park and Ro, 2011).

2.3.4 Methods

To determine the influences of rational efficiency and institutional pressures on the extent of logistics outsourcing, this study used the partial least square (PLS) for data analysis with Smart PLS 2 software (Ringle et al. 2005). PLS is a components-based approach to structural equation modeling (Chin et al. 2003) and one of the most commonly used tools in operations management, as well as other disciplines (Blome et al. 2013; Braunscheidel and Suresh 2009; Chiang et al. 2012; Yoo et al. 2013). While covariance-based structural equation modeling (SEM) is used to explain observed covariance, PLS emphasizes the prediction of dependent variables. Thus, this technique

is commonly used when a model is set for a predictive application. The results of a PLS are generated by extracting successive linear combinations of the independent variables.

The use of PLS offers several advantages. First, PLS avoids many of the restrictive assumptions that underlie maximum likelihood techniques (Fornell and Bookstein 1982). The PLS approach minimizes demands on measurement scales, sample size, and residual distributions. Moreover, PLS does not require any assumption related to scales of measurement because the estimation does not involve a statistical model. All types of scales are permissible in PLS, including nominal, ordinal, and interval scales. In addition, PLS avoids issues of factor indeterminacy (a covariance-based SEM technique requires a prior knowledge) and inadmissible solutions (e.g., negative variance) that a covariance-based SEM technique often faces (Fornell and Bookstein 1982; Steiger 1979). A PLS analysis was executed in two stages: (a) the assessment of the measurement model, including the reliability and discriminant validity of the measures, and (b) the assessment of the structural model (Chin 1998a).

2.4 RESULTS

2.4.1 Missing Value Treatment

Because missing values constituted less than 5%, this study imputed missing values using the expectation-maximization (EM) algorithm (Newman, 2014). The EM algorithm is a maximum-likelihood approach procedure for missing value imputation. The algorithm is recommended for calculating a correlation matrix, means, and standard deviations (Newman, 2014). Prior to imputation, Little's missing completely at random (MCAR) test was conducted. Little's MCAR test checks whether missing cases are MCAR. If the result of the test is not significant, the data are assumed to be MCAR, which means that the lack "does not depend on the observed data values nor on the missing data values" (Little & Rubin, 2014; Newman, 2014; Schafer & Graham, 2002).

Because the p values of Little's MCAR test for each of the constructs were not significant, the missing values are MCAR. Because missing cases are MCAR, the missing values for each construct were imputed using the EM algorithm (Newman, 2014). The imputed data were used for the following analysis.

2.4.2 Measurement Reliability and Construct Validity

Table 2.3. Correlations of constructs

	α^*	<u>C.R.</u>	<u>AVE</u>	<u>Coer</u>	<u>Mimic</u>	<u>Norm</u>	<u>StrImp</u>	<u>Topmgt</u>	<u>Extent</u>
-									
Coercive	0.920	0.949	0.862	0.928					
Mimetic	0.924	0.950	0.865	0.504	0.930				
Normative	0.776	0.868	0.688	0.497	0.481	0.829			
Strategic importance	0.942	0.963	0.895	0.068	0.140	0.213	0.946		
Top mgt championship	0.919	0.948	0.859	0.182	0.181	0.233	0.073	0.927	
Extent	1.000	1.000	1.000	0.293	0.197	0.279	0.260	0.123	1.000

**Cronbach α , C.R.: composite reliability, square root of AVE on diagonal in boldface*

Table 2.4. Correlations of constructs

	α^*	<u>C.R.</u>	<u>AVE</u>	<u>Coer</u>	<u>Mimic</u>	<u>Norm</u>	<u>StrImp</u>	<u>Topmgt</u>	<u>No.</u>
-									
Coercive	0.920	0.949	0.862	0.928					
Mimetic	0.924	0.950	0.865	0.503	0.930				
Normative	0.776	0.868	0.687	0.496	0.482	0.829			
Strategic importance	0.942	0.962	0.894	0.069	0.141	0.212	0.946		
Top mgt championship	0.919	0.949	0.860	0.179	0.179	0.231	0.081	0.927	
Number of outsourced logistics activities	1.000	1.000	1.000	0.253	0.197	0.189	0.109	0.227	1.000

**Cronbach α , C.R.: composite reliability, square root of AVE on diagonal in boldface*

Reliability was tested with values of Cronbach's α , composite reliability, and average variance extracted (AVE). Table 2.3 and Table 2.4 show values for the reliability with each measure for the extent of logistics outsourcing. In both reliability tables, Cronbach's α is greater than 0.7. Composite reliability is greater than 0.7. AVE is greater than 0.5. Correlations with other

constructs are lower than the square root of AVE value of each construct. The results indicate discriminant validity among constructs.

Table 2.5. Cross-loadings with percentage of money allocated to outsourced logistics activities

	<u>Coercive</u>	<u>Mimetic</u>	<u>Normative</u>	<u>Strategic importance</u>	<u>Top Mgt Championship</u>	<u>Extent</u>
Coer01	0.872	0.483	0.514	0.077	0.144	0.225
Coer02	0.953	0.464	0.449	0.045	0.171	0.296
Coer03	0.958	0.463	0.437	0.070	0.188	0.287
Mimic01	0.499	0.927	0.438	0.108	0.136	0.152
Mimic02	0.436	0.928	0.449	0.114	0.206	0.166
Mimic03	0.485	0.934	0.454	0.171	0.147	0.235
Norm01	0.430	0.350	0.785	0.208	0.183	0.279
Norm02	0.450	0.389	0.820	0.184	0.149	0.233
Norm03	0.380	0.449	0.880	0.150	0.233	0.195
StrImp01	0.042	0.115	0.199	0.943	0.025	0.248
StrImp02	0.099	0.153	0.211	0.958	0.064	0.254
StrImp03	0.051	0.127	0.195	0.938	0.121	0.235
TopChamp01	0.107	0.115	0.157	0.095	0.878	0.085
TopChamp02	0.165	0.189	0.234	0.049	0.947	0.098
TopChamp03	0.212	0.185	0.240	0.069	0.952	0.147
%	0.293	0.197	0.279	0.260	0.123	1.000

Table 2.5 and Table 2.6 show cross-loadings with each of the measures for the extent of logistics outsourcing. Cross-loadings in both tables show that loadings of each item for corresponding constructs is greater than 0.7. There is no loading highly correlated with other constructs. Results indicate internal validity and confirm the discriminant validity.

Table 2.6. Cross-loadings with the number of outsourced logistics activities

	<u>Coercive</u>	<u>Mimetic</u>	<u>Normative</u>	<u>Strategic importance</u>	<u>Top Mgt Championship</u>	<u>Extent</u>
Coer01	0.871	0.483	0.513	0.080	0.140	0.285
Coer02	0.953	0.464	0.449	0.044	0.169	0.230
Coer03	0.958	0.464	0.436	0.071	0.186	0.204
Mimic01	0.498	0.928	0.439	0.107	0.136	0.166
Mimic02	0.436	0.927	0.450	0.117	0.203	0.192
Mimic03	0.484	0.934	0.454	0.172	0.144	0.187
Norm01	0.430	0.350	0.782	0.209	0.179	0.092
Norm02	0.450	0.389	0.818	0.184	0.144	0.170
Norm03	0.379	0.449	0.883	0.148	0.234	0.200
StrImp01	0.042	0.115	0.199	0.928	0.027	0.078
StrImp02	0.099	0.153	0.210	0.959	0.065	0.107
StrImp03	0.051	0.127	0.195	0.950	0.122	0.116
TopChamp01	0.108	0.115	0.158	0.099	0.890	0.204
TopChamp02	0.165	0.188	0.234	0.055	0.944	0.195
TopChamp03	0.212	0.185	0.240	0.077	0.947	0.230
No.	0.253	0.197	0.189	0.109	0.227	1.000

2.4.3 PLS Results

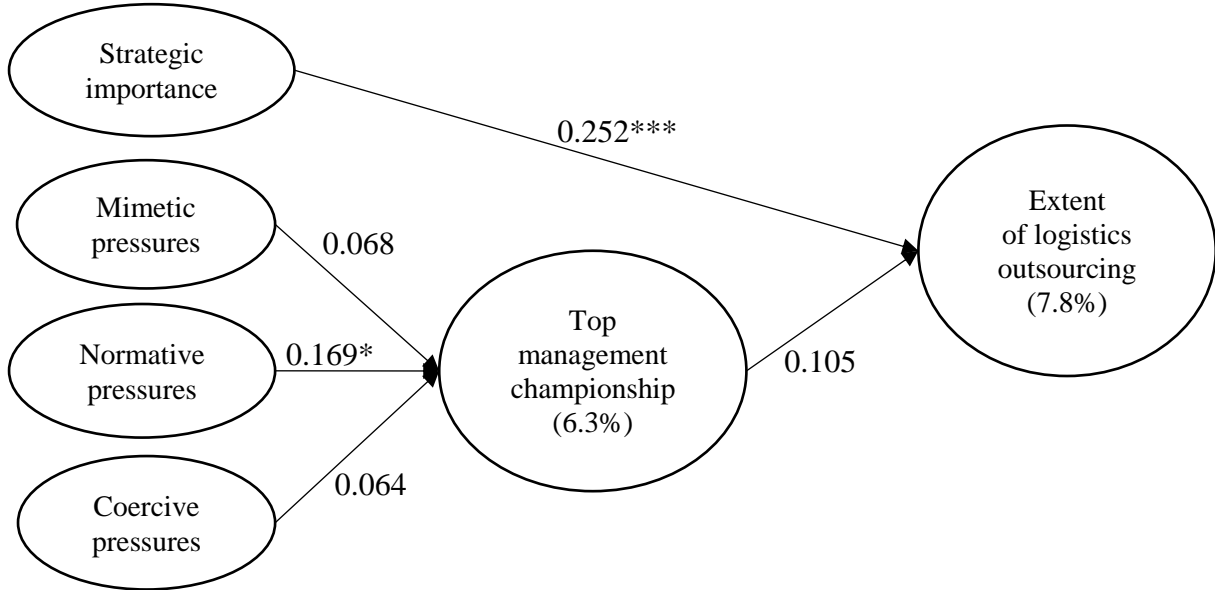


Figure 2.2. PLS results with percentage of money allocated to outsourced logistics activities

Figure 2.2 shows the results of PLS with the percentage of funds allocated to outsourced logistics activities over total logistics expenses as the dependent variable. The results indicate that strategic importance has significant effects on the extent of logistics outsourcing ($\beta=0.252$; $t=3.514$), whereas top management championship does not ($\beta=0.105$; $t=1.345$). The results support H5, but not H1. The effects of external institutional pressures on internal institutional pressure were tested next. Normative pressures have a significant positive effect on top management championship at 90%. However, mimetic and coercive pressures do not show significant effects on top management championship. The results indicate that H3 is supported and H2 and H4 are not supported.

