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Director, Office of Graduate Studies: DATE:
Jones, Benjamin, R. A Study in the Functions of Third Party Logistics Programs and the Importance in Food Product Supply Chain Optimization

Abstract
The study was conducted to not only state supply chain problems that faced food manufacturers and distributors, but also how the intervention of outsourced logistics providers and supply chain programs would mitigate the risk involved in the transportation realm. The supply chain programs developed and diagramed in the research go through chronological steps on how the data was extracted, analyzed and developed into a potential solution for specified customers. With geographical limits, each solution was developed into a single day program where a carrier completed two shipments; one shipment that was from the organic customer portfolio and the other that was derived from the extracted information. Each program had three main benefits that were the result, cost savings for the customer, improved service levels that stemmed from benchmarking key performance indicators and alleviated trailer rejections due to unacceptable conditions. Each one of the benefits was set to build a consistent supply chain foundation and assist each customer in notching a step closer to supply chain optimization.
Acknowledgments

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Chapter I: Introduction

“Food supply chains are the lifeline for human existence on the planet” (Dani, 2015, p. 8). This statement truly encompasses the importance of the food supply chain because simply put, food needs to get from the producer to the consumer in a safe, yet timely manner. If this is not accomplished efficiently, the food can expire if of the perishable nature and shortages are the outcome, which drives up market prices offered to consumers. While the term supply chain is an umbrella statement for all activities, inside and out of the facility that are required to get a product from point A to point B, the focus of the research covered the external aspect. The external supply chain consists of all functions outside of a facility that are required to get a product from one location to another. This mainly includes the transportation of food product, via semi-truck, railcar or any other motor vehicle, from a shipper to a consignee. External supply chain optimization goals differ from company to company but can generally be defined as successfully delivering the product without damage while achieving set supply chain expense goals. These goals of supply chain optimization are a critical, yet difficult aspect for manufacturers and dairy brokers to achieve due to the many existing variables that are encountered.

Three main challenges that are encountered for food distribution companies that ship food grade product include volatile freight markets, unreliable motor carriers and increasing regulations being imposed on all aspects of the supply chain via FSMA (Food Safety Modernization Act) regulations. Under FSMA, if the food product is at all compromised during transit, it is now a requirement to reject the food product and downgrade it. Once the product is downgraded, the food product will no longer be used for human consumption and will be used for animal nutritional products. Although this does not seem to be a negative outcome, the
selling price difference once the product gets downgraded is generally in the thousands of dollars and at times, the product is salvaged for an operational loss on the balance sheet. One external factor to the supply chain that has increased these challenges exponentially along with FSMA is “Consumers’ sensitivity to quality, safety, health and nutritional factors of food products” (Makweba & Xu, 2009, p. 70). As the concern from consumers on food product safety increases, so do challenges that arise when attempting to move the food product from the origin into the consumer’s hands. One external factor encountered is the volatile freight markets that stem from many variables that are constantly changing within the produce and food product freight markets. In areas that are affected by extreme weather, semi-truck availability becomes increasingly tight when the difficult weather conditions exist. In areas that produce major quantities of produce, such as California and the Southeast United States, truck availability becomes increasingly tight during the spring harvesting months, which generally occur from April until early June. This tight market stems from many of the motor carriers having contracts with agricultural distributors which means during the harvest, motor carriers will become contractually obligated to haul the farmers produce and the amount of open trucks available to the market is limited.

These volatile freight markets present companies that ship food grade product the challenge of accurate forecasting and budgeting for transportation expenses. With the freight pricing that customers are paying out fluctuating based on motor carrier availability, a food manufacturer’s freight rates act in an inverted manner to market availability. If motor carrier capacity is tight, the customer will pay an increased rate to get their product moved. This issue stems from the simple laws of supply and demand. If motor carrier capacity is constrained, fewer trucks are available within a specified market than the amount of freight that needs to be
moved. This issue drives up freight rates, as the available trucks within the market will request higher freight rates to move the product as motor carriers control the leverage. The same holds true if an excessive amount of trucks are available within a certain market and the available freight is limited. Shippers and distributors hold the leverage and paid-out freight rates are decreased.

