

An Examination of Current Logistics Outsourcing Services in U.S. and Canada

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This research aims to examine shippers' current outsourcing decisions, enabling providers to differentiate themselves in the market. Based on 197 responses from practitioners, this research provides an empirical and comprehensive analysis of logistics practices, while examining the competence level of current outsourcing of these practices. The findings for this research can be broken down into five major areas: 1) logistics outsourcing priorities, 2) domestic logistics practices, 3) warehousing logistics practices, 4) technology logistics practices, and 5) international logistics practices, assessing the percentage of logistics functions that are currently handled in-house versus outsourced and the performance level of the internal operations and the logistics service providers. This research provides an analysis of currently employed practices across all logistics functions, while assessing the competence of in-house, outsourcing, and collaboration. The results identify areas for collaboration between shippers and logistics service providers, as well as areas for further research.

Field: Management

1. Introduction

The third and fourth party logistics (3PL and 4PL) industry has been growing and maturing in practice in recent years; however, academic research is lagging behind industry practices. Research has indicated that both shippers (party responsible for initiating a shipment) and logistics service providers (LSPs) are becoming increasingly sophisticated in their requirements (Lieb & Bentz, 2005). To best serve these industry practitioners, as well as to augment research in the logistical outsourcing field, academic researchers must respond with more advanced methodologies and analyses.

As the industry matures, 3PLs continually enhance their ability to drive innovation and create value for their customers, while refining their effectiveness as buyers of outsourced logistics services. While industry research indicates that 3PLs provide new and innovative ways to improve logistics effectiveness, and that they are sufficiently agile to accommodate future business needs and business challenges, growth in strategic shipper/3PL relationships has been dampened by economic uncertainties in the global marketplace. Even so, 3PL users are increasing their use of outsourced logistics services. Research indicates that the most frequently outsourced logistics functions tend to be those that are more transactional, operational, and repetitive. Although these activities may be regarded as common and routine, successful 3PLs need to be experts at delivering these in ways that are unique and highly differentiated from the customers' point of view. Other outsourced logistics activities tend to be somewhat more strategic, customer facing, and IT-intensive.

Extant literature has proven that involvement in logistical outsourcing relationships, especially cooperative, collaborative alliances, can have a positive economic, organizational, and financial impact for shippers. Benefits include reduced cost, improved

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service levels and technology, increased flexibility and productivity, improved employee morale, increased access to markets, and new competencies (Bowersox 1990). The purpose of this research is to develop a comprehensive analysis of current logistics services in the U.S., while examining the current competence level of the outsourcing of these practices. This will enable organizations to identify and direct their focus on the dimensions that may have potential for growth and improvement. Analysis of current practices, examining all of the potential service offerings while offering prospects for continued collaboration, has been limited in research. The motivation for this paper is to address this gap in the research, offering an important first step in identifying prospective opportunities for collaboration between shippers and logistics service providers. This research also aims to identify opportunities for future research in this area. This is a valuable addition to the body of logistics outsourcing literature, providing practical information for relationship management between shippers and logistics service providers.

The remainder of the paper is organized as follows. The literature review can be found in section 2, followed by the methodology and model in section 3. The findings are discussed in section 4. Section 5 summarizes the conclusions and limitations.

2. Literature Review

Outsourcing is the practice of utilizing external resources to perform activities that previously were performed in-house. With respect to the logistics management activities of transportation, warehousing, order processing, and related information technology support, outsourcing has become a prominent strategy. By understanding which practices are successfully outsourced, as well as the potential opportunities, shippers and LSPs may coordinate their efforts to provide an integrated logistics offering that improves supply chain efficiency.

2.1 Current State of 3PL and 4PL

One of the challenges in trying to evaluate the growing body of literature in logistics outsourcing is the lack a consistent definition of the terminology (Skjoett-Larsen 2000). Broader definitions imply that a 3PL may include the outsourcing of any logistics activities that were previously performed in-house (Lieb 1992; Coyle & Bardi 1980). Narrower views define a 3PL as a distinctive, functional, inter-organizational outsourcing relationship, including transportation and warehousing, as well as the inclusion of other activities such as inventory management, information-related activities, value-added activities, and supply chain management (Berglund *et al.* 1999). In the middle ground between these views, Bask (2001) described 3PLs as “relationships between interfaces in the supply chains and 3PL providers, where logistics services are offered, from basic to customized ones, in a shorter or longer-term relationship, with the aim of effectiveness and efficiency.” As the logistics outsourcing industry continues to grow, a new outsourcing concept is growing as well. Shippers are outsourcing all supply chain processes to a single organization that can assess, design, build, and run comprehensive supply chain solutions. This evolution is known as 4PL. 4PLs can be defined as “supply chain integrators who assemble and manage the resources, capabilities, and technologies of an organization with those of complementary service providers to deliver a comprehensive supply chain solution” (Bade & Mueller 1999). Supply chains have evolved from providing the service in-house to outsourcing to 4PL arrangements.

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Many early studies concentrated on the users of 3PL services; more recent work has focused on the 3PLs themselves. The booming expansion of the industry has received considerable attention as researchers provide insights into the issues on the provider side of the relationship, including service offerings, current status, and future prospects (Gammelgaard & Larson 2001; Lieb & Randall 1996; Lieb 2008; Lieb & Bentz 2005; Lieb *et al.* 1998), operational issues, network design, and optimization (Ko *et al.* 2006; Zäpfel & Wasner 2002) benchmarking (Min & Joo 2006), and quality (Brah & Lim 2006; Fung & Wong 1998; Neo *et al.* 2004).