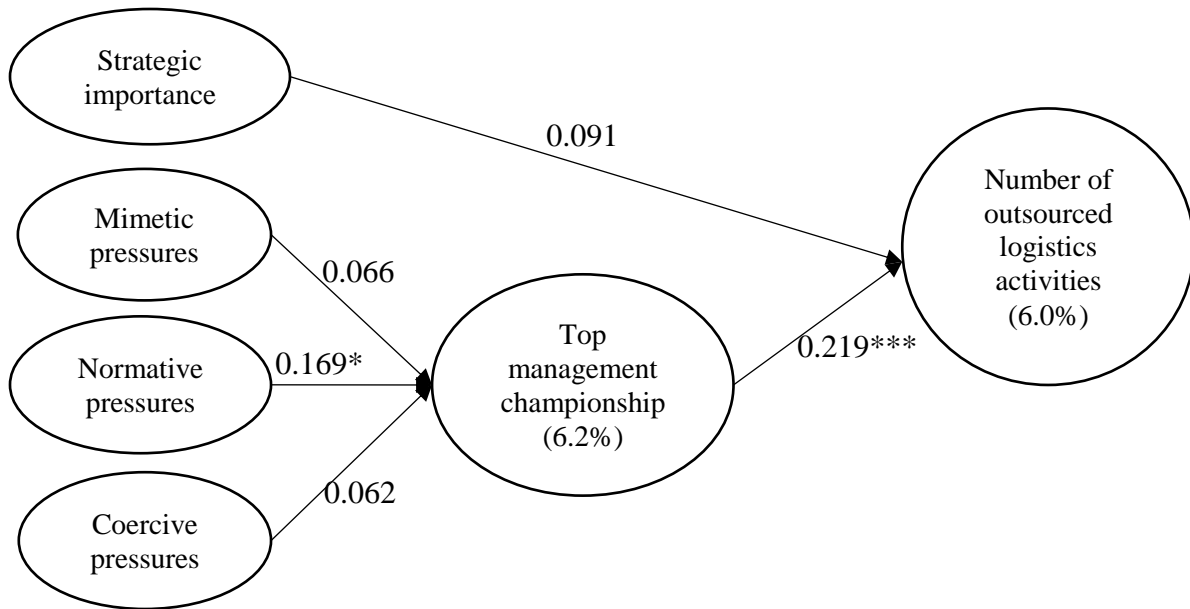


Figure 2.3. PLS results with the number of outsourced logistics activities

Figure 2.3 shows the PLS results with the number of outsourced logistics activities as the dependent variable. While strategic importance does not have a significant effect on the number of outsourced logistics activities, top management championship shows the significant positive effect on the extent of logistics outsourcing. The results support H5, not H1. As did for the model with the percentage of funds allocated to outsourced logistics activities over total logistics expense, the effects of external institutional pressures on internal institutional pressure were tested. The results indicate similar conclusions. Normative pressures had a significant positive effect on top management championship at 90%. However, mimetic and coercive pressures did not show significant effects on top management championship. H3 was supported, but H2 and H4 were not supported.

2.5 CONCLUSIONS AND IMPLICATIONS

This study investigated the effects of external institutional pressures and rational efficiency on the extent of logistics outsourcing. In addition, this study developed a post-outsourcing model to show that top management championships mediated the external institutional pressures' effects on the

extent of logistics outsourcing. This study adopted two different measures from CSCMP reports to define the extent of logistics outsourcing: (a) percentage of funds allocated to outsourced logistics activities over total logistics expense and (b) the number of outsourced logistics activities out of 18 commonly outsourced logistics activities.

The results differ in measuring the extent of logistics outsourcing. While strategic importance had a significant effect on the percentage of funds for outsourced logistics, it did not show a significant difference on the number of outsourced logistics activities. The results indicated that firms depended more on outsourced logistics activities once they had experienced that the outsourced logistics activities were valuable and had a meaningful impact on the achievement of organizational objectives. However, the firms did not decide to outsource another logistics activity because of the experience. Unlike the results for strategic importance, while top management championship did not have a significant effect on the percentage of funds for outsourced logistics, it showed a significant effect on the number of outsourced logistics activities. When top management had a positive attitude and actively participated in the logistics outsourcing decisions, firms showed a higher extent of logistics outsourcing. This happened often when top management was involved in the decision-making procedure for additional logistics activity outsourcing. The results imply that outsourcing a new logistics activity involved top management in the decision. However, managers decided how much to use outsourced logistics service based on their daily or monthly activities once the new logistics activities were outsourced.

Institutional pressures should be positively related to the extent of logistics outsourcing. However, only normative pressures showed significant effects on top management championship. In other words, institutional pressures are not dominant factors for logistics outsourcing decisions once the firms had already outsourced their logistics activities. Yet institutional pressures are still

retained on the decision of the extent of logistics outsourcing through top management, especially when firms need to decide to outsource an additional logistics activity.

Even though measurement validity did not show any issues and the research was designed to provide parsimonious results, this study still shows limitations. The limitations can provide directions for future research. First, the data were collected by self-reports of respondents. Even though using managerial perceptions for measures is a common procedure in operations research, the validity of the results can be improved by using objective measures. Moreover, data were collected from a single informant. Even though this study addressed the issues at survey design and used techniques for common method bias, the common method variance may still occur. Using financial data from questionnaires also improves these common method variance issues. Second, data were collected at a certain point. A lack of logistics competence does not appear overnight but evolves over time. Longitudinal studies can improve the results to describe the dynamics of the alignment.

3 ESSAY THREE: A State-of-the-Art Review of Logistics Outsourcing

3.1 INTRODUCTION

As operations are globalized and logistics become complicated and require specialized expertise, logistics outsourcing is becoming a vital governance choice for obtaining the required logistics capabilities. Hence, according to 2016 Third-Party Logistics Study, the market for logistics outsourcing has increased in past years. The percentage of outsourced logistics usage is much higher than the insourcing, close to a ratio of 3:1 (Langley & Capgemini, 2015).

Including cost savings and customer service improvement, logistics outsourcing is expected to bring benefits to firms. Logistics outsourcing can expand customer requirements, reengineer firms' processes, enable firms to increase efficiency and effectiveness derived from specialization and focus on their core competences, and bring unique types of expertise to firms (Bhatnagar et al., 1999; Sink & Langley, 1997; Wilding & Juriado, 2004). Firms also get rid of major problems by outsourcing logistics. Firms can even explore new markets through logistics outsourcing (Wilding & Juriado, 2004).

However, the effects of logistics outsourcing are mixed. Positive effects of logistics outsourcing, operationally and financially, can be easily found in the literature. Knemeyer and Murphy (2004) found the effects of logistics outsourcing on asset reduction, Sinkovics and Roath (2004) investigated its market performance implications, and Cho, Ozment, and Sink (2008) argued that logistics outsourcing actually should lead to profitability and sales growth. However, concerns and failures of logistics outsourcing are also commonly found (Bhatnagar et al., 1999; Dapiran et al., 1996; Sink & Langley, 1997). The most common reason why firms are not outsourcing logistics is firms' concerns about the potential loss of direct control of logistics activities. In addition, firms might not be sure about the capabilities, services, and quality of

performance they can get from the market. Firms also need to consider how to deploy their personnel after outsourcing logistics. Therefore, many companies are still hesitant to outsource and retain outsourced logistics services in-house (Fernie, 1999).

As a consequence, many studies on logistics outsourcing have examined why firms outsource logistics, what effects firms can get from logistics outsourcing, and how to manage logistics outsourcing. To extend the literature, I need to identify and clarify gaps in the literature. Hence, this study reviews the literature on logistics outsourcing. Using surveys, this study aims to identify the status of logistics outsourcing in the U.S. manufacturing sector.

3.2 LITERATURE ON LOGISTICS OUTSOURCING

To review literature on logistics outsourcing, this study reviewed the literature through Business Source Complete with three keywords: logistics outsourcing, logistics service, and third-party logistics. After reviewing studies, I found 81 relevant studies and divided them into three areas: (a) reasons to outsource logistics, (b) how to manage logistics outsourcing relationships, and (c) what effects firms have received.

The first logistics outsourcing research area seeks reasons to outsource logistics activities, as shown in Table 3.1. In general, cost savings and customer service improvement are identified as the most common reasons. Firms have also outsourced their logistics activities because they had limited resources and wanted to avoid investing in logistics to focus on their core competencies. In addition, as operations are globalized and firms attempt to expand to new markets, the firms prefer to use logistics services providers rather than to invest directly in the new market.

However, factors influencing logistics outsourcing decisions differ in the functions that firms outsource. Fernie (1999) found that while a reason to outsource warehousing is to exploit the greater management expertise of contractors and focus on the core business, a reason to

outsource transportation is to seek a more flexible system, more specialist services, and cost savings. Hsiao et al. (2010) argued that reasons for logistics outsourcing differ in levels of the outsourced logistics activities. When firms decided what logistics activities were to be outsourced, they considered asset specificity, core closeness, and supply chain complexity.

Table 3.1. Reasons for logistics outsourcing

<u>Literature</u>	<u>Country</u>	<u>Reasons</u>
Sink and Langley (1997)	US, Europe	operating costs, improved customer service, expanding customer requirements, reengineering, getting efficiency and effectiveness derived from specialization and the unique types of expertise
Daugherty and Dröge (1997)	US	structure effects, external factors: deregulation, services available, quality of service, data processing/communications, vendor management quality, customer attitudes
Bhatnagar et al. (1999)	Singapore	cost savings, customer satisfaction, flexibility, productivity improvement, maintaining focus on the core business, obtaining access to up-to-date techniques, expertise
Boyson et al. (1999)	US	cost savings, maintaining focus on the core business, outsourced function is a major problem area for the firm, reengineering
Fernie (1999)	UK	warehouse: to exploit the greater management expertise of contractors, focus on the core business, transport: more flexible system, more specialist services, cost savings
Van Laarhoven, Berglund, and Peters (2000)	Europe	cost savings, and reduction in the amount of capital invested, service or quality improvement, strategic flexibility, a focus on core competencies
Wilding and Juriado (2004)	UK, France, Germany	competencies of 3PLs, operational flexibility, cost reduction, focus on core business, avoiding investment, expansion to new markets, labor considerations
Cho et al. (2008)	US	logistics capabilities
Tsai, Liao, and Han (2008)	Taiwan	asset risk, relationship risk, competence risk
Hsiao et al. (2010)	Netherland	<i>asset specificity</i> , measuring uncertainty, <i>core closeness</i> , <i>SC complexity</i> , logistics strategy

Some of the studies tried to explore the antecedents of logistics outsourcing decisions using theories from other disciplines and attempted to explain reasons of logistics outsourcing decisions, including strategic outsourcing, transaction cost economics, resource-based view, and resource-

advantage theory (Anderson, Coltman, Devinney, & Keating, 2011; Bolumole, Frankel, & Naslund, 2007; Spencer, Rogers, & Daugherty, 1994). The theories provide underlying justifications for why firms outsource their logistics activities and what factors drive the outsourcing practice. According to resources allocation, since resources are constrained, firms might need to outsource non-core functions and get external providers to perform the functions (Spencer et al., 1994). Using external providers can free labor and financial resources and the saved resources can be used for the core competencies (Spencer et al., 1994).