One major coming aspect of the trucking industry that has a considerable effect on market freight pricing is the Electronic Logging Device (ELD) mandate that will take effect December 18, 2017. “An ELD synchronizes with a vehicle engine to automatically record driving time, for easier, more accurate hours of service (HOS) recording” (Federal Motor Carrier Safety Administration, 2018). This drastic change that is being imposed on carriers will eliminate all forms of paper logbooks that had previously been utilized to track drivers hours-of-service. This newly imposed rule whose impact date is rapidly approaching has caused widespread apprehension throughout the supply chain industry as motor carrier availability is going to decrease. “Many drivers and carriers – particularly owner-operators and small carriers – will leave the industry when the mandate becomes official law” (Shaffner, 2017, p.1). This exodus from the industry is expected to cause a significant decrease in available capacity, which in simple terms, means less trucks available to haul freight for shippers.

The problem with installing the electronic logging device units for many of the estimated 190,000 motor carriers that employ fewer than twenty trucks in the fleet is the overall cost of each unit. While the costs vary depending on the type of unit and the brand of ELD selected, general pricing will cost companies over $1,000 per unit to install plus monthly fees that can cost a couple hundred dollars a month. These added expenses paired with the increasing costs of fuel and maintenance, insurance, truck payments and driver pay will render many small carriers
inoperable as profit margins have already decreased to nearly unprofitable territories. This leads small motor carrier owners only two options, sell off the current assets or raise the line-haul price the carrier charges third party logistics companies or distributors to haul available freight. While the market for freight rates is already on the uptick, this newly mandated law, which is meant to improve safety, would only aid the rate trend. Along with shippers being exposed to these increased rates and fluctuating availability, manufacturers and distributors are exposed to a vast number of carriers that are in the trucking business today.

While many of the motor carriers that travel the highways today adhere to all regulations and strive to provide elevated levels of service, there are all too many that operate with poor intentions. Motor carriers exist whose sole intention is to increase profit margins, regardless of the service that is provided on the freight the carrier is hauling. Problems such as planned transit delays, unauthorized product consolidation and document forging cause issues for logistics transportation service providers and in turn, food shippers and distributors. While websites and online portals where these failings can be recorded exist, these carriers are often so large they cannot be eliminated from the industry. These unreliable carriers negatively impact supply chain performance levels as well as the state that the product is delivered, both of which have direct links to the customers of manufacturers and distributors of the food grade product. This leads to another vital aspect of successful deliveries, adhering to the newly implemented FSMA regulations. Within the Food Safety Modernization Act is the Sanitary Transport of Human and Animal Food rule (STHAF).

The STHAF rule establishes criteria and definitions that will apply in determining whether food will be deemed adulterated because it has been transported or offered for transport by a shipper, carrier by motor vehicle or rail vehicle, or receiver engaged in the
transportation of food under conditions that are not in compliance with the sanitary food transportation regulations (Gonzalez, 2015, para. 2).

This regulation further limits the available capacity that is able to haul food grade product as it provides specific guidelines for the equipment that can haul food grade product. Under this newly imposed regulation, equipment now must adhere to certain standards if it is able to haul food product. Semi-trailers must be clean, dry, have no holes and be odor free as well as have been manufactured by a certain year. These regulations have put a further constraint on available capacity and have only lead to increased rates and further difficulties adhering to budgets for food product manufacturers and distributors.

Statement of the Problem

Supply chain optimization for manufacturers and distributors within the food industry has become increasingly difficult. A consistent challenge is the perishable nature of the products that are being transported, which creates time sensitive shipping situations. Along with time constraints, increasing costs of distribution from market volatility and new Sanitary Transportation of Human and Animal Food rulings, which impose strict regulations on motor carriers involved in the transportation of food grade products, present obstacles for food distribution companies.