Much of the literature focuses on the strategic behavior of 3PLs, primarily looking at the competitive strategies of both shippers and 3PLs. Traditionally, cost has been seen as a primary driver of outsourcing decisions; however, more recent literature has researched the differentiating strategic factors that drive outsourcing decisions (Sum & Teo 1999; Hertz & Alfredsson 2003), including value-added services (Berglund *et al.* 1999) and goal achievement (Brewer *et al.* 2013). Studies have begun to examine how the drivers that have led shippers to outsource logistics functions are the same factors that result in insourcing and reshoring decisions (Foersti *et al.* 2016; Hartman *et al.* 2017).

Much of the logistics outsourcing literature focuses on the alliances and the relationships between the partners. The characteristics of these relationships have been based on conceptual typologies (Pappu & Mundy 2002; Zinn & Parasuraman 1997). Empirical research has focused on scope, duration, and frequency (Paché 1998; Rabinovich *et al.* 1999), or the behavioral or relational attributes of relationships, such as trust, commitment, dependence, conflict, and equity (Gardner *et al.* 1994; Knemeyer *et al.* 2003; Knemeyer & Murphy 2005; Moore & Cunningham 1999). More recently, the dependencies within these relationships have been studied (Huo *et al.* 2015; Sallnas 2016) as well as the study of dynamic capabilities within the alliance design (Brekalo *et al.* 2013; Brekalo & Albers 2016). Various models and decision frameworks have been developed to aid in identifying the resources and practices needed to successfully establish relationships (Bagchi & Virum 1996; Sink & Langley 1997; Lambert *et al.* 1999; Andersson & Norman 2002; de Boer *et al.* 2006).

2.2 Logistics Outsourcing Services

The first comprehensive study on the use of 3PL services identified the extent of logistics outsourcing among American manufacturers, including benefit, impact on cost, customer satisfaction, and 3PL trends (Lieb 1992). Several researchers conducted similar studies in Australia (Sohal *et al.* 2002), Singapore (Bhavnagar *et al.* 1999), and Mexico (Arroyo *et al.* 2006). Based on these studies, users generally see improved costs, logistics service levels, and customer service levels as a result of logistics outsourcing. In addition, it was found that many companies outsource due to lack of physical assets, especially in terms of large-scale assets such as vehicles and warehouses (Hsiao *et al.* 2010; Kremic *et al.* 2006). Assets may also include intangible assets such as skills, knowledge, and capabilities (Green 2000; Kremic *et al.* 2006).

The outsourcing of logistics practices can be done as a whole or selectively by logistics practice. Evidence shows that firms tend to outsource as a package by combining services that share related transactional aspects and information flows, with the aim of reducing cost and increasing coordination (Selviaridis and Spring 2007). Various logistics outsourcing services have been studied. Table 1 summarizes the different services investigated in various studies. In general, based on the research, the most common practices, or services, sought and provided by 3PLs include transportation, warehousing, packaging, and materials

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handling. In addition to these studies, there are studies on supply chain practices on a broader scale (Gorane and Kant, 2015; Gorane and Kant, 2016). While various logistics outsourcing services have been studied, there is no study that focuses on a comprehensive list of logistics outsourcing services and dimensions collectively. This paper is the first paper to provide this thorough analysis.

Table 1: Dimensions of Logistics Outsourcing Practices/Services

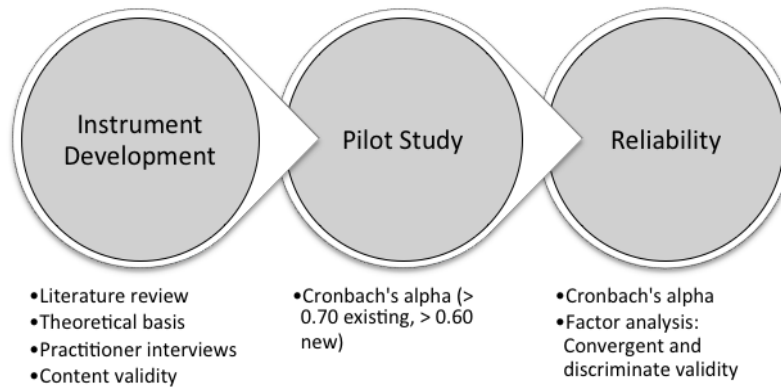
Practice/Service	Service Dimension	Author(s)
Transportation/Distribution	Domestic – outbound/inbound International Customs clearance Reverse Freight forwarding Asset-based Non-asset-based Shipment consolidation Freight management Staffing Network design Fleet management Transport/Handling Compound services Freight bill auditing/payment	Cho <i>et al.</i> 2008; Göl & Çatay 2007; Gudehus & Kotzab 2010; Hsiao <i>et al.</i> 2011; Min, DeMond, & Joo 2013; Rahman 2011; Rao & Young 1994; Razzaque & Sheng 1998; Setthakaset & Basnet 2005; Solakivi <i>et al.</i> 2013; Wilding & Juriado 2004
Warehousing	Order fulfillment Order processing Returns Special services Storage Material handling – pre/post production	Cho <i>et al.</i> 2008; Göl & Çatay 2007; Gudehus & Kotzab 2010; Hilletoft & Hilmola 2010; Hsiao <i>et al.</i> 2011; Min, DeMond, & Joo 2013; Rahman 2011; Rao & Young 1994; Razzaque & Sheng 1998; Sahay & Mohan 2006; Setthakaset & Basnet 2005; Solakivi <i>et al.</i> 2013; Wilding & Juriado 2004
Inventory Management	Inventory management Procurement	Hilletoft & Hilmola 2010; Hsiao <i>et al.</i> 2011; Razzaque & Sheng 1998; Solakivi <i>et al.</i> 2013
Packaging	Packaging	Hsiao <i>et al.</i> 2011; Min, DeMond, & Joo 2013; Setthakaset & Basnet 2005
Information Processing	Information systems	Setthakaset & Basnet 2005
Administrative	Planning Administrative	Rao & Young 1994

3. The Methodology and Model

3.1 Instrument Development

The survey instrument was sent electronically to most respondents, and mailed to others. While the electronic version was preferred due to simplicity and timeliness, some email addresses were not available. In that event, surveys were mailed. The overall methodology can be viewed in figure 1.