Transaction cost economics (TCE) and resources-based views (RBVs) are the most commonly used theoretical frameworks to explain logistics outsourcing decisions. According to TCE, logistics outsourcing decisions can be made based on differences among governance costs and risk prevention, which safeguards firms from exchange hazards (Anderson et al., 2011). Discriminating decisions on logistics outsourcing according to characteristics of logistics outsourcing transactions, firms could economize governance costs (Williamson, 1975). However, RBVs assert that firms might decide to outsource parts or whole logistics functions for capabilities that can supplement existing capabilities and are new to the firms (Holcomb & Hitt, 2007).

These two perspectives can be integrated to explain why a firm makes logistics outsourcing decisions. According to Holcomb and Hitt (2007), these two perspectives complement each other to delineate the reasons for outsourcing decisions. Especially, RBV can augment TCE and sharpen the focus on firms' relative advantages (Holcomb and Hitt, 2007). Because the decision to outsource involves a complex set of factors, focusing only on exchange conditions and transactional attributes can limit understanding of the decision to outsource. Therefore, outsourcing decisions consider not only characteristics surrounding transactions but also capability attributes and the governance context that the transactions create. Research based on this argument

aims to prove that organizational capability considers a trade-off with economizing constraints for outsourcing decisions (Hoetker, 2005; Holcomb & Hitt, 2007; Jacobides, 2005; Poppo & Zenger, 1998).

Resource-advantage (R-A) theory can also be applied to the decisions of logistics outsourcing. Extending RBV, R-A theory emphasizes the role of resources. Firms might generate competitive advantages by purchasing logistics services to supplement their existing capabilities. However, researchers might say that purchased resources may not be able to sustain the competitive advantages because the resources might be imitated easily by competitors. Counter to that argument, research drawing on R-A theory has argued that competitive advantages of purchasing capabilities can be sustained by matching capabilities that external providers perform based on the needs of particular market segments. Drawing on Austrian economics, R-A theory argues that since information is imperfect and costly in markets, it is important for firms to align their capabilities with market segments for sustaining competitive advantages (Hunt and Davis, 2008).

Even though linkages are not drawing on any theory, industry types and firm-specific characteristics are also considered as antecedents to logistics outsourcing decisions. By surveying the status of logistics outsourcing, Hong, Chin, and Liu (2004) sought the differences of outsourcing usage across production mode, firms' size, ownership, and industry types. While industry types, production mode, and firm size with respect to average assets were identified as significant, ownership and firm size with respect to employee population were identified as not significant. Wanke, Arkader, and Fernanda Hijjar (2007) focused on the effects of firm characteristics on logistics outsourcing decisions. They argued that the structures of the logistics function and organizations affect logistics outsourcing decisions and postulated that logistics

sophistication and manufacturing process types might be associated with outsourcing decisions. Logistics sophistication was conceptualized in Bowersox and Daugherty (1992) and measured by the degree of organizational formalization, the use of information technology, and the use of indicators to monitor performance. The study found logistics sophistication as a significant antecedent to logistics outsourcing decisions. In a specific organizational structure, the functional structure might more strongly affect the decisions.

3.2.1 Concerns to Outsourcing

Concerns to logistics outsourcing also have been identified, as listed in Table 3.2. Dapiran et al. (1996) investigated why firms did not show commitment to implementing logistics outsourcing. They listed concerns that logistics managers had when they discussed logistics outsourcing, including the potential loss of direct control of logistics activities, uncertainties about the capabilities of the logistics service providers, the costs of outsourcing, and the deployment of company personnel. Sink and Langley (1997) examined the market for logistics services. They argued that even though it is not core competency, firms hesitate to outsource their logistics due to market constraints. Three factors constraining the market were listed, including the lack of supply, the lack of interchangeable services, and loss of the ability to control service providers. Sankaran, Mun, and Charman (2002) conducted flexible, in-depth interviews concerning contracts with logistics service providers. They aimed to identify the managerial insights into effective logistics outsourcing with respect to outsourcing contracts.

Van Laarhoven et al. (2000) stated that the concerns could differ before and after logistics outsourcing and investigated the differences between concerns before and after the start of a partnership. Before outsourcing logistics, firms had concerns about IT, poor performance, inadequate knowledge, limited acceptance by employees, trust in provider, over-dependence on

single provider, and loss of control. The authors found that concerns decreased once logistics outsourcing was implemented. However, concerns about IT and the quality of the service were still high even after the implementation.

Table 3.2. Concerns to outsource logistics

Authors	Country	Challenges
Dapiran et al. (1996)	Australia	the potential loss of direct control of logistics activities, uncertainties about the capabilities of the logistics service providers, the costs of outsourcing, the deployment of company personnel
Sink and Langley (1997)	US, Europe	factor market constraints: the lack of supply, the lack of interchangeable services, loss of the ability to control service providers
Bhatnagar et al. (1999)	Singapore	teaching users policies and business requirements, resistance of employees to changes, coordination and integration between companies, price negotiations and billing problems, the contract providers' insufficient understanding of buyer's operations, incompatibility of information systems, the lack of trust
Van Laarhoven et al. (2000)	Northern Europe	IT, poor performance, inadequate knowledge, limited acceptance by employees, trust in provider, over-dependence on single provider, loss of control
Sankaran et al. (2002)	New Zealand	issues related to contracts

Different settings and contexts might change concerns and challenges about logistics outsourcing. Bhatnagar et al. (1999) identified challenges and difficulties of online logistics outsourcing in Singapore. The results were different than those of general logistics outsourcing practices. Over 70% of the users reported that they faced challenges and difficulties in contracting out logistics services online. The difficulties listed were teaching users policies and business requirements, resistance of employees to changes, coordination and integration between companies, price negotiations and billing problems, the contract providers' insufficient understanding of a buyer's operations, incompatibility of IS, and lack of trust. In addition, the state of logistics outsourcing practices could be different than those in developed countries. Hong et al.

(2004) investigated the reasons why logistics outsourcing is not common in China. They explored how logistics managers perceived the barriers to development of logistics outsourcing in China. The identified reasons included lack of awareness of logistics concepts, inadequate infrastructure, inadequate multimode capability, underdeveloped information network, lack of a quality logistics manager, and regional protectionism.

In conclusion, the main concerns commonly identified were the potential loss of direct control of logistics activities, uncertainties about the capabilities of the logistics service providers, the costs of outsourcing, and the deployment of company personnel. The potential loss of direct control of logistics activities was the most common reason why firms did not outsource logistics. Firms might not outsource logistics because they might not be sure about the capabilities, services, and quality of performance they can get from the market. The cost of outsourcing is one of the biggest pressures logistics service providers might get from the buyers (CSCMP, 2015). Because of the deployment of company personnel, many papers have studied how to deploy personnel after outsourcing logistics.

3.2.2 Factors Dissatisfying Users

As discussed above, concerns and challenges can affect logistics outsourcing decisions. Meanwhile, dissatisfaction with logistics service providers can mean firms do not renew contracts with existing logistics service providers. Hong, Chin, and Liu (2004) investigated reasons for dissatisfaction with their third party logistics (3PL) providers in China. The most influential factor was poor operational performance from the service providers, including ratings levels, on-time delivery, and the number of service offerings. Other reasons included information systems, responsiveness to customer needs, quality of personnel, error rate, business geographic coverage, and loss and damage performance.

Wilding and Juriado (2004) identified the reasons for contract nonrenewals in Europe. They argued that the nonrenewals were the result of dissatisfaction with their current 3PL providers, which could result in switching to a different 3PL provider or taking the functions back in-house. The most commonly mentioned reasons were service and quality (68%) and cost (52%). “Soft issues” are important in deciding not to renew. The issues include communication and trust. These results were in line with Stank et al. (1999). Operational performance and relational performance are important factors in buyer-supplier relationships. Responsiveness to changes is also a reason for nonrenewal.

3.2.3 Information Sources

When a firm considers outsourcing its logistics activities, information sources for the outsourcing vary, as shown in Table 3.3. Because logistics outsourcing management requires a high level of expertise, professionalization is an important information source (Boyson et al., 1999). Hence, discussion with logistics professionals has been identified as one of the most important steps when firms make decisions on logistics outsourcing. Furthermore, sales contacts at conferences, an example of professional networks, have been commonly mentioned as ways to get information on logistics service providers. This implies that participating in professional networks could involve firms in norms of logistics outsourcing. Firms that have not paid attention to sales calls become subject to sales calls at conferences. In addition, the recommendations of organizations on which firms depend have been identified as information sources that firms acquire for logistics outsourcing decisions. The recommendations might originate from friends, customers, suppliers, and even head offices (Sohail and Al-Abdali, 2005).

Information sources to affect logistics outsourcing decisions differ by country. Unlike the argument of Boyson et al. (1999), sales calls have been identified as one of the most important

information sources by which firms become aware of logistics service providers in other countries, including Australia, Singapore, Saudi Arabia, and so on. Every survey study except one in the United States has shown that more than 40% of respondents indicate sales calls as important sources to perceive logistics service providers.

Table 3.3. Logistics outsourcing information sources

Literature	Country	Information sources
Lieb (1992)	US	sales call (52%), discussion with other logistics professionals (46%), sales contact at logistics conferences (local:11%, national: 15%), advertisement
Dapiran et al. (1996)	Australia	sales calls (47%), discussion with other logistics professionals (38%), advertisement, sales contact at logistics conferences
Bhatnagar et al. (1999)	Singapore	sales calls (40%), discussion with other logistics professionals (18.7%), sales contact at logistics conferences, advertisement
Boyson et al. (1999)	US	in-house research (most effective), professional networks (most effective), trade associations, conferences, journal articles, advertisement
Mohammed Sadiq Sohail and Saad Al-Abdali (2005)	Saudi Arabia	sales calls (40%), discussion with other logistics professionals (23.2%), advertisement (15.2%), sales contact at logistics conferences, recommendations from friends, suppliers, customers, appointed by customers
Sohail et al. (2006)	Singapore, Malaysia	sales calls (40%), discussion with other logistics professionals (18.7%), recommendations from friends, suppliers, and customers, appointed by customers, sales contact at logistics conferences, advertisement

3.2.4 Future Research from Literature Review

TCE (Hsiao et al., 2010; Rabinovich et al., 2007) and RBV (Hsiao et al., 2010) have been widely used to justify outsourcing logistics. However, those theories are based on neoclassic economics (Hunt & Davis, 2008), which has been criticized in that theories based on neoclassic economics conceptualize the market as being under-socialized, neglecting the role of social relations

(Granovetter, 1985). Future research may be conducted to explore the effects of social relations on logistics outsourcing decisions.

In addition, future research on investigations in logistics outsourcing decisions should consider industry characteristics. To date, research on logistics outsourcing has mainly focused on internal antecedents within firms. Identifying external factors of logistics outsourcing decisions can make intellectual contributions by complementing the extant firm-level research. In logistics outsourcing literature, a significant difference has been identified between industry types and outsourcing decisions (Hong et al., 2004). However, scant research has investigated how industry characteristics affect the extent of logistics outsourcing. This future research can provide a broader industry-level insight into the antecedents to the logistics outsourcing decisions.