Purpose of the Study

The purpose of the research was to show the benefits of supply chain programs constructed by third party logistics companies. The main benefits were to reduce transportation costs for select customers and to increase transportation service levels on shipping lanes. The main reasoning for these two areas of focus stems from recurring problems that are becoming more common within the supply chain. With transportation freight spending increasing, being
able to control pricing for customers is vital for forecasting and budgeting. Utilizing an advanced transportation management technology platform, capacity management was maximized which was a foundational element in providing cost effective pricing that adheres or beats market pricing fluctuations. Along with reducing transportation freight spend; two aspects of service levels were at the foundation driving the research. Increasing service levels expressed in terms of on time pick-up as well as on time delivery is the first aspect. The second aspect is to increase the equipment acceptance percentage for shipments. If equipment is being rejected due to improper condition, on time pick-up and delivery is directly impacted. Transportation service levels are strongly correlated with production schedules at the manufacturing facilities. If a shipment is late, the production schedule can be delayed which for many companies, can become a large expense.

**Assumptions of the Study**

Within the realm of transportation and more particularly the external portion of supply chain, many uncontrollable variables exist. A few examples of these extraneous variables that are encountered are equipment failures, poor weather conditions and issues incurred from traffic conditions. These external variables are aspects of the supply chain that are completely out of the control of the transportation provider and the parties are involved, yet are encountered daily. When these inopportune situations arise, primary transportation strategy gets abandoned and a new a new strategy is formulated which the basis of is to get the freight product to the delivery location on time, regardless of the cost or hours it takes. Many times, extended resources or labor must be dedicated to resolving the problem, which means overtime charges, or extra labor charges are incurred. Extra resource costs paired with a limited amount of time to contract a truck onto a freight load inflates the cost to accomplish the task, as generally the carrier
availability as well as available time is limited. As stated before, these situations are encountered on a weekly basis and cause statistical outliers to be present when analyzing cost and on-time-service data that is extracted from the Transportation Management System.

**Definition of Terms**

The following terms are defined to explain items were frequently used in the research or provide further depth into the industry and services that are utilized.

- **Consignee.** An individual or firm to whom freight is shipped. A freight receiver. (Erera n.d, p. 2)

- **Consolidation service.** Bringing together many small shipments, often from different shippers, into large shipment quantities, to take advantage of economies of scale in transportation costs. In-vehicle consolidation is when a vehicle makes pickups from many customers and consolidates freight inside the vehicle. Out-of-vehicle consolidation occurs at a terminal facility; shipments to a single customer/region are consolidated before shipment. (Erera, n.d, p.7)

- **Logistics.** The process of planning, implementing, and controlling procedures for the efficient and effective storage of goods, services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements. This definition includes inbound, outbound, internal, and external movements. (Thomas Publishing Company, 2018, p. 12)

**Limitations of the Study**

Multiple limitations were present during the course of the study. While each supply chain program focused on service improvement and cost efficiency, there was a limitation to the available amount of qualifying freight. Programs could have been developed for longer shipments that spanned multiple days but due to available internal shipments and warehouse
locations, the implemented supply chain programs were limited to single day operations with limits of 200 miles per shipment for each leg. This was decided upon as single day shipments were more controlled and presented a clearer picture of the benefits that come from supply chain programs.

**Methodology**

The main system utilized was the internally set-up transportation management system called MercuryGate Transportation Management System. This system was the main frame where all shipment information was entered to not only tender out the shipments and contract carriers, but also to procure data from for reporting and tracking purposes. Prior to winning the contracts for the shipments from customers, the company utilized a value add consulting service called network study analysis. Within this format, external supply chain data was procured from a specified customer. Once the data had been received, analysis was performed to identify areas of weakness such as service level issues from incumbent carriers or inflated freight rate pricing. When the network study analysis was completed, the carriers were contracted to allow the company to offer decreased prices as well as increased service levels on freight lanes the customer is currently operating. When the transportation department at the third-party logistics firm was awarded the opportunity to service the studied lanes, benchmarks for improved performance were set. After set periods of three months, six months and twelve months, business reviews are had with the customer to state progress and performance on the awarded lanes.

The focal points of the benchmarks were collaboratively established goals that were called key performance indicators. The key performance indicators varied in desired numbers depending on the customer that was worked with but the basis for the research was cost savings,
service levels express in a percentage of on time deliveries and FSMA related incidents expressed also expressed in percentages of successful shipments without incidents. The incidents included rejected trailers that were not suitable for hauling food grade equipment, broken freight seals causing loads to be rejected and damages incurred while the product was in transit.