Figure 1: Methodology (Mathien, 2018)



3.1.1 Pilot Study

A pilot study was conducted to test the initial survey instrument with the intended target population, under controlled circumstances. The pilot test ensured that the full-scale study effectively measured the constructs of interest and minimized threats to validity.

The survey was first reviewed by a group of six experts and three shippers in the field of supply chain and logistics management who identified how well the survey items measured the constructs of interest among the target population. This review was followed by individual interviews with these participants, who were asked to comment on the appropriateness of the research questions, as well as the validity of the survey instrument in measuring constructs of interest. The survey instrument was modified based on this pre-pilot step.

Following this pre-pilot work, a small-scale pilot survey was conducted with a sample of 30 shippers in the local community. New scales were assessed for reliability using coefficient alpha, with a value of 0.60 or greater as an accepted standard for new scales (Nunnally, 1978). Upon reviewing the Cronbach alphas for the new constructs from the pilot study, it was noted three new scales had an alpha of less than 0.60. Two of the scales were retained, while one item was deleted from the data set. Existing scales received a Cronbach alpha of 0.70 or higher.

3.1.2 Evaluation of the Questionnaire

Factor analysis was conducted to establish that items load together appropriately, indicating that the measures are explained by an underlying construct. This analysis tends to strengthen claims of measurement validity. Evidence for convergent validity is that the items measured for each construct load to a single factor, while evidence suggesting discriminant validity is that the appropriate separate factors are identified in the factor analysis. In common factor analysis (CFA), all factors with positive eigenvalues should be retained. Factors with negative eigenvalues are not intuitively appealing, just as a negative variance is not. This oddity occurs only in common factor analysis due to the restriction that the sum of eigenvalues be set equal to the estimated common variance, not the total variance. Based on this rule, all scales contained positive eigenvalues and were retained. See Appendix A for details.

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3.1.3 Reliability

For variables employed in existing research, measures with acceptable measurement quality were adopted and slightly modified to increase their applicability. For variables unique to the conceptual framework of this study, operational measures were developed and assessed to determine their content validity. All factors had an alpha value of greater than 0.70 for existing scales and greater than 0.60 for new scales.

3.2 Main Study

A full-scale study was conducted to assess the research questions. This study consisted of identifying the target population, selecting an appropriate sample, conducting the study, and analyzing the data.

3.2.1 Population and Sample

The unit of analysis for this survey was the firm. The target population for this survey was shippers in the U.S. and Canada. This population was chosen for its likelihood of participating in logistics outsourcing initiatives, and the convenience of accessing the target population for study.

Recommendations for the design of web-based surveys were closely followed as recommended by Dillman (2000). The sample consisted of 509 members of the local chapter of Council of Supply Chain Management Professionals (CSCMP), 226 members of the Buffalo Niagara Partnership, 76 professional contacts, 556 LinkedIn group requests, 360 members of CSCMP National, 317 members of Institute of Supply Management (ISM), and an estimated 325 members of National Association of Purchasing Managers (NAPM) and 250 members of the American Production and Inventory Control Society (APICS). This makes a known sample size of 2,044 possible respondents. It must also be noted, several requests were asked to forward the survey to additional colleagues at various companies for completion. This was encouraged; however, it does pose issues in calculating response rate, since the effective sample size is not known with accuracy. Therefore, the original sample is used for measurement, while taking into consideration that response rates may be slightly lower than indicated due to this effect. In total, 208 responses were received. The response from the highest-ranking respondent from individual organizations was retained for analysis provided that the survey information was complete. After deleting multiple response surveys, a total of 197 responses were used in the analysis. This represents a 9.6% response rate.

3.2.2 Response Bias

Tests for response bias were conducted. Response bias is at times a significant problem in empirical research. The procedures stated above, coupled with a well-designed survey instrument, serve to reduce non-response, yet, in practice, response rates tend to be generally low. The method followed for assessing response bias was to compare early from late respondents on demographic criteria. Statistically significant differences were interpreted as evidence for response bias. A chi-squared test was performed to determine if there were significant differences between the early and the late responders on the demographic variables. For each of the variables there were no significant differences found. The results are as follows: Firm Size: $\chi^2 = 2.344$, $p = 0.886$, Firm Age: $\chi^2 = 1.978$, $p = 0.992$, Market Dynamism: $\chi^2 = 6.165$, $p = 0.104$, Nature of Product: $\chi^2 = 1.346$, $p = 0.718$.

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3.2.3 Responders Versus Non-Responders

A chi-squared test was performed to determine if there were significant differences between respondents and non-respondents. No allowances were made for those who opted out of the survey for any reason (e.g. who were out of the office); these potential respondents were simply coded as being non-responders. There were no significant differences found between responders and non-responders ($\chi^2 = 13.47$, $p = 0.19$); therefore, it is believed that no bias exists between respondents and non-respondents.