3.3 BENEFITS EXPECTED FROM LOGISTICS OUTSOURCING

To identify the performance effects of logistics outsourcing, several different measures have been used for business performance. The measures can be categorized into three different performance measures: financial, operational, and relational performance. Because literature on relational performance is broad, relevant literature will be discussed in a separate chapter.

3.3.1 Financial Performance

Table 3.4 shows that different financial performance measures can be derived from logistics outsourcing. The most commonly used financial performance measures are return on assets (ROA; Chu and Wang, 2012; Lai et al., 2013), return on sales (ROS; Chu and Wang, 2012; Lai et al., 2013; Yang and Zhao, 2016), sales growth (Cho et al., 2008; Chu and Wang, 2012; Yeung et al., 2012), and market shares (Jayaram and Tan, 2010; Yeung et al., 2012; Yang and Zhao, 2016). In addition, sales volumes, profit, and asset reduction have been used as proxies for financial performance.

Table 3.4. Financial effects

<u>Literature</u>	<u>Measures</u>	<u>Direct antecedents</u>
Knemeyer and Murphy (2004)	asset reduction performance	trust
Sinkovics and Roath (2004)	market performance	capabilities: operational flexibility, collaboration
Cho et al. (2008)	profitability (financial and marketing issues), sales growth	logistics capabilities (outsourcing as a moderator)
Jayaram and Tan (2010)	a firm's sales, profits, quality level, market share, and customer service level	information integration, 3PL selection criteria, performance evaluation, relationship building
Chiang, Kocabasoglu-Hillmer, and Suresh (2012)	growth rate in annual profit, growth in annual sales, return on sales (ROS), return on assets (ROA)	relationship quality: benevolence trust, capability trust, commitment, satisfaction
Yeung, Zhou, Yeung, and Cheng (2012)	sales and growth, market share, profitability	3PL providers' basic and augmented capability, exporters' competitive advantage
F. Lai, Chu, Wang, and Fan (2013)	growth rate in annual profit, return on sales (ROS), return on assets (ROA)	relationship quality, logistics integration
Yang and Zhao (2016)	sales volume, profit, market share, and ROS	integration

One interesting finding has been that logistics outsourcing is not commonly used as a direct antecedent for financial performance. In most of the studies examined, logistics outsourcing affected financial performance through logistics capabilities of users and relational performance. In addition, logistics outsourcing decisions might not bring positive effects on a firm's performance. For example, Cho et al. (2008) found that the performance effects of logistics capabilities might be weakened by outsourcing logistics functions. The authors interpreted the results that duplicated investment in logistics via outsourcing as generating negative results.

3.3.2 Operational Performance

Most studies identified the positive effects of practices served by third-party logistics on operational performance, as listed in Table 3.5. Operational performance is measured by the strengths of the outsourcing firms on competitive priorities, including cost saving and delivery time reliability (Liu et al., 2010; Sinkovics & Roath, 2004). Operational performance is also measured in terms of supply chain, such as supply chain reactivity (Sauvage, 2003) and supply chain performance (Lin & Ho, 2009).

The operational performance effects could be direct or indirect. Sauvage (2003) found that technological ability of logistics service providers can directly improve the supply chain's reactivity. Sinkovics and Roath (2004) found that the operational flexibility of logistics service providers showed positive direct effects on their outsourcing firms' logistics performance, reducing lead time and improving delivery time reliability. In addition, most of the studies found that logistics service providers can lead to operational performance indirectly. Typically, outsourcing firms' operational performance has been improved by external logistics service providers through their relational performance with the providers. For example, based on marketing literature, Knemeyer and Murphy (2004) argued that firms can improve operational performance by their logistics service providers through trust because trust can increase cooperation and reduce uncertainty. Trust also can generate long-term orientation by outsourcing firms and ultimately proactive improvement (Hofer, Knemeyer, & Murphy, 2012). Liu et al. (2010) found that customer service expertise by logistics service providers encourages firms to develop joint decision ownership and collective responsibility with the providers. The collaboration augments the firms' resource alignment and utilization and facilitates other capabilities

development, including responsiveness and learning capability. Hence, the firms were able to respond to market and customer needs and changes.

Table 3.5. Operational effects

<u>Literature</u>	<u>Measures</u>	<u>Direct antecedents</u>
Sauvage (2003)	SC reactivity	technological ability of 3PL
Knemeyer and Murphy (2004)	marketing channel performance, operations performance	trust
Sinkovics and Roath (2004)	logistics performance, market performance	capabilities: operational flexibility, collaboration
Dixit and Pindyck (1995)	SC performance of 3PL	willingness to adopt RFID
Liu et al. (2010)	buying firm logistics performance (cost and lead time reduction, delivery time reliability, overall logistics capability)	buyer-3PL collaboration
Hsiao et al. (2010)	logistics service performance: lead time, reliability, flexibility (not empirically tested)	logistics outsourcing level decisions
Tian, Ellinger, and Chen (2010)	customer firm logistics improvement: service variety, information availability, timeliness, continuous improvement	3PL provider customer orientation
Hofer et al. (2012)	proactive improvement: improvement efforts, self-motivational aspects, overall level of proactive innovation efforts by 3PL	long-term orientation, trust, cooperation
Ding, Kam, Zhang, and Jie (2015)	L&SC competencies: positioning, distribution support, agility	HRM practices: recruitment & selection, training & development, performance management, reward management
Yang and Zhao (2016)	delivery reliability, customer satisfaction, flexibility, response to changes in customer demand, response to urgent orders	integration

Some definitions of operational performance are different than others. Hsiao et al. (2010) introduced the concept of *logistics service performance*, which Stank, Goldsby, Vickery, and Savitskie (2003) defined as a firm's ability to deliver requested products within the requested delivery time frame at an acceptable cost. Hofer et al. (2012) used proactive improvement (derived

by justice and relationship variables) to capture operational performance. Proactive improvement has been defined as a customer's affective and cognitive evaluation of a third party's efforts to actively improve logistics systems. Deepen, Goldsby, Knemeyer, and Wallenburg (2008) identified the mediating role of proactive improvement between relational factors (communication and cooperation) and outsourcing performance, as measured with goal achievement and goal exceedance.

3.3.3 Effects of Outsourcing

Some logistics outsourcing effects have been surveyed. Table 3.6 shows the effects that logistics outsourcing can have on firms. The effects highly overlap with reasons why firms outsource their logistics activities. The most commonly mentioned benefits in survey research have been logistics costs decrease, logistics performance improvement, and improved customer services. A reduction in capital requirements for the user firm (Dapiran et al., 1996) and a decrease in the size of the logistics department and a simplification of the planning and control process (Van Laarhoven et al., 2000) have also been identified as effects of logistics outsourcing. However, firms can suffer from negative effects once they outsource their logistics activities, such as lower employee morale (Lieb, 1992; M Sadiq Sohail et al., 2006; Mohammed Sadiq Sohail & Saad Al-Abdali, 2005). Because the use of 3PL services changes the number of full-time employees, the firms have experienced morale issues. Hence, employee deployment can be a concern when firms outsource their logistics (Dapiran et al., 1996).

When outsourcing logistics and appreciating its effects, firms and their managers should be cautious regarding two aspects (Boyson et al., 1999; Lieb, 1992; Mohammed Sadiq Sohail & Saad Al-Abdali, 2005). First, firms and managers need to make sure what goals they want to achieve from external logistics services. Identifying benefits of logistics outsourcing, Boyson et

al. (1999) argued that effects of the outsourced functions differ by what goals firms have, such as customer service levels and logistics costs. The differences generate two implications. First, rating the capabilities that firm can get from their logistics service providers is not sufficient to evaluate effects on performance. The effects of capabilities should be considered (aligned) with respect to the priorities the firms pursue because the effects could be evaluated differently in terms of the priorities. Second, because strategies that a firm has should be considered, a decision maker should have not only technical knowledge (specialized logistics skills) that can lead a managerial system to logistics outsourcing management, but also domain knowledge (the company-wide logistics system). Even better, the decision maker should have higher decision-making power at the executive level of the organization.

Table 3.6. Effects of logistics outsourcing in survey

Literature	Effects
Lieb (1992)	logistics costs decrease, logistics performance improvement, improved customer services, the employee morale
Dapiran et al. (1996)	cost reduction, improved expertise, a reduction in capital requirements for the user firm, flexibility enhancement (e.g., seasonality), market accessibility enhancement, utilization of 3PL competences, non-core process reduction (focus on its core business)
Boyson et al. (1999)	service enhancement, costs savings
Bhatnagar et al. (1999)	cost reduction, opportunity for focusing on their core businesses, improved service quality levels, increased productivity, savings on time
Van Laarhoven et al. (2000)	cost reduction, service improvement, a decrease in the size of the logistics department, a simplification of the planning and control process
Wilding and Juriado (2004)	cost reduction, maintaining service level, personnel, added value services, industry-specific knowledge in consumer goods industry
Mohammed Sadiq Sohail and Saad Al-Abdali (2005)	employee morale, logistics costs, customer satisfaction, internal logistics system performance
Rahman and Jim Wu (2011)	on-time delivery, real-time information, inventory accuracy, flexibility, and responsiveness

Another aspect that firms need to consider with logistics outsourcing is the related training needed for implementation (Lieb, 1992; Mohammed Sadiq Sohail & Saad Al-Abdali, 2005). Surveys on the effects of logistics outsourcing have been based on the notion that logistics outsourcing represents an important shift in the way business is conducted. One of the challenges a firm can face with logistics outsourcing concerns morale issues and employee deployment. However, not many companies consider retraining employee to be important. Lieb (1992) found that most of the firms examined did not necessitate retraining of logistics personnel, and Mohammed Sadiq Sohail and Saad Al-Abdali (2005) showed only 38% of the respondents had a need for retraining employees. Moreover, Lieb (1992) and Mohammed Sadiq Sohail and Saad Al-Abdali (2005) emphasized the changes in organizational governance structures, relationships with the providers, and the development of IT skills of employees.

3.3.4 Future Research from Literature Review

Future research should consider strategic factor market for logistics services. Logistics is a resource over which with both competitors and noncompetitors in output markets vie (Ellram, Tate, & Feitzinger, 2013). Considering factor markets for logistics services can lead to a better understanding of the decisions and consequences of logistics outsourcing. In factor markets, firms take advantage of competitive imperfections (J. B. Barney, 1986) and, due to these, firms may have an opportunity to derive competitive advantages by setting accurate expectations of the true value of these resources. There are two resources for generating accurate expectations: analysis of environment and analysis of organization. Whereas analysis of organization is the ability to analyze information about the organizational skills and capabilities that a firm already controls, analysis of environment is the ability to monitor environment related to factor and unrelated factor. The performance effects of organization analysis have been identified in the study of the business

outsourcing process model (Handley & Benton, 2009). However, little research has investigated the performance effects of environment analysis on factor markets in logistics area. Factor market rivalry (FMR) theory may contribute to the investigation (Ellram et al., 2013). FMR theory was developed to understand factor market rivalry among firms considered noncompetitors in output markets that become competitors in input markets (Markman, Gianiodis, & Buchholtz, 2009). Scanning and better understanding the factor market for the resources, firms can gain informational advantages to develop more accurate insights into strategic value of resources (J. B. Barney, 1986).