**Summary**

Supply chain optimization is becoming an increasingly important business function for food distributors to achieve. With supply chain expenses on the rise, decreasing service levels and new regulations being imposed on the industry, outsourced supply chain operations are becoming of vital importance. With the implementation of third party logistics value added services, companies can outsource supply chain functions to overcome challenges that exist and focus on core competencies that are revenue drivers. The value-added services that third-party logistics companies offer have become an increasingly studied topic since inception when the service originated as a single-serve warehouse provider. From supply chain program implementation to the importance of information transparency with a focus on analysis, a variety of topics delve into the growing importance of outsourced logistics. These topics will be examined in further depth in Chapter II.
Chapter II: Literature Review

Supply chain activities have become a multi-faceted entity that is vital to businesses success across the globe. Seuring and Muller (2008) further develop this statement while explaining the vital aspects of the supply chain, one of which is cooperation among companies, which will lead to sustainable management of materials and information. The importance of information quality and the capacity to support supply chain functions is explained further by Yousefi and Alibabaei (2015), these foundational functions that must support all operational processes involved in supply chain management which is defined in a variety of ways.

A summary definition of the supply chain can be stated as; all the activities involved in delivering a product from raw material through to the customer including sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer and information systems necessary to monitor all of these activities. Supply chain management coordinates and integrates all of these activities into a seamless process. (Lummus & Vokurka, 1999, p. 1)

Mentzer and colleagues (2001) summarize supply chain management in a similar manner and expand on how the management approach can affect corporate strategy. Not only can supply chain management affect the direct applications of logistics and transportation but also production, procurement and warehousing. While a common misconception may be that supply chain is a simple one-step process, the many activities listed must be synchronized for an effective and efficient supply chain. As Lummus and Vokurka (1999) expand upon, supply chain goals can vary depending on which activity within the supply chain companies are attempting to improve upon. Grolleaud (2002) delves deeper into this external portion of the
supply chain and the importance of effective supply chain management and the focus on supply chain management within the food sector.

The problem with ineffective food supply chain management within the food sector is the potential for food product waste that occurs in transit, which can be a foundation for food shortages. “Food loss refers to total modification or decrease of food quantity or quality which makes it unfit for human consumption” (Grolleaud, 2002, p. 2). Expanding on how the supply chain has evolved to be able to prevent these issues, Mentzer and Gundlach (2009) write about how increased levels of collaboration between supply chain parties has created efficiencies to prevent food loss in the supply chain. In a different direction, Sreenivas and Srinivas (2008) further expand on issues by citing means of private fleet concerns and mode assessment as issues that are causing supply chain failures.

While Grolleaud (2002) expands on aspects that can ruin food quality within the supply chain and create shortages, tools exist that help companies achieve supply chain goals. One of the many benefits offered by third party logistics companies is to assist food manufacturers and distributors in bridging the gap that exists between current supply chain states and optimized ones. One of the main tools used by outsourced logistics providers is information technology and analytics.

**Supply Chain Network Analysis and Information Sharing**

Analytics and more importantly business intelligence when it comes to supply chain has become increasingly important in recent years due to the elevated competition within the business world. Yu, Yan and Cheng (2001) study this point and further elaborate on how with proper business intelligence and competent information sharing, the whole supply chain state can be improved. Sahay and Ranjan (2008) also write about this point and shift the focus to
analytics and how it is vital to supply chain success. The general concept is to extract enormous amounts of data and consolidate it into meaningful reports that allow decision makers to develop informed strategies for the supply chain. These decision makers are able to utilize real time business intelligence analytics that allow for solutions to be developed for ongoing problems.