3.2.4 Missing Data

To control for missing data, the e-mailed version of the survey included prompts. By design respondents were allowed to opt out of answering any question; therefore, it was assumed that there would be some missing data in this research. To account for this, for each variable of interest, the responses were organized into two groups, missing and completed responses. These two groups were compared on other variables of interest. If there were significant differences between the groups, this implies that missing data may be NMAR. There may be some difference by chance, but a pattern of differences implies that there are difference between responders and non-responders. Maximum likelihood methods were employed for this research.

3.3 Data Analysis

One objective of this research was to determine what percentage of the respondents' logistics functions is currently handled in-house versus outsourced. Respondents were asked whether they provided the service in-house, outsourced, both in-house and outsourced, or neither in-house nor outsourced (the logistics practice is not performed). Only those responses that indicated in-house, outsourced, or both were included in the results.

The second objective was to determine the performance level of the internal operations and the LSPs. The respondents were then asked to rate their satisfaction with the performance of the service provided using a five-point scale. Those responses that were in the top two boxes (satisfied, highly satisfied) were compared with those in the bottom two boxes (somewhat dissatisfied, dissatisfied).

To test for the significance of difference between the proportions, t tests were conducted to test the differences between those that provide the service in-house, outsource, or both and between those in the top two satisfaction box ratings and the bottom two satisfaction box ratings (boxes refer to the response options). For example, on a five-point scale, counting the number of respondents that selected the two most favorable responses fall into the top box. Dividing this top-box count by the total number of responses generates a top-box proportion. The idea behind this practice is that only those that are expressing a strong attitude are included. T tests were then conducted between the proportions. Those with significance at the .05 level are included in the findings. For a full list of all variables tested, see Appendix B.

4. The Findings

The findings for this research can be broken down into five major areas: 1) logistics outsourcing priorities, 2) domestic logistics practices, 3) warehousing logistics practices, 4) technology logistics practices, and 5) international logistics practices. A profile of

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respondents is presented first, followed by the general findings in regards to current logistics practices. The percentages denote those who responded to the survey questions; the remaining percentages, for those who opted out of a question, are not represented in the tables.

Table 2 presents the profile information provided by respondents. All of the respondents were in a management or upper management logistics role within the organization. The respondents primarily represented centralized (49%) or a combination of centralized/decentralized (46%) logistics functions, with only a small percentage (5%) representing a decentralized logistics organizational structure.

More than half (56%) of the respondents employ more than 20 full-time employees (FTEs) within their logistics function, with the balance (44%) being distributed amongst the smaller number of FTEs. This number can be compared with annual sales volumes, reported by most of the organizations, denoting that most of the respondents represent large organizations.

Only firms that outsourced some portion of their logistics are represented in this study. Among the respondents, 32% outsource up to one quarter of their logistics functions; 23% outsourced between one and two quarters of their logistics functions; 9% outsource between two and three quarters; and 25% outsource between three quarters to all of their logistics functions to a third party.

To obtain information on commitment and partnerships, the respondents were asked about the number of LSPs they utilize. It was distinctly noted that LSPs did not represent one-time shipments or individual carriers. The majority of the respondents (69%) use only one to two (36%) or three to five (33%) LSPs, possibly indicating partnerships between these firms and the outsource providers. Eighteen percent of the respondents use six to ten LSPs, while the remaining respondents (13%) indicate they utilize more than ten.

Based on the response to the number of LSPs used by the respondents, it is expected that the majority of respondents (60%) have long-term agreements with more than half of their LSPs, with another 20% having long-term agreements with 21 to 50% of their LSPs. Only 22% of respondents have long-term agreements with less than 20% having long-term agreements with 20% or less; of these, 7% indicate they do not have any long-term agreements.

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Table 2: Profile of Respondents

Logistics Organizational Structure	Centralized	49%
	Decentralized	5%
	Combination	46%
Number of Logistics FTEs	1 – 5	19%
	6 – 10	12%
	11 – 15	7%
	16 – 20	5%
	More than 20	56%
Percent of Logistics Function Outsourced	>0 – 25%	32%
	26 – 49%	23%
	50 – 74%	9%
	75 – 100%	25%
Number of Logistics Service Providers (LSP) Used	1 – 2	36%
	3 – 5	33%
	6 – 10	18%
	More than 10	13%
Percentage of LSPs with Long-Term Agreements	0%	7%
	1 – 20%	15%
	21 – 50%	20%
	More than 50%	60%

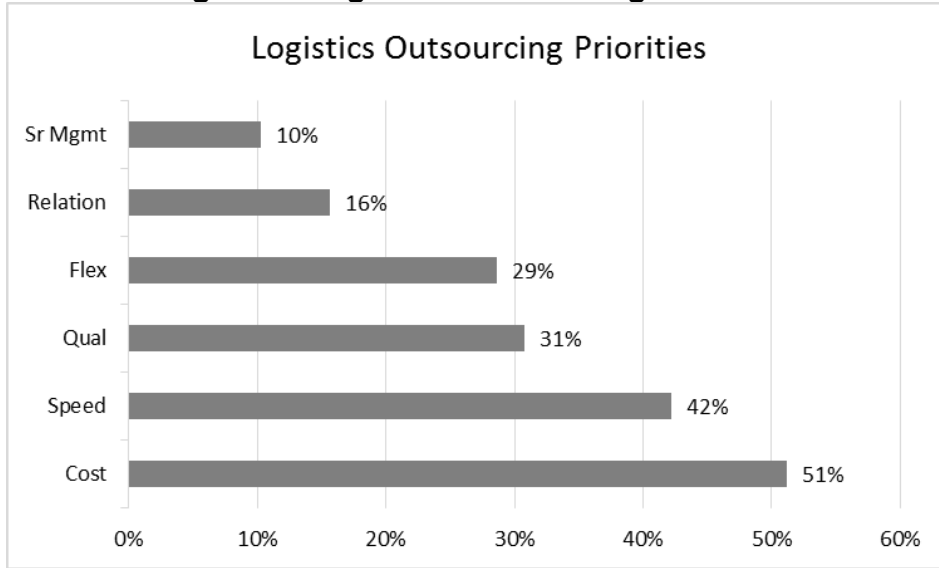
4.1 Logistics Outsourcing Priorities

Figure 2 provides information relating to the respondents' focus on key factors in the outsourcing agreements, namely: 1) senior management support, 2) relationship strength, 3) flexibility, 4) quality, 5) speed, and 6) cost. Respondents were asked to spread a total of 100 points across these six categories, indicating the priority of each when entering or continuing a logistics outsourcing agreement.