In addition, the effects of logistics outsourcing have been investigated in mainly the setting of operational performance for the firms that outsourced logistics activities. In other words, logistics outsourcing has not been directly linked to financial performance. In the literature, financial performance implications logistics outsourcing has been derived through operational performance (Cho et al., 2008). It still remains unclear whether and how logistics outsourcing decisions affect various dimensions of a firm's performance.

3.4 HOW TO MANAGE LOGISTICS OUTSOURCING RELATIONSHIPS

Logistics outsourcing literature is replete with studies on how to evaluate and choose logistics service providers and to how to effectively manage relationships with the providers. Selection and evaluation will be discussed first, and the means by which firms manage their logistics service providers will be considered. The means cover not only contract but also relational management involving trust, commitment, and customer partnering behavior.

3.4.1 Selection and Evaluation

3.4.1.1 Selection criteria

Once firms decide to outsource their logistics activities, the decision-making process will begin with logistics service provider selection. Studies have provided criteria for appropriate logistics

service provider selection. Table 3.7 shows the criteria that previous literature has identified. Bhatnagar (1999) found that costs savings and service quality are the most important criteria for evaluation. Company reputation, past experience, and a range of services that are provided follow. They also identified word of mouth as a potentially important criterion. Wanke, Arkader, and Hijjar (2007) linked logistics sophistication (LSI) and process type to the choice of 3PL providers. Jayaram and Tan (2010) identified 3PL selection criteria as part of supply chain management affecting firm performance. Firms that include 3PL in their supply chains emphasize the criteria to a higher extent.

Table 3.7. Selection criteria

Literature	Drivers
Boyson et al. (1999)	financial stability, customer service capability, price of services, problem solving creativity, information systems and technology capabilities, general reputation, reputation for continuous improvement, compatibility with company culture and philosophy
Bhatnagar et al. (1999)	cost savings, service quality, company reputation, range of services provided, past experience, word of mouth
Menon, McGinnis, and Ackerman (1998)	perceived capability (creative management, financial stability), perceived performance (on-time shipments and deliveries, meet or exceed promises, availability of top management, superior error rates)
Wanke et al. (2007)	logistics sophistication index (LSI), manufacturing process types
Anderson et al. (2011)	reliable performance, delivery speed, customer service, track and trace, customer service recovery, SC flexibility, professionalism, proactive innovation, SC capacity, relationship orientation
Anderson et al. (2011)	reliable performance, delivery speed, professionalism, service support, SC flexibility, track and trace, service recovery, SC capacity, proactive innovation, global network, relationship orientation, parity price, risk management, account representative, culture, billing service, management reporting, top management team availability, quality certification, brand, surcharge option

In emerging markets, the criteria could be different than in mature markets. Hong, Chin, and Liu (2004) identified selection criteria for external logistics providers in China, a fast-emerging market. They argued that logistics outsourcing in China is in its infancy. Service quality

has been identified as the most important factor, and rate level and service reliability follow. Existence of a long-term relationship is the least important factor; 42% of the relationships with 3PL providers in Chain are temporary and transaction oriented. Hence, almost half of manufacturers use a “mixed” strategy.

3.4.1.2 Evaluation criteria

Rahman and Wu (2011) identified logistics performance criteria by customers with respect to warehousing services, distribution services and information technology and services, and transportation. The criteria also differ by country. For example, in the automotive industry, firms that outsource distribution services evaluate logistics performance provided by logistics services providers in terms of delivery reliability, on-time delivery, and flexibility. In the same industry, firms that outsource warehouse service consider product damage rate the most. Hong, Chin, and Liu (2004) investigated reasons for dissatisfaction with their 3PL providers in China. The most influential factor has been rating level. On-time delivery and number of service offerings follow. Other reasons for logistics outsourcing include information systems, responsiveness to customer needs, quality of personnel, error rate, business geographic coverage, and loss and damage performance.

Little research has uncovered who should evaluate logistics services by the providers. Boyson et al. (1999) sought efficiencies of methods when firms evaluate the benefits. While the use of company personnel was identified as the most efficient method to evaluate the firm’s costs and processes, the use of logistics services providers for the evaluation was identified as the least efficient method. This implies that the locus of control over outsourcing activities should be located in the buying firms (shippers).

3.4.2 Contracts

Evaluating and managing performance by logistics service providers is always problematic for firms. There are several means by which firms control and manage logistics service providers. Contracts are one of the most commonly used methods to organize, operate, and monitor logistics outsourcing relationships. Written and formalized contracts are mainly (almost 75%) used for the partnerships between buyers and service providers (Van Laarhoven et al., 2000). A list of potential contract provisions to manage 3PL providers has been identified, and service costs have been identified as the most necessary provisions shown on the contracts (Boyson et al., 1999). A contract between a firm and a logistics service provider commonly involves performance metrics, termination clause, delineation of duties, insurance/allocation of liabilities, length of contract, payment method, dispute mechanisms, noncompliance penalties, technology/intellectual property, gain sharing, and human resources.

Comparing performance incentives and penalties, penalty clauses are identified more commonly on written contracts. For example, in the United States, a 3PL usage survey showed that while less than a third of the contracts contained performance incentives, 47% included penalties for nonperformance (Lieb, 1992). In Saudi Arabia, 31% of contracts included performance incentives, and 38% of contracts include penalties for nonperformance (Mohammed Sadiq Sohail & Saad Al-Abdali, 2005). Van Laarhoven et al. (2000) also found that 40% of signed logistics outsourcing contracts made in Northern Europe included penalty clauses for providers. However, in some of countries, performance incentives were used more than penalties. For example, the contracts included performance incentives (54%) and penalties for nonperformance (52%) in Australia (Dapiran et al., 1996).

Many studies have identified the duration of contracts, and 1–3 years is typical of logistics outsourcing contracts. For example, Lieb (1992) found the durations between 1–3 years account for 86% of logistics outsourcing contracts in the United States. Dapiran et al. (1996) found that 83% of contracts were for periods of 1–3 years in Australia. However, the duration differs by country. For instance, in China, 42% of the relationships with 3PL providers were identified as temporary and transaction oriented (Hong et al., 2004). M Sadiq Sohail et al. (2006) surveyed companies in Malaysia and Singapore. They found that among firms using external logistics services, almost half had 5-year contracts or longer in Malaysia and that 84% had more than 3-year contracts or longer in Singapore.

When it comes to the number of logistics service providers with which a firm makes contracts, having one to three logistics service providers is common (Langley & Capgemini, 2015). However, in China, the number of external logistics providers employed by users is at least 3 providers. Hong et al. (2004) interpreted the result that foreign firms in China aim to disperse risks by contracting out with a considerable number of logistics service providers because the market for logistics outsourcing in China is still immature.

Interesting findings on contracts in logistics outsourcing literature include that contracts are becoming more formalized. Then as the list of potential provisions on the contracts grows longer, the contracts get more complicated. In addition, in an amateur market, firms tend to have contracts with more service providers for shorter periods to disperse risks.

3.4.3 Trust and Commitment

Another way to control and manage logistics service providers is through building close relationships (Cao & Lumineau, 2015; Knemeyer, Corsi, & Murphy, 2003; Rabinovich et al., 2007). Many studies have found that it is important to develop and improve relationships between

buyers and logistics service providers. Studies on logistics outsourcing have investigated how to measure relational factors and the importance of relational factors in logistics outsourcing settings (Hartmann & de Grahl, 2012; Hofer, Knemeyer, & Dresner, 2009; Knemeyer et al., 2003).

The most commonly used relational factors in logistics outsourcing literature have been trust and commitment. They are considered the most effective governance mechanisms for relationships with logistics service providers (Wallenburg & Raue, 2011). As a governance mechanism, they safeguard logistics outsourcing relationships from opportunistic behavior (F. Lai, Tian, & Huo, 2012). Table 3.8 shows the antecedents and consequences of trust commitment.

Table 3.8. Trust and commitment

<u>Literature</u>	<u>Antecedents</u>		<u>Consequences</u>
Hofer et al. (2009)		3PL's benevolence	customer partnering
Grawe, Daugherty, and Dant (2012)	organizational implantation, relational capital, responsiveness, inter-organizational outcome interdependence	commitment between LSP and customer	
F. Lai et al. (2012)	relational norm	trust	opportunism
Li, Ford, Zhai, and Xu (2012)	perception of relational benefits: value-add benefits, collaborative benefits, economic benefits	trust, commitment	
Schmoltzi and Wallenburg (2012)	cooperation effectiveness	cooperation commitment	operational formalization, mutual influence
Huo, Ye, and Zhao (2015)		trust	detailed contract, contract application, opportunism

Studies have investigated trust and commitment and their relationships with a firm's performance. The underlying argument is that trust and commitment play roles as a governance mode, reduce opportunism and opportunistic costs, economize costs for firms, and generate performance outcomes (Cao & Lumineau, 2015; Huo et al., 2015; F. Lai et al., 2012). In addition,

they enable firms to achieve operational formalization and build mutual influence between the firms and their logistics service providers (Schmoltzi & Wallenburg, 2012).

Trust and commitment also affect contracts. Traditionally, trust and commitment were identified as substitutes for a governance mode for formal contracts. However, Poppo and Zenger (2002) argued that trust and commitment could complement formal contracts. The relational factors can provide a basis for psychological safety with which firms and their service providers can negotiate even sensitive issues, and they can prevent distrust and conflict (Edmondson & Moingeon, 1999; Woolthuis, Hillebrand, & Nooteboom, 2005). At the same time, trust and commitment help the firms to be willing to spend large amounts of time, money, skills, and specific routines over contracts (Bacharach & Gambetta, 2001). In logistics outsourcings, Hofenk, Schipper, Semeijn, and Gelderman (2011) verified that trust and commitment positively affect contractual factors that include contract formality and negotiation thoroughness, as well as relationship effectiveness. Huo, Ye, and Zhao (2015) argued that trust reduces opportunism by developing detailed contracts (ex ante) and contract application (ex post) because trust acts as a precondition for contracts. However, contracts also influence relational factors. Because well-specified contracts narrow down the risk in exchange relationships, they promote close, collaborative, and long-term relationships. Negotiating contracts means firms must pay attention to the technical, economic, and operational aspects of contracts, as well as their content.

There is also literature regarding how to achieve trust and commitment. Huo et al. (2015) found that commitment consists of normative and instrumental relationship commitments. Commitments rely on the extent of dependence (Huo et al., 2015), organizational implantation, relational capital, inter-organizational outcome interdependence (Grawe et al., 2012), relational norms (F. Lai et al., 2012), and perception of relational benefits (Chiang et al., 2012).

3.4.4 Customer Partnering Behavior

Another relational factor in logistics settings is customer partnering behavior. Hofer, Knemeyer, and Dresner (2009) investigated dimensions of customer partnering behavior in logistics outsourcing relationships. Based on the concept of partnership, Gardner, Cooper, and Noordewiser (1994) as well as Hofer, Knemeyer, and Dresner (2009) defined a 3PL customer's partnering behavior as the customer's perception that its relationship with the 3PL possesses five behavioral dimensions: extendedness, operational information exchange, mutual operating controls, shared benefits and burdens, and planning.