Benefits of Supply Chain Network Analysis and Information Sharing

Business intelligence and supply chain transparency both serve as foundational elements for which network analysis is built. “Supply chain management requires exchange of information to make the best product-combination choices, determine how products will be shipped to retailers, and choose the quantities to be shipped to stores. Partners must feel comfortable with that” (Hinson, 2005, p. 14). Mentzer and Gundlach (2009) not only expand on the topics of trust and business intelligence but also focus more on information technology. By writing about the topic of information technology the benefits of business intelligence on overall performance in the supply chain are revealed. Hinson (2005) presents an alternative method to success and how the prelude to successful business intelligence is developing trust between supply chain partners. Once that trust is present, accuracy and efficiency stem from the supply chain analytical strategies that are developed. Power (2005) elaborates on this trust between partners by bringing in theories on cooperative models that must be put in place for information sharing and thus, network analysis to be successful. “The cooperative model, by way of contrast, focuses on the sharing of information (and in some cases assets) between organizations, recognizing areas of common interest and mutual competitive advantage” (Power, 2005, p. 256). Mutual competitive advantages that will reveal supply chain network alignment opportunities for third party logistic companies services and customers supply chains. Information sharing has also become increasingly important to creating efficiencies within the supply chain and forming
healthy relationships between supply chain partners. “When a manufacturer or distributor of any industry selects a 3PL, the company must make sure the relationship with the 3PL is healthy and beneficial, shippers should communicate their expectations so the service provider understands the shipper’s needs and key performance objectives” (Clayson, 2011, p.1). Wong, Tjosvold and Zhang (2005) reinforce these points by stating how effective communication and collaboration will lead to customer satisfaction within the supply chain. Once these preceding communication channels have been opened, data collection procedures and proactive automation of supply chain goal forming can occur. “Having the capability to automate the collection of key performance indicator data that is both accurate, timely and presented in a dashboard format allows executive management and other functional personnel to understand trends and be more proactive” (Cubitt, 2006, p. 1). Yu, Yan and Cheng (2001) write about these benefits and how being proactive with information will achieve specific objectives such as reductions in total costs and inventories, two items that can be classified as key performance indicators

Beamon (1998) takes the aspects of supply chain network analysis and provides insight further into benchmarking. While analysis is important to identify problems and lead to solutions, benchmarking performance measures must be established so the benefits of analysis can be revealed. “A performance measure, or a set of performance measures, is used to determine the efficiency and/or effectiveness of an existing system or to compare competing alternative systems” (Beamon, 1998, p. 11). While many different benchmarks or key performance indicators can be utilized for setting a baseline for supply chain network analysis, five facets that can service as foundational elements for benchmarking are commonly used. “Price/cost, quality, delivery dependability, time to market and product innovation” (Li, Ragu-Nathan, & Rao, 2004, p. 111), are five of the elements of internal and external supply chain that
gauge effectiveness and efficiency. Ensign (2001) elaborates further on these elements and reclassifies it into a different term, the value chain. “Value chain analysis can be used to formulate competitive strategies, understand the source(s) of competitive advantage, and identify and/or develop the linkages and interrelationships between activities that create value” (Ensign, 2001, p.1). Gunasekaran and Ngai (2004) journal about how information systems can help bridge the gaps that may exist between these aforementioned activities that do create value. Value that is derived from advanced collaboration of supply chain activities inside and outside the organization.

**Limitations**

Fawcett, Magnan and McCarter (2008) write about the limitations that supply chain network analysis can present. While previous aforementioned research has shown that trust and cooperation must be present for analysis to succeed, limitations become a factor when those aspects are lacking. “Absent a willingness to cooperate, a supply chain will not be able to attain lower costs and higher returns on investment. Further, irregular collaborative meetings among chain partners hinder managers’ opportunities to share with one another concerns, weaknesses and best practices” (Fawcett et al., 2008, p. 37). Collaborative meetings will open the channels of communication, which is vital to supply chain success, and failure to state undertake in these meetings will bring this limiting aspect into play.

**Third Party Supply Chain Program Implementation**

Once the information sharing and supply chain network analysis tools have been used, program implementation is completed to put the proposed solutions into effect. The aspects of program implementation are multi-layered and start with the customer recognition of the outsourced supply chain provider buying process. Yang (2014) establishes this process as,
“Identify the need to outsource logistics; develop feasible alternatives; evaluate candidates and select supplier; implement service; and continuously evaluate” (Yang, 2014, p.19). The beginning and most importance part of this buying process is first, identifying the need to outsource logistics. Customer’s identifying the need for outsourced supply chain capabilities opens the door for analysis, which is the predecessor for program implementation. Sheikh and Rana (2012) take this point and identify the multiple programs that are available to customers; warehousing, consolidation, transportation and cross docking are a few of the main ones.