In general, the fundamental performance objectives for an organization include speed, flexibility, quality, and cost. Flexibility involves volume, or output, flexibility of output over time, and delivery flexibility. Quality includes consistency in service, while meeting or exceeding expectations. Speed involves timeliness of decisions and movement of materials and information; it also includes reliability and dependability. Low cost is a fundamental factor in outsourcing any function.

Consistent with these fundamental operational performance objectives, flexibility (29%), quality (31%), speed (42%), and cost (51%) were all rated highly as important priorities when outsourcing logistics functions. Surprisingly, and in contrast with the respondent demographics in regards to long-term agreements, senior management support (10%) and relationship strength (16%) were both much lower priorities among the respondents. This indicates that while these two factors are considered in the outsourcing of logistics functions, traditional measures of performance are still valued more highly when looking to outsource non-core functions.

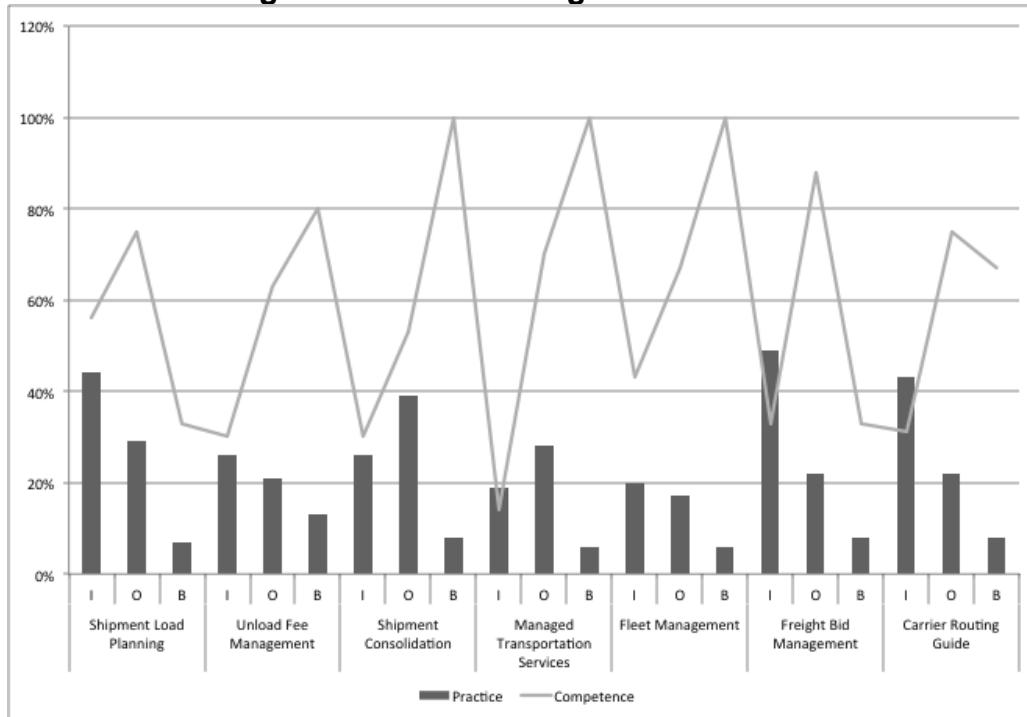
Figure 2: Logistics Outsourcing Priorities



4.2 Domestic Logistics Practices

Domestic logistics practices include several factors. While the most widely outsourced practices include those that are operational and repetitive activities, the findings conclude that the value-added services of load planning, shipment consolidation, and unload fee management, as well as the strategic and information-intensive services of managed transportation services, fleet management, freight bid management, and carrier routing guides, provide opportunities for increased collaboration between shippers and LSPs to achieve logistic cost and service improvements (see figure 3). Based on the respondents, the activities of shipment load planning, unload fee management, fleet management, freight bid management, and carrier routing guide are all conducted in-house more than outsourced, providing for opportunities to grow the overall practices, as well as to increase the percentage outsourced. This is especially critical given that the respondents reported a higher level of competence for outsourcing for all of the preceding practices, as well as shipment consolidation and managed transportation. The economies of scale gained by outsourcing such functions to a third-party provider outweigh the investment in the necessary commercial or customized software required to keep these practices in-house.