Table 3.9. Customer partnering behavior

<u>Literature</u>	<u>Antecedents</u>	<u>Consequences</u>
Hofer et al. (2009)	Inter-organizational conditions (customer's dependence on 3PL, 3PL's credibility, 3PL's benevolence, satisfaction with previous outcomes), firm-specific factors (prior experience 3PL partnering, relationship marketing orientation)	
Hartmann and de Grahl (2012)		logistics outsourcing performance: goal achievement, goal exceedance

Some studies have identified the antecedents and consequences of customer partnering behavior, as shown in Table 3.9. Hartmann and de Grahl (2012) linked customer partnering behavior to logistics outsourcing performance, which includes goal achievement and goal exceedance. Because strong commitment to close relationships among supply chain participants is required for enhanced performance, an effective partnering between customers and 3PL providers is a key factor for a successful relationship (Stank, Keller, & Daugherty, 2001). Hartmann and de Grahl (2012) extended these arguments. They postulated that partnering behavior of a customer

firm enables its 3PL partners not only to meet but also to exceed its expectations. *Goal achievement* refers to logistics outsourcing performance that achieves expected outcomes ex ante agreed upon by a company and its 3PL providers. *Goal exceedance* is defined as services that significantly surpass the goals and expectations (Deepen et al., 2008; Wallenburg et al., 2010).

Hofer, Knemeyer, and Dresner (2009) also identified factors enhancing customer partnering behavior. Based on social exchange theory, they found four inter-organizational conditions: customer's dependence on 3PL, 3PL's credibility (trust), 3PL's benevolence, and satisfaction with previous outcomes. They also found the firm-specific factors of prior experience 3PL partnering and relationship marketing orientation.

3.4.5 Relationship Quality

Chu and Wang (2012) operationalized relationship quality to define successful logistics outsourcing relationships. These relationship outcomes consist of trust (benevolence, capability), commitment, and satisfaction. This study also identified the drivers to the outcomes based on transaction costs economics and resource dependence theory. The relationship outcomes may lead to financial performance in logistics outsourcing context in China. Lai et al. (2013) also investigated the role of relationship quality in 3PL context. Relationship quality affects financial performance partially through improving logistics integration.

3.4.6 Future Research from Literature Review

One of the primary issues regarding logistics outsourcing relationships today is information technology (IT) gaps (Langley & Capgemini, 2016). *IT gaps* refer to the difference between what shippers feel is important and their ratings of their logistics service providers' current IT capabilities. IT services are becoming a differentiating factor for logistics service providers. However, scant research has explored what IT-related capabilities from logistics service providers

are considered important to shippers or how those capabilities affect the performance of the providers or shippers. A commonly mentioned IT-related capability has been visibility (Langley & Capgemini, 2015). Future research can be developed to identify IT services, which may increase visibility and its effects to logistics services providers or shippers.

When it comes to logistics outsourcing relationships, one of the challenges is shippers' understanding of technical knowledge. A lack of technical knowledge could engender difficulties in performance measure congruence and contract. While suppliers' domain knowledge of buyers' businesses has been identified as an important factor in supplier-buyer relationships, little attention has been paid to the implications of buyers' technical knowledge in a successful outsourcing relationship. Such knowledge could offer significant insight into outsourcing decision-making processes and their effects on performance (Tiwana, 2009). Therefore, future research should consider both technical knowledge and business domain knowledge in the logistics outsourcing decisions and investigate their roles in the performance implications of logistics outsourcing.

3.5 DATA & METHODS

To investigate the status of logistics outsourcing, this study conducted a survey. The sample frame was compiled from 4000 Dunn and Bradstreet U.S. manufacturers. The survey targeted a sample of CEO and senior managers and mid- and upper-level supply chain and logistics managers in manufacturing firms. After a validation exercise, 3167 valid contacts were achieved. As Dillman (2000) recommended, three reminders were sent after the first e-mail blast for the survey, and 185 usable responses were collected.

Table 3.10. Demographic description

		<u>No.</u>	<u>%</u>
SIC Code	20 Food and Kindred Products	13	7.03
	22 Textile Mill Products	1	0.54
	23 Apparel and other Finished Products	3	1.62
	24 Lumber and Wood Products, except Furniture	2	1.08
	25 Furniture and Fixtures	4	2.16
	26 Paper and Allied Products	4	2.16
	27 Printing, Publishing, and Allied Industries	4	2.16
	28 Chemicals and Allied Products	11	5.95
	29 Petroleum Refining and Related Industries	4	2.16
	30 Rubber and Miscellaneous Plastics Products	8	4.32
	31 Leather and Leather Products	1	0.54
	32 Stone, Clay, Glass, and Concrete Products	9	4.86
	33 Primary Metal Industries	14	7.57
	34 Fabricated Metal Products	14	7.57
	35 Industrial and Commercial Machinery and Computer Equipment	16	8.65
	36 Electronic and other Electrical Equipment and Components	17	9.19
	37 Transportation Equipment	13	7.03
	38 Measuring, Analyzing, and Controlling Instruments	6	3.24
	39 Miscellaneous Manufacturing Industries	4	2.16
Missing	37	20.00	
No. of Employees	≤ 10	20	10.81
	11 to 50	36	19.46
	51 to 200	62	33.51
	201 to 1000	38	20.54
	More than 1000	19	10.27
	Missing	10	5.41
Sales	≤ 5M	22	11.89
	5 - 20M	26	14.05
	20 - 100M	51	27.57
	100M - 1B	31	16.76
	>1B	16	8.65
	Missing	39	21.08
Titles	CEO, Owner, General VP/Director	22	11.89
	VP/Director Operations, Planning	8	4.32
	Operations, Planning Manager	10	5.41
	VP/Director Logistics, Supply Chain	27	14.59
	Logistics, Supply Chain Manager	96	51.89
	VP/Director Account, Marketing, Purchasing	1	0.54
	Account, Marketing, Purchasing Manager	10	5.41
	Missing	11	5.95

Table 3.10 shows demographics that are descriptive of the sample. Because the survey was conducted across manufacturers, the first 2 digits of the SIC code fall between 20 and 39. The number of employees and sales show the sizes of the firms. Most of the firms had 11–1000 employees and 5M–1B in yearly sales. Job titles of respondents had mainly logistics and supply chain managers or directors, and they included the CEO, director, and managers in operations. Even though some of the respondents did not include logistics or supply chain in their title names, they were in charge of the functions of logistics and supply chain management.

Table 3.11. Logistics coverage and size

		<u>No.</u>	<u>%</u>
Number of countries	Domestics	18	9.7
	2 to 5	44	23.8
	6 to 20	57	30.8
	21 to 100	37	20
	more than 100	18	9.7
	missing	11	5.9
Logistics professionals	0	2	1.1
	1 to 3	50	27.0
	4 to 20	68	36.8
	21 to 100	34	18.4
	more than 100	16	8.6
	missing	15	8.1

Table 3.10 shows demographics that are descriptive of the sample. Because the survey was conducted across manufacturers, the first 2 digits of the SIC code fall between 20 and 39. The number of employees and sales show the sizes of the firms. Most of the firms had 11–1000 employees and 5M–1B in yearly sales. Job titles of respondents had mainly logistics and supply chain managers or directors, and they included the CEO, director, and managers in operations. Even though some of the respondents did not include logistics or supply chain in their title names, they were in charge of the functions of logistics and supply chain management.

Table 3.11 shows the number of countries in which logistics within a firm are handled and the number of logistics professionals in the logistics function. Products are mainly distributed across countries. Only around 10% of respondents reported that their firms delivered their products domestically. Other respondents said that their products were distributed in at least more than one country. Logistics professionals across firms mainly ranged from 1–100. Just under 10% of firms had more than 100 logistics professionals.

3.6 RESULTS

The results are reported in order of reasons and the extent of logistics outsourcing, the decision-making process, and relationships with logistics.

3.6.1 Why Outsource Logistics

Table 3.12. Logistics governance choice

	<u>No.</u>	<u>%</u>
Governance choice In-house	30	16.22
Outsourcing	155	83.78

Table 3.12 shows how firms achieve their logistics capabilities according to logistics strategic objectives. More than 80% of respondents reported that their firms outsource at least one of the logistics activities or that they used logistics services from outside providers. This is similar to what was reported in the 2016 CSCMP's Annual State of Logistics Report. An open-ended question was asked about the reasons to outsource logistics activities. The answers have been listed and grouped as follows.

Table 3.13 shows why firms outsource their logistics activities. In line with previous works, cost savings and service improvement were the most cited reasons (61.85%). Firms also sought expertise from external sources by outsourcing logistics (11.34%). Sometimes, the firms outsourced their logistics activities simply because they lacked internal resources to have logistics

in-house (9.79%). One of the respondents answered that they outsourced their logistics activities to explore new markets.

Table 3.13. Reasons to outsource logistics activities

<u>Reasons</u>	<u>Counts</u>	<u>%</u>
Cost savings	90	46.39
Service improvement	30	15.46
Expertise	22	11.34
Lack of internal resources	19	9.79
Focus on core competence	15	7.73
Personnel trouble	5	2.58
Standards compliance	4	2.06
Peak demand	4	2.06
Risk management	2	1.03
Service availability	2	1.03
New market exploration	1	0.52
Missing	20	

3.6.2 Extent of Logistics Outsource

Table 3.14. Status of outsourced logistics activities

<u>Outsourced Logistics Activities</u>	<u>Count (n=152)</u>	<u>%</u>
Domestic transportation	131	86.18
Warehousing	72	47.37
International transportation	112	73.68
Freight forwarding	108	71.05
Customs brokerage	119	78.29
Reverse logistics (defective, repair, return)	47	30.92
Cross-docking	35	23.03
Freight bill auditing and payment	48	31.58
Transportation planning and management	33	21.71
Inventory management	18	11.84
Product labeling, packaging, assembly, kitting	32	21.05
Order management and fulfillment	14	9.21
Service parts logistics	19	12.50
Fleet management	39	25.66
Information technology (IT) services	35	23.03
Supply chain consultancy	24	15.79
Customer service	10	6.58
LLP / 4PL services	32	21.05
None	30	
Missing	3	

To measure the extent of logistics outsourcing, this study used two measures: (a) the number of outsourced logistics activities and (b) the money allocated to outsourced logistics activities from the total logistics budget. To count outsourced logistics activities, the study provided a list of logistics outsourcing activities adopted from the 2017 Third Party Logistics Report. Respondents were asked to choose all the activities that applied to their companies. As shown in Table 3.14, the results indicate that the median number of outsourced logistics activities was 5 out of 18 activities. The most outsourced logistics activity was domestic transportation (86%). Customer brokerage (78.29%), international transportation (73.68%), and freight forwarding (71.05%) followed. The results are similar to the ones in the 2017 Third Party Logistics Report, except for warehousing (66% in the report and ranked second).

Another measure this study used for the extent of logistics outsourcing was to ask respondents about the proportion of money allocated to outsourced activities (percentage of the total logistics budget paid to contract logistics companies). Values of mean and median were 43.35% and 40%, respectively.