**Benefits of Third Party Supply Chain Program Implementation**

Implementing a supply chain program is not a one step process as there are many variables that must be considered.

An effective SCM implementation plan balances scope, clarity, and level of detail. The plan of action and milestones portion of the plan may be the most critical element. This portion of the plan describes supply chain implementation as a phased effort with manageable stages (Reay, 2000, p.28).

Proper third party program implementation from a logistics perspective will have beneficial outcomes for customers. This foundational element of supply chain program implementation is reliant upon having collaboration between customer and logistics provider but also choosing a provider that has the experience and the knowledge to properly implement a multi-stage program. “Competent 3PL providers are highly skilled at coordination, enabling them to search out reliable partners and subcontractors to efficiently manage the inter-firm flow of goods” (Tezuka, 2011, p. 26). Skills and coordination will lead to customer satisfaction, cost benefits and a comprehensive logistics process, which are three of the foundational benefits that Reay (2000) writes about. Efficiency and on time deliveries are two additional critical key
performance indicators that lie within successful supply chain programs and lead to evolution of the supply chain as a whole. Programs that achieve these key performance indicators have supply chains that develop, as each implemented supply chain program that achieves set benchmarks will continuously evolve.

The aim of supply chain development is to enhance the interconnection and reliance among firms and also enhancing organizational benefit, customer response and ability to deliver value to the customers. Augmenting in consumer needs such as low price, quicker delivery, high quality products or services and increase the variety of items because of business sector growing from local to global market (Veerenddrakumar, Narasalagi, & Shivashankar, 2015, p.1).

As Sreenivas and Srinivas (2008) state mode assessment, flexibility and real time information systems are three key outcomes of proper program implementation. Veerenddrakumar et al., (2015) further expand this point by stating how if done correctly, it will create competitive advantages for customers. Competitive advantages within the supply chain such as competitive pricing, a dependable delivery schedule, production innovation and reduced inventory levels.

**Limitations**

The limitations for proper supply chain program implementation are similar to the barriers that exist to prevent successful information sharing and thus, successful network analysis. Sabir and Irfan (2014) specifically strengthen this by mentioning lack of partner trust and the choice of the incorrect supply chain or third party logistics partners. These two aspects prevent the sharing of confidential information and transparency that reveals current supply chain issues.
Barriers to supply chain information integration explored that adoption to e-business into supply chain function is slower than expected. These barriers are poor strategic alignment of information strategies, lack of awareness or potential benefits of IT adoption, lack of managerial leadership and thrift in this regard in different organizations (Sabir & Irfan, 2014, p.57).

Seuring and Muller (2008) expand upon the importance of this potential limitation by explaining how building a partnership is as important as ensuring correct operational process for supply chain success. Further into this potential restriction, Veerenddrakumar, Narasalagi and Shivashankar (2014) explain how uncertainty and complexity within the program paired with a lack of trust can cause delays and prevent efficiencies. Tezuka (2001) strengthens this point of how proper supply chain program implementation will assist in forming proper partnerships, effective sharing of information and how these aspects can help prevent these limitations from occurring. Many of the author’s statements can be derived from one foundational element that leads to success in supply chain management with the proper use of third party logistics, process flow. Each aspect is important as its own entity but all elements are strongly linked and serve as a process flow leading to the desired solution of effective transportation of goods for customers.