Figure 3: Domestic Logistics Practices

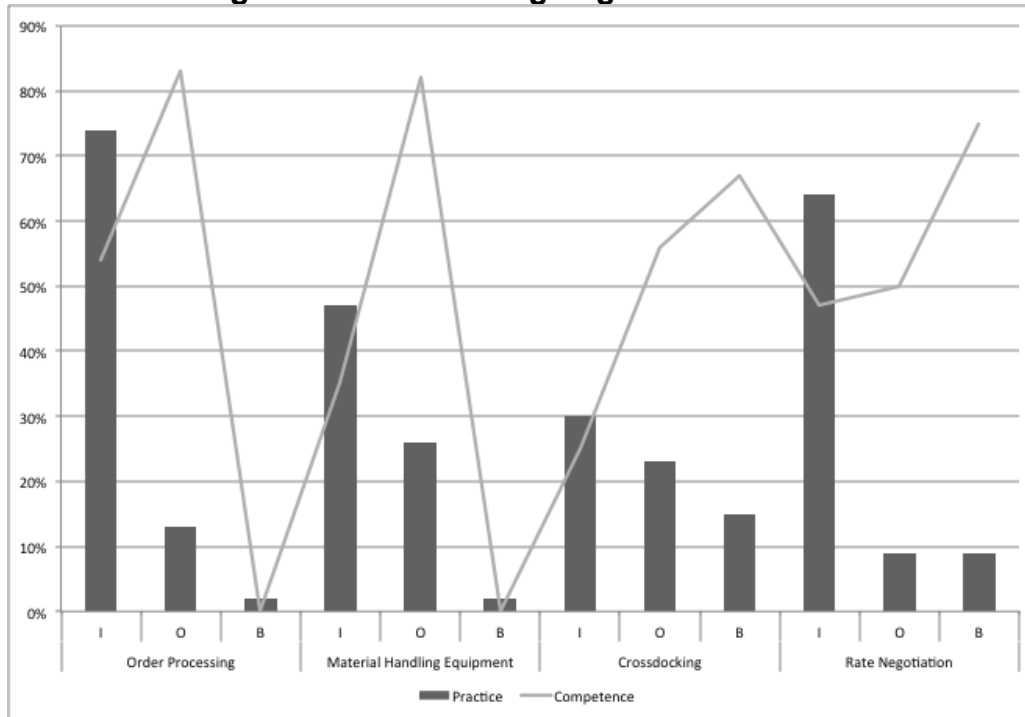


4.3 Warehousing Logistics Practices

Warehouse performance is traditionally measured via metrics such as lines shipped and fill rate, which are ratios of a system output quantity to a resource input quantity. These metrics assist in the analysis of operations and may be reported in a manner consistent with standard financial and managerial cost data.

As shown in figure 4, the study identified four different warehousing logistics practices that are not highly outsourced, which may provide for improved warehousing metrics if considered as potential outsourcing activities. The practices of order processing, material handling, cross-docking, and rate negotiation provide outsourcing opportunities for shippers to achieve logistic cost and service improvements. Based on the respondents, order management, material handling, cross-docking, and rate negotiation are all carried out in-house more than outsourced, providing for opportunities to increase the percentage outsourced, given that the respondents reported a higher performance level for outsourcing for all of the preceding practices. The increase in satisfaction for outsourcing of rate negotiation was not significantly increased for outsourcing, but this may be due to the small percentage that is actually outsourced. This may be a practice that could be further investigated as a potential for outsourcing.

Figure 4: Warehousing Logistics Practices

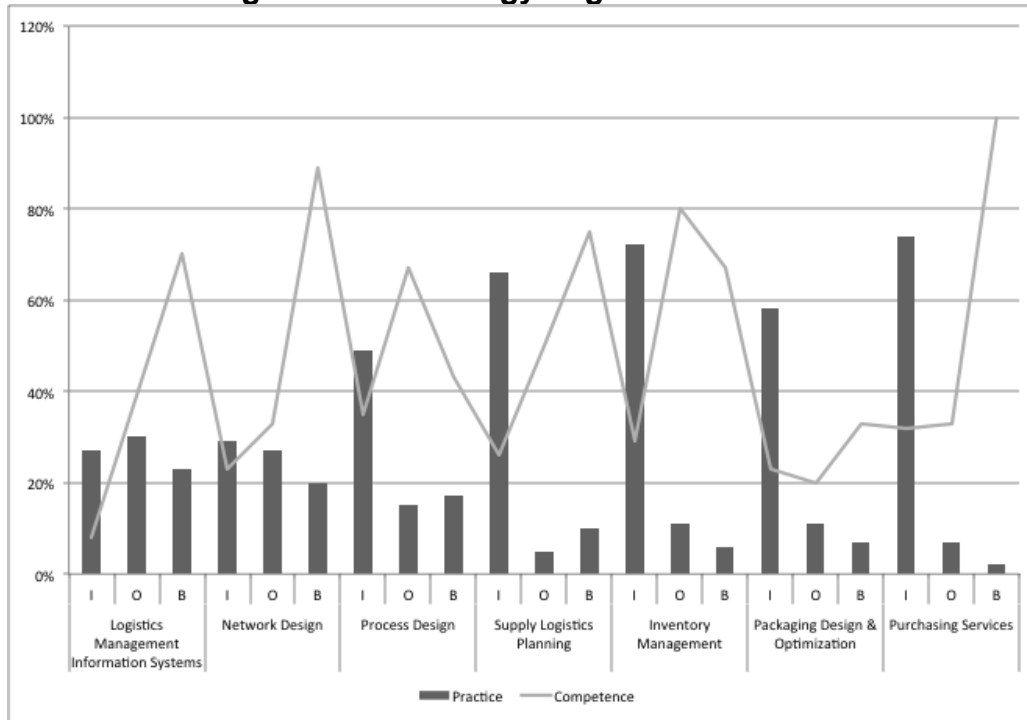


4.4 Technology Logistics Practices

As companies are expanding their global reach while optimizing their supply chain networks, integrated systems that gather and manage data to provide real-time supply chain decisions are increasingly critical for competitive differentiation; however, technology investments and certain technology requirements may be barriers to entry for shippers to work with certain companies. Increasing transportation costs, complex trade regulations, and multi-channel distribution challenges are an increasing complexity for logistics. Shippers may have opportunities, but may not be able to economically justify the necessary supporting infrastructure. By leveraging the pre-existing infrastructure of an LSP, shippers may be able to capture savings and increase efficiency and productivity.