3.6.3 Decision-Making Process

Table 3.15. Decision making in logistics outsourcing

		<u>No.</u>	<u>%</u>
Decision Level	Local	57	30.81
	Divisional	41	22.16
	Corporate	82	44.32
	Missing	5	2.70
Degree to which other functions are involved in logistics outsourcing decisions	$\mu=3.51$ Std. Dev = 1.737	184	
	Missing	1	

One survey question asked the organizational level which strategic decision to use for logistic services that originated within the firm. Table 3.15 indicates that decisions for logistics outsourcing are made across different levels, including corporate (44.32%), division (22.16%), and local (30.81%).

The survey also asked them to rate the extent to which managers in other functional areas are routinely involved in the decision to use the external logistics services on a seven-point Likert scale. The results is shown in Table 3.15. Mean and standard deviation values are 3.51 and 1.737, respectively.

3.6.4 Relationships with Logistics Service Providers

Table 3.16 shows firms' relationships with logistics service providers. Typical tenure with logistics service providers lasts from 1–10 years. Most of the firms have more than a 1-year relationship with their logistics service providers. The results indicate that typical tenure has increased since Lieb (1992) and Dapiran et al. (1996). However, the results differ from typical tenure identified in developing countries (Boyson et al., 1999; Hong et al., 2004). Hong et al. (2004) found that logistics outsourcing relationships in a developing country were based on temporary purchases. The temporary purchases might mitigate the risk due to unreliable and unresponsive logistics service providers. Therefore, the results in this study might support the assumption that firms relied on a small number of logistics service providers for longer periods as they outsourced logistics activities and logistics outsourcing market matured (Langley & Capgemini, 2015).

Table 3.16. Relationships with logistics service providers

	<u>No.</u>	<u>%</u>	
Supplier tenure	less than 1 year	9	4.9
	1 to 5 years	42	22.7
	5 to 10 years	37	20
	10 to 15 years	19	10.3
	more than 15 years	12	6.5
	missing	66	35.7
Supplier availability	0 to 2	15	8.1
	3 to 5	39	21.1
	6 to 25	63	34.1
	26 to 100	15	8.1
	more than 100	23	12.4
	missing	30	16.2

3.7 FINDINGS AND IMPLICATIONS

While investigating the status of logistics outsourcing, this study found reasons and the extent of the logistics outsourcing, decision-making process, and relationships with logistics in the setting of manufacturing. More than 80% of respondents reported that their firms outsource at least one logistics activity or that they used logistics services from outside providers. Cost savings and service improvement are the most cited reasons for logistics outsourcing as well as expertise from external sources. Typically, manufacturers are outsourcing five logistics activities out of eighteen. The most outsourced logistics activity was domestic transportation (86%). Customer brokerage (78.29%), international transportation (73.68%), and freight forwarding (71.05%) closely followed. The approximate average percentage of the total logistics budget paid to contract logistics companies was 43.35%. Typical tenure with logistics service providers falls from 1–10 years. Most firms have more than a 1-year relationships with their logistics service providers, implying that typical tenure has increased.

This study aims to clarify gaps in the literature of logistics outsourcing for future research and identify the status of logistics outsourcing in the manufacturing sector. Based on the literature review above, this study suggests two future research directions. First, theoretical perspectives could be drawn on to identify reasons for logistics outsourcing. Even with identifying factors and reasons for logistics outsourcing, few papers have proven a link by drawing on theories. Transaction cost economics (Hsiao et al., 2010; Rabinovich et al., 2007) and resource-based views (Hsiao et al., 2010) have been widely used to explain reasons to outsource logistics. Based on neoclassic economics theories, characteristics of transactions and resources are identified as significant reasons for logistics outsourcing. However, critics have said that theories based on neoclassic economics conceptualize the market as being under-socialized, neglecting the role of

social relations (Granovetter, 1985). Other theories like institutional theory could support alternative explanations for logistics outsourcing.

Second, the effects of logistics outsourcing have mainly been investigated in the setting of operational performance for firms that outsourced logistics activities. In other words, logistics outsourcing has not been directly linked to financial performance. In the literature, financial performance implications logistics outsourcing has been achieved through operational performance (Cho et al., 2008). It still remains unclear whether or how logistics outsourcing decisions affect various dimensions of firm performance. Employing a series of two-stage, self-selection models, future research may be able to account for the potential influence of unobserved attributes for logistics outsourcing decisions and investigate performance implications of the decisions' effects (Leiblein, 2003).

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APPENDIX: SURVEY INSTRUMENT

The purpose of this research is to explore logistics management issues comprehensively, along with their impacts on business performance.

Privacy and Confidentiality:

None of the data collected will be used to identify particular individuals. All data will be presented in aggregate form only. All analyses of results will be reported in aggregate form and no individual identities will be revealed in any publications or presentations resulting from this research study. The web-based survey system hosted by Qualtrics sent via a private server will be used to collect the aggregate form of data. Qualtrics is a U.S.-based, private research software. It provides multiple layers of security to ensure that all data remain private and secure. The data will reside behind the latest in firewall and intrusion prevention technology. The emails were sent by group mail, therefore there is no link between the emails and participants' identity. While the survey responses will be stored in the secured database provided by SUNY at Buffalo, those responses will not be linked to participants' identities. Only the listed researchers will have the access to the data. The data will be stored for four years for research purposes only.

Benefits:

There are no direct benefits to you for participating in this research. However, you will **get a \$25 Amazon gift card**. In addition, **a copy of the aggregated survey results** will be made available.

Risks:

There are no known risks in participating in the research. Your participation is voluntary. We estimate that the survey may take about 20 minutes to complete. Please ensure that all questions are answered to the best of your ability. However, you have the right to choose not to answer all questions and can stop at any time.

Contact Information for Questions, Concerns, or Complaints:

The research is conducted by Mr. Soomin Park (soominpa@buffalo.edu) under the supervision of Prof. Nallan Suresh (ncsuresh@buffalo.edu). Any questions, concerns or complaints that you may have about this study can be answered by Mr. Soomin Park and Prof. Suresh. They can be contacted through the Department of Operations Management & Strategy, School of Management at the State University of New York at Buffalo, Buffalo, NY 14260 or by phone (716) 867-5067. If you have any questions about your rights as a participant in this research project, or questions, concerns or complaints about the research and wish to speak with someone who is not a member of the research team, you should contact (anonymously, if you wish) University at Buffalo Institutional Review Board (Office of Research Compliance, Clinical and Translational Research Center, 875 Ellicott St., Room 5018, Buffalo, NY 14203. Phone: (716) 888-4888).

Instructions:

1. For all questions, please respond at the supply chain or firm level, as appropriate, unless directed otherwise (49 Questions in total).
2. The survey is to be answered by a Logistics or Supply Chain Management executive at a senior level in your company. Please consult with your manufacturing & sales counterparts, if necessary, for some of the questions.

3. You can simply RESUME YOUR SURVEY by clicking the link at the same device. When you leave the survey, your answer will be saved automatically. Once you click the survey link again at the same computer, the link directs you to where you left. Incomplete survey data will not be transferred to the researcher.
4. You will get a \$25 Amazon gift card. We will gladly send you the aggregated research results (Straight lined answers will not be eligible).

Thank you for your kind participation!

IMPORTANCE AND PERFORMANCE OF LOGISTICS CAPABILITIES

Importance

The following STATEMENTS concern various objectives of logistics activities for your main product line. Indicate the level of strategic IMPORTANCE you assign to each aspects on a 7-point scale: (1=Not Important, 7=Very Important).

Performance

On the SAME STATEMENTS, please rate your *achieved performance compared to your major competitors for performance*, again on a 7-point scale: (1=Worst among competitors, 7=Leader among competitors). The following statements concern the logistics performance of your main product line resulting from BOTH in-house and externally purchased logistics services.

	Importance							Performance						
Cost														
The total cost of distribution	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Inventory costs (raw materials, finished goods, and pipeline)	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Transportation costs	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Logistics labor productivity	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Productivity of logistics resources	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Quality														
Customer satisfaction provided by logistics services	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Ability to enhance customer success	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Number of logistics-related complaints (lower is better)	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Ability to not damage product during handling	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Ability to track shipments	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Delivery														
Ability to deliver expedited shipments	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Delivery lead time for goods shipped	1	2	3	4	5	6	7	1	2	3	4	5	6	7
on-time delivery performance	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Flexibility														
Ability to accommodate special or non-routine requests	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Ability to handle unexpected events	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Ability to provide rapid response to customer requests	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Innovation														
Aggressiveness in increasing the value-added content of logistics services	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Aggressiveness in the reduction of order cycle time (i.e. logistics cycle time)	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Ability to provide new and better logistics services	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Asset utilization														
High utilization of logistics resources	1	2	3	4	5	6	7	1	2	3	4	5	6	7
the improvement of the cash to cash cycle time	1	2	3	4	5	6	7	1	2	3	4	5	6	7
the improvement of net asset turns (asset turnover)	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Geographical coverage														
Ability to effectively provide widespread and/or intensive distribution coverage	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Ability to effectively target selective or exclusive distribution outlets	1	2	3	4	5	6	7	1	2	3	4	5	6	7

BUSINESS STRATEGY

Please indicate the extent to which you adopt to use each of the following, compared to your major competitors (1: much less than competitors, 7: much more than competitors)

Innovative differentiation							
R&D expenditures for product development	1	2	3	4	5	6	7
R&D expenditures for process innovations	1	2	3	4	5	6	7
Emphasis on being ahead of competition	1	2	3	4	5	6	7
Rate of product innovations	1	2	3	4	5	6	7
Marketing differentiation							
Innovations in marketing techniques	1	2	3	4	5	6	7
Emphasis on marketing department organization	1	2	3	4	5	6	7
Advertising expenditures	1	2	3	4	5	6	7
Emphasis on strong sales force	1	2	3	4	5	6	7
Low cost							
Modernization and automation of production processes	1	2	3	4	5	6	7
Efforts to achieve economies of scale	1	2	3	4	5	6	7
Capacity utilization	1	2	3	4	5	6	7

PERFORMANCE

Please rate your company performance compared to major competitors for each of the aspects (1=Much lower, 7=Much higher)

Performance							
Sales growth	1	2	3	4	5	6	7
Market share (of main product)	1	2	3	4	5	6	7
Profits as percent of sales	1	2	3	4	5	6	7
Cash flow	1	2	3	4	5	6	7
Savings	1	2	3	4	5	6	7
Return on investment after tax (ROI after tax)	1	2	3	4	5	6	7
Return on assets after tax (ROA after tax)	1	2	3	4	5	6	7
Growth in return on investment (growth in ROI)	1	2	3	4	5	6	7
Return on sales (ROS)	1	2	3	4	5	6	7

Please rate the change of the following performance measures over the past 3 years (a percentage)

Performance	
Sales growth	%
Market share (of main product)	%
Profits as percent of sales	%
Cash flow	%

Savings	%
Return on investment after tax (ROI after tax)	%
Return on assets after tax (ROA after tax)	%
Growth in return on investment (growth in ROI)	%
Return on sales (ROS)	%