**Summary**

Common themes can be seen amongst the authors writing about supply chain network analysis, information sharing and program implementation. Effective supply chain collaboration between third party logistics companies and customers starts with trust. Once the trust between parties exists, information sharing occurs and information sharing along with supply chain transparency serves as the foundation for network analysis. Power (2005) explains this holistic approach to logistics and the importance of multi-sector integration between information sharing,
analysis and succeeding program implementation. All of which are factors of successful supply chain management. Chapter III changes direction from past findings on factors that contribute to successful supply chain management and transitions into the methodologies used for accomplishing successful third-party logistics programs.
Chapter III: Methodology

Supply chain optimization has become an imperative component to food manufacturing and distributing company’s success. Third party logistics companies and outsourced logistics providers, provide foundational benefits that bridge the gap between current supply chain and optimized states. Information sharing, supply chain network analysis and program implementation were three beneficial tools that were utilized to achieve this transition. The methodology utilized stemmed from these three tools being foundational elements. Information sharing as the predecessor, served as the first step in the methodology. Information sharing involved extracting current supply chain data from select customer’s networks. Vital information included origination and destination points, ship dates, equipment type and product. After information sharing was completed, network analysis began. The information was analyzed for the select customer and was synchronized with available carriers, which created cost efficiency opportunities. Finally, once available carriers were identified, the customer, the third party logistics company, shipper and the receiver implemented a program that created operational efficiencies and prevented disruptions from occurring. Proper program implementation prevented additional costs from being incurred, created operational and cost efficiencies and improved the overall supply chain state.

Information Sharing

Information sharing was the first step in performing successful third party logistics program implementation. Customers that were eligible for supply chain program implementation were identified through a study that analyzed internally based customers who were outsourcing less than twenty five percent of external supply chain activities. Further explained, customers who were actively doing business with the third party logistics company
and had less than twenty five percent of external supply chain expenses being routed the third party logistics company. After customers were identified, shipping lane data that was not being outsourced to third party logistics was extracted. Extraction occurred through bill of lading collection from the third party logistics warehouse databases as well as a data exchange between the customer and third party logistics company. When shipments were shipped outbound from the third party logistics warehouse, bill of lading data was stored in an internally accessible database. Bill of lading’s provided all the necessary data for network analysis; origination, destination, product and equipment. After all the potential lanes were analyzed, qualifying lanes were extracted from the mass data tables and inserted into a separate data table. Table 1, filled with example data, exemplified the extraction sheet of how the identified lanes were organized.

Table 1

*Example Supply Chain Data Extraction Sheet*

<table>
<thead>
<tr>
<th>Customer</th>
<th>Volume</th>
<th>Equipment</th>
<th>Rate</th>
<th>Shipper</th>
<th>Ship</th>
<th>Consignee</th>
<th>Cons.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>Dry Van</td>
<td>$500.00</td>
<td>A</td>
<td>1</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>AA</td>
<td>2</td>
<td>Dry Van</td>
<td>$600.00</td>
<td>B</td>
<td>2</td>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>AAA</td>
<td>3</td>
<td>Reefer</td>
<td>$700.00</td>
<td>C</td>
<td>3</td>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>AAAA</td>
<td>4</td>
<td>Dry Van</td>
<td>$800.00</td>
<td>D</td>
<td>4</td>
<td>D</td>
<td>4</td>
</tr>
</tbody>
</table>

This data was compiled to reveal high volume shipping lanes that occurred frequently and were less than two hundred miles in length. Volumes must have been a minimum of two times per week and the two hundred mile max was based off of the shipment being a single day transit. These high volumes and shipment mileage maximum allowed for simplicity of equipment mode selection as well as potential partner carrier identification. The secondary
reason for the restrictions was ensuring efficiencies as with food grade product, minimized transit times meant minimized risk to the product being compromised.

Supply Chain Network Analysis

When lanes that qualified for the third party logistics program implementation had been identified, supply chain network analysis was performed to identify synchronized lanes that could be paired with shipping lanes to create efficiencies. The first step in supply chain network analysis was to conduct a geographical study of shipping lanes, which formed a collaborative round trip for the selected carrier. A round trip was classified as a shipping lane that had two separate legs to it. The first leg picked at a certain point, delivered at the first destination, which was less than two hundred miles away. The second leg had a pick up point within 25 miles of the leg 1 destination and returned to a delivery point within 25 miles of where leg one picked up. Figure 1 illustrated the basic premise of the round trip shipments that made up the supply chain programs.

![Figure 1](image)

Figure 1. Illustration of round trip shipments.

After a shipment for the select customer was identified as a potential match, a collaborative shipment was located by searching the organic customer portfolio. The organic
portfolio was defined as the customers that previously worked with the third party logistics and had at least seventy five percent of the external supply chain spend being routed through the third party logistics company. Table 2 was an example of the matrix that organized the internal shipping lanes that would be matched with qualified lanes shown in Table 1.

Table 2

*Example Internal Supply Chain Data Extraction Sheet*

<table>
<thead>
<tr>
<th>Lane</th>
<th>Volume</th>
<th>Equipment</th>
<th>Ship City</th>
<th>Ship State</th>
<th>Cons. City</th>
<th>Cons. State</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>Dry Van</td>
<td>A</td>
<td>1</td>
<td>AA</td>
<td>11</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>Dry Van</td>
<td>B</td>
<td>2</td>
<td>BB</td>
<td>12</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>Dry Van</td>
<td>C</td>
<td>3</td>
<td>CC</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>125</td>
<td>Dry Van</td>
<td>D</td>
<td>4</td>
<td>DD</td>
<td>14</td>
<td>125</td>
</tr>
</tbody>
</table>

Once the preceding steps had been completed, network analysis transitioned into carrier identification and selection.

Within each third party logistics company, there was a carrier portfolio of contracted carriers that the third party logistics company was eligible to work with. Analysis continued by scanning through potential carriers and identifying geographically relevant providers. Geographically relevant was defined as carriers that had an operational home base within the two hundred miles that the two transportation lanes moved between.

Carrier identification and selection happened within a tier system based off of carrier network alignment. The first tier was the top three carriers’ selected from the carrier portfolios that were the best candidates to become dedicated carriers on the lane. Generally these were carriers who had operational home bases close to leg ones pick up location as that meant the
empty miles for the carrier were minimized to the fullest. Tier one level carrier’s; due to
minimized deadhead miles were the service providers whose costs for the lane were the lowest
and thus, the most advantageous to be assigned to the supply chain program, as they presented
the most cost savings to the selected customer. The second tier of carriers also contained three
selected carriers whose geographical profiles matched with the shipping lane but were not as
closely aligned as a tier one motor carrier. The tier two carriers only became relevant if all three
of the tier one carriers rejected the lane dedication proposal.

The final stage of network analysis involved procuring pricing from the tier one carrier’s
through emails or phone calls, proposing the supply chain program and contracting the carrier on
the opportunity. After the primary carrier was selected and contracted and the pricing for the
shipment became a fixed number, the cost analysis phase commenced. Carrier selection was
based off of multiple factors, offered rates to service the shipping lane, service levels on other
shipping lanes and available capacity. The cost analysis was based off of comparing supply chain
expense the new program offered, to the selected customers previous rates for the designated
shipping lane and the DAT Rateview freight market cost tool. DAT Rateview was a freight
market analysis tool that showed freight market prices, as well as trends on specific shipping
lanes. The data that was drawn from a three month segment as rates and freight market volatility
were susceptible to seasonality changes. Table 3 is an example of how the data was compared
and how the cost analysis was organized.
Table 3

Example Cost Analysis Matrix

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Volume</th>
<th>Current Rate</th>
<th>Proposed Rate</th>
<th>DAT Rateview</th>
<th>Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open – Close</td>
<td>100</td>
<td>$1000.00</td>
<td>$800.00</td>
<td>$950.00</td>
<td>$200.00</td>
</tr>
</tbody>
</table>

When all the internal analysis was performed, the solution was consolidated and presented to the customer in two formats, one was the cost analysis matrix shown in Table 3 and the second was an example of the graph displayed in Figure 2.

Figure 2. Example cost analysis chart of freight spend from February through April 2017.

The cost analysis chart simplified and visualized the cost aspect of the proposed solution on a single shipment basis. After construction of these solutions, they were presented to the selected customer to gauge interest in entering the supply chain program. If the solution was
agreeable, the third party logistics transcended into the supply chain program implementation phase.

**Supply Chain Program Implementation Phase**

Once the customer had agreed to enter the supply chain program, the implementation occurred for the carrier entering the program. The transportation department of the third party logistics company had to coordinate a multitude of aspects for the program to be successful for the desired customer. The first aspect that must be coordinated was the leg one pick up time. The third party logistics transportation department coordinated