As shown in figure 5, all of the practices studied, with the exception of transportation management systems (TMS), could benefit from outsourcing to LSPs and/or increased collaboration between shippers and LSPs. The practices of process design, supply logistics planning, and inventory management are all practices that are not heavily outsourced, based on the respondent data; however, respondents reported an increased level of competence when outsourced to an LSP, in part or in full. In the case of logistics management information systems (LMIS), satisfaction with performance was low for both insourcing and outsourcing, but this increased substantially when collaboration between partners existed. The practice of packaging design and optimization revealed low satisfaction for insourcing, outsourcing, and both, while purchasing services satisfaction was low for both insourcing and outsourcing, but very high when collaborating. It must be noted that the reported percentage for collaboration was low for both packaging design and optimization and purchasing services, thus those satisfaction ratings may not be representative of the population.

Figure 5: Technology Logistics Practices

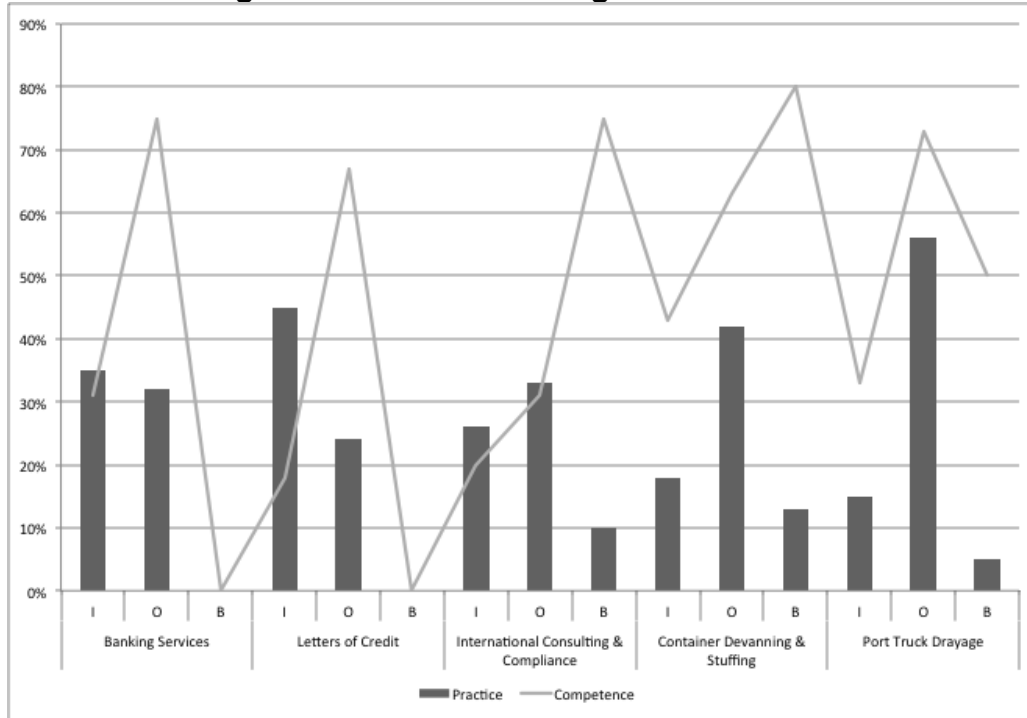


4.5 International Logistics Practices

Since World War II, there has been a continual increase in international trade, as well as a parallel improvement in the economic development of the majority of nations. While trade growth has been sluggish for the past years, there was a modest upturn in 2014, and further consolidation of this growth appeared in 2015 results. While downside risks to trade abound, significant potential also exists. The U.S. economy seems to be gaining momentum and the European Union appears to be reviving. International logistics professionals have been some of the main facilitators of this growth.

Due to the complexity of international logistics, most practices are heavily outsourced to third party providers. As shown in figure 6, overall satisfaction levels tend to be low with several of the practices, especially with regards to in-house practices. The practices of banking services and letters of credit may benefit by increasing outsourcing, since respondents reported a high satisfaction level with the outsourcing of these practices. In addition, container devanning and stuffing and port truck drayage show significant differences in shipper satisfaction when outsourced or both in-house and outsourced. Consistent with other consulting practices, international consulting and compliance would be a practice in which collaboration between the two parties may be beneficial.

Figure 6: International Logistics Practices



5. Summary and Conclusions

The results in this study support the findings of several previous studies on outsourcing, indicating that transactions costs are the main impetus to outsourcing non-core functions. In addition, traditional supply chain measures such as cost, speed, quality, and flexibility are used widely by shippers to measure successful outsourcing. While relationship management and senior management support are important factors in outsourcing logistics functions, shippers are still looking for basic on-time and in-full (OTIF) metrics to identify success. It is critical that 3PLs and 4PLs do not lose sight of this as they seek to build comprehensive strategic relationships with shippers. Although logistics outsourcing is an increasing reality in the U.S., several opportunities still exist for shippers and outsourcing providers.

Domestically, shippers report more success in outsourcing the value-added services (load planning, shipment consolidation, and unload fee management) rather than handling them in-house. Additionally, as global logistics trends increase, many firms are finding themselves in the complexities of international shipping. Overall, shippers would be well served to outsource many of these functions due to the involvedness and regulations. The risks can be transferred from the shippers to the LSPs who are experts. Currently, shippers have shown low satisfaction with outsourcing of these functions, but insourcing is often not a viable option. Thus, opportunities exist for logistics providers to differentiate themselves in this growing area.

Collaboration opportunities between shippers and providers exist in several areas. Domestically, strategic and information-intensive services provide significant collaboration opportunities. Warehousing practices are not widely outsourced but could provide major opportunities for collaboration between shippers and providers, especially in the areas of order processing, material handling, and cross-docking, and even rate negotiation. These are practices have traditionally been thought of as in-house activities that may be better served by third-party providers. Additionally, with high-infrastructure costs it would be wise for firms to outsource most IT-intensive practices. Logistics services providers who may

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already have the pre-existing infrastructure in place may gain economies of scale by providing these services more broadly. With increased data security, this could be a collaboration (or outsourcing) opportunity.

The practice of logistics outsourcing is becoming increasingly popular among firms who look to outsource non-core functions and gain competitive advantage. The study of logistics outsourcing is further enhanced by comprehensively examining the various services that may be outsourced and the perceived level of competence as reported by shippers. This is the first study to provide an analysis of currently employed practices across all logistics functions, while assessing the competence of providing the service in-house, outsourcing, and collaboration. The results identify areas for collaboration between shippers and logistics service providers.

5.1 Limitations and Future Research

There are several limitations associated with this research. As such, the conclusions drawn from this study must be interpreted within the context of the following limitations. First, the study examined logistics outsourcing from the perspective of the shipper. The perception of the LSP was not captured in the data. Second, all constructs were measured using perceptual scales. Ideally, objective measures should be used to match the perceptual measure, especially those that are related to financial performance. Another concern is the comparability of the findings from this study conducted in the U.S. across other countries, especially Canada. Although Canadian shippers were approached, the respondent pool was primarily U.S.-based. Some researchers have claimed that inter-organizational interactions may be affected by cultural differences; however, others have found that cultural differences have not affected their results. Despite this controversy, given that most logistics outsourcing studies have been conducted with U.S. firms, there may be cultural-specific issues that could affect the results.

The limitations associated with this research present several viable opportunities for future research. Future research may begin by obtaining a larger sample size, so the results can again be verified using other methodologies. This sample should extend into Canada, if possible. Second, studies from the perspective of the logistics provider can provide a more complete picture of the impact of logistics outsourcing on supply chain performance.

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Appendix A: Common Factor Analysis (CFA) Loadings

	Eigenvalue	Difference
Domestic Logistics Practices	15.0014791	12.7797243
	2.2217548	0.4184203
	1.8033345	0.6169380
	1.1863965	0.2263991
	0.9599974	0.0866001
	0.8733973	0.1514535
	0.7219438	0.0613380
	0.6606058	0.1786006
	0.4820052	0.0500567
	0.4319485	0.0598774
	0.3720711	0.0661494
	0.3059217	0.0717918
	0.2341298	0.0741366
	0.1599932	0.0176605
	0.1423327	0.0511942
	0.0911385	0.0091644
0.0819741	0.0065612	
0.0754129	0.0172077	
Warehousing Logistics Practices	5.07225518	3.37625653
	1.69599865	0.45229443
	1.24370423	0.46412367
	0.77958055	0.12446259
	0.65511796	0.14768894
	0.57168404	0.12098022
	0.35156166	0.10156678
	0.24999488	0.03513288
	0.21486200	0.07462966
	0.14023234	0.05096880
	0.09113851	0.00916440
	0.01847280	0.00816570
	0.01030720	0.00419410
	0.00611310	0.00305360
	0.00305950	
	3.61596774	2.35533042
1.26063732	0.27338361	
0.98725371	0.53352164	
0.45373207	0.12049515	
0.33323692	0.14170367	
0.19153325	0.03389426	
0.10683340	0.05774324	
0.09454825		
International Logistics Practices	6.65969137	4.84969214
	1.80999923	0.94894336
	1.00395381	0.39838554
	0.86105587	0.21614516
	0.64491070	0.29492484
	0.60556827	0.03388423
	0.57168404	0.12098022
	0.45070382	0.19652021
	0.34998587	0.11686123
	0.23312464	0.03912269
	0.19400195	0.07560580
	0.11839615	0.05381429
	0.06458186	0.00739547
	0.05718638	0.05012040
	0.00706599	

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Appendix B: Services/Practices Included in Questionnaire

Domestic Logistics Practices	Dry Less Than Truckload Dry Full Truckload Project Cargo Barge Service Great Lakes Shipping Intermodal Rail Carload Rail Airfreight Parcel	Expedited Services Shipment Load Planning Unload Fee Management Shipment Consolidation Managed Transportation Services Fleet Management Freight Bid Management Carrier Routing Guide Reverse Logistics
Warehousing Logistics Practices	Order Processing Assembling/Reassembling Pick/Pack Packaging/Labelling Bonded Temperature Controlled Pallet Systems Conveyor Systems	Hazmat (Hazardous Materials) Bulk (Liquid/Dry) Material Handling Material Handling Equipment Fumigation Cross-docking Consulting Services Rate Negotiation
Technology Logistics Practices	Logistics Management Information Systems Network Design Process Design Supply Logistics Planning	Transportation Management Systems Inventory Management Packaging Design & Optimization Purchasing Services
International Logistics Practices	Ocean Export Forwarding Ocean Import Forwarding Air Export Forwarding Air Import Forwarding Banking Services Letters of Credit International Consulting & Compliance Customs Clearance	Export Packing Container Devanning & Stuffing Port Truck Drayage Terminal Operators Stevedoring Cross-Border Trucking Services Container Management