STRATEGIC ALIGNMENT

Please rate the extent to which each of following are successfully fulfilled in your firm's logistics planning (1=entirely unfulfilled, 7=entirely fulfilled)

Strategic Alignment							
Understanding the strategic priorities of top management	1	2	3	4	5	6	7
Aligning logistics strategies with the strategic plan of the organization	1	2	3	4	5	6	7
Adapting the goals/objectives of the logistics function to the changing goals/objectives of the firm	1	2	3	4	5	6	7
Maintaining a mutual understanding with top management on the role of the logistics function in supporting the organizational strategy	1	2	3	4	5	6	7
Identifying logistics related opportunities to support the strategic direction of the firm	1	2	3	4	5	6	7
Educating top management on the importance of logistics functions.	1	2	3	4	5	6	7
Adapting logistics plans to strategic change	1	2	3	4	5	6	7

PRODUCT CHARACTERISTICS

Please, rate the following characteristics regarding your main products (1=low, 7=high)

Product characteristics							
The weight to bulk (volume) ratio (e.g. low: balloon, high: sand)	1	2	3	4	5	6	7
The value to weight ratio (low: sand, high: diamonds)	1	2	3	4	5	6	7
Substitutability	1	2	3	4	5	6	7
Perishability	1	2	3	4	5	6	7
Flammability	1	2	3	4	5	6	7
Ease of being stolen	1	2	3	4	5	6	7

ENVIRONMENT

Please, rate changes over the past 5 years

Market activities of your key competitors (1=have become far more predictable, 7=have become far less predictable)	1	2	3	4	5	6	7
The tastes of preferences of your customers in your principal industry (1=have become much more stable and predictable, 7=have become much more hard to forecast)	1	2	3	4	5	6	7
Rate of innovation of new operating processes and new products or services in your principal industry (1=rate has fallen dramatically, 7=rate has dramatically increased)	1	2	3	4	5	6	7
Your principal industry's downswings and upswings (1=have become far more predictable, 7=have become far less predictable)	1	2	3	4	5	6	7
Market activities of your key competitors (1=have become far more hostile, 7=have become far less hostile)	1	2	3	4	5	6	7
Market activities of your key competitors	1	2	3	4	5	6	7

(1=now affect the firm in far fewer areas, 7=now affect the firm in many more areas, e.g. pricing, delivery, service, quality, etc.)							
Needed diversity in your production methods and marketing tactics to cater to your different customers (1=diversity has dramatically decreased, 7=diversity has dramatically increased)	1	2	3	4	5	6	7

Please indicate the degree of agreement that you have with each statement (1=Strongly disagree, 7=Strongly agree)

Managers from other functional areas were actively involved in the decision to use external logistics service providers	1	2	3	4	5	6	7
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INSTITUTIONAL PRESSURES

Please indicate the degree of agreement that you have with each statement (1=Strongly disagree, 7=Strongly agree)

Mimetic Pressures							
What is the extent of logistics outsourcing by your firm's competitors currently? (1= None has adopted, 7= All have adopted)	1	2	3	4	5	6	7
My main competitors that have outsourced logistics:							
have benefited greatly.	1	2	3	4	5	6	7
are perceived favorably by others in the same industry.	1	2	3	4	5	6	7
are perceived favorably by suppliers.	1	2	3	4	5	6	7
are perceived favorably by customers.	1	2	3	4	5	6	7
Normative Pressures							
Do you participate in any industry, trade or professional bodies where you have been exposed to logistics outsourcing promotion and information	1	2	3	4	5	6	7
Logistics outsourcing has been widely outsourced by our suppliers currently.	1	2	3	4	5	6	7
Logistics outsourcing has been widely outsourced by our customers currently.	1	2	3	4	5	6	7
Logistics outsourcing has been widely outsourced by our competitors currently.	1	2	3	4	5	6	7
Coercive Pressures							
Has your parent company outsourced logistics?	1	2	3	4	5	6	7
The competitive conditions require our firm to outsource logistics	1	2	3	4	5	6	7
Our main customers that matter to us believe that we should outsource logistics.	1	2	3	4	5	6	7
We may not retain our important customers without logistics outsourcing.	1	2	3	4	5	6	7
Our main suppliers that matter to us believe that we should outsource logistics.	1	2	3	4	5	6	7
Our suppliers that are crucial to us hotly wish us to outsource logistics.	1	2	3	4	5	6	7

EXCHANGE HAZARDS

Asset Specificity							
To run your logistics functions effectively, the supplier's (our) workers have to spend a lot of time and effort learning the ins and outs of our firm.	1	2	3	4	5	6	7
There is a need for significant firm-specific training for a new employee to effectively execute your logistics functions, even if he or she has general experience in our industry.	1	2	3	4	5	6	7
The procedures and routines used in your logistics functions are specific to our firm.	1	2	3	4	5	6	7

Technological Uncertainty							
The core technologies associated with your logistics functions change: (1 = Very slowly; 7 = Very quickly).	1	2	3	4	5	6	7
The core technologies associated with your logistics functions become outdated: (1 = Very slowly; 7 = Very quickly).	1	2	3	4	5	6	7
Trends in the core technologies associated with your logistics functions are: (1 = Very easy to monitor; 7 = Very difficult to monitor).	1	2	3	4	5	6	7
Measurement Difficulty							
To what degree is it easy to measure the collective performance of those individuals who perform the key tasks associated with your logistics functions? (1 = Very easy; 7 = Very difficult).	1	2	3	4	5	6	7
Evaluating the performance of the supplier (your employees) requires extensive inspection and monitoring effort in terms of your logistics functions.	1	2	3	4	5	6	7
For this supplier (these employees), it is difficult to ascertain if a good job is being done in terms of your logistics functions.	1	2	3	4	5	6	7
Appropriability Hazards							
Performing the key tasks associated with your logistics functions requires the supplier (employees) to be exposed to our firm's proprietary information.	1	2	3	4	5	6	7
To what extent do your logistics functions involve knowledge or technologies which are proprietary to your firm? (1 = None; 7 = Very extensive).	1	2	3	4	5	6	7

DOES YOUR FIRM OUTSOURCE ANY LOGISTICS ACTIVITIES?

1. Yes
2. No (If “No” is selected, following questions till logistics providers’ tenure are not asked)

EXTENT OF LOGISTICS OUTSOURCING (EMBEDDED LOGIC)

Please, indicate all logistics services your company outsources

Outsourced Logistics Services	
Domestic transportation	Inventory management
Warehousing	Product labeling, packaging, assembly, kitting
International transportation	Order management and fulfillment
Freight forwarding	Service parts logistics
Customs brokerage	Fleet management
Reverse logistics (defective, repair, return)	Information technology (IT) services
Cross-docking	Supply chain consultancy
Freight bill auditing and payment	Customer service
Transportation planning and management	LLP / 4PL services

1.1 What percentage of your total logistics activities are outsourced? (%) _____

1.2 Why do your company outsource logistics activities? (e.g. costs savings, customer service improvements) _____

STRATEGIC IMPORTANCE (EMBEDDED LOGIC)

Please indicate the degree of agreement that you have with each statement (1=Strongly disagree, 7=Strongly agree)

Strategic importance of outsourced activity							
The services provided by provider are valuable to our organization	1	2	3	4	5	6	7
Provider provides services that are crucial to our organization	1	2	3	4	5	6	7
The services rendered by provider are very important to achieving our goals	1	2	3	4	5	6	7

TOP MANAGEMENT CHAMPIONSHIP (EMBEDDED LOGIC)

Please indicate the degree of agreement that you have with each statement (1=Strongly disagree, 7=Strongly agree)

Top Management Championship							
Top management actively participates in formulating a strategy for logistics outsourcing	1	2	3	4	5	6	7
Top management actively participates in establishing goals and standards to monitor the logistics outsourcing	1	2	3	4	5	6	7
Top management has a clear vision for the logistics outsourcing	1	2	3	4	5	6	7

PROVIDER’S TENURE (EMBEDDED LOGIC)

1.3 How long your main provider has been providing services to your company? _____ years

INTENTION OF LOGISTICS OUTSOURCING

Please indicate the degree of agreement that you have with each statement (1=Strongly disagree, 7=Strongly agree)

Intention of Logistics Outsourcing							
My company is contemplating to outsource a part or whole logistics functions in a year's time	1	2	3	4	5	6	7
My company is likely to outsource a part or whole logistics functions in a year's time	1	2	3	4	5	6	7
My company is expecting to outsource a part or whole logistics functions in a year's time	1	2	3	4	5	6	7

SC RESPONSIVENESS

Please, indicate the strategic priorities for your main product line (1= not important, 7=very important)

Improve delivery reliability	1	2	3	4	5	6	7
Maintain buffer inventory of parts or finished goods							
Retain buffer capacity in manufacturing							
Respond quickly to unpredictable demand							
Increase frequency of new product introductions							

SUPPLY AND DEMAND UNCERTAINTY

- How long is the average life-cycle of the products in the main product line?
 < 6months ___ 6-12 months___ 1-2 years___ 2-5 years___ >5 years___
- How many different variants are available for the main product line?
 <20___ 20-49___ 50-99___ 100-999___ 1000 or more ___
- What is the average margin of error in the forecast based on units at the time production is committed?
 0-9%___ 10-19%___ 20-39%___ 40-59%___ 60-100%___
- What is the number of sales locations for the main product line?
 <100___ 100-499___ 500-999___ 1000_1499___ 1500 or more ___
- What is the frequency of change in order content for the main product line?
 Extremely low___ Low___ Medium___ High___ Extremely high___

LOGISTICS CHARACTERISTICS

- How would you characterize your channel strategy (Check one)
 Supply to stock___ Supply to order___
- How would you characterize your shipment (Check one)
 Less than Truckload (LTL)___ Full Truckload (FTL)___
- How many logistics service providers are available to your company? _____
- What percentage of product costs are logistics costs for your main product line? (%) _____
- Organizational level where the decision to outsource originated
 Local level ___ Divisional level ___ Corporate level ___

6. What is the current number of logistics professionals in your firm? (Please include all personnel involved with inventory management, transportation, and warehousing. Do not include other personnel such as customer service.) _____

DEMOGRAPHICS

1. Your title: VP/Director of Purchasing ___ Purchasing Manager ___
 VP/Director of Manufacturing ___ Plant Manager ___
 VP/Director of Logistics ___ Logistics Manager ___
 Title if not listed _____

2. Industry SIC Code: _____

3. Please indicate the annual sales of your business unit _____

4. How would you characterize your major product/product line (check one).

Make to stock ___ Make to order ___ Engineer to order ___ Assemble to order ___

5. Funds expended on outsourced logistics services _____%

6. The number of countries provided by 3PL _____

10. What is your firm's Zip code _____

BENEFITS

1. If you wish to be entered into **the drawing for a \$25 Amazon gift card**, please provide a valid email address (6 in total will be awarded) _____

2. If you wish to receive the results from this survey, please provide a valid email address where the results can be sent. This email address will only be used for sending the results. All results will be in aggregate form and will not be associated or traceable to any individual. **Please note that responses will be sent in Oct 2016.** _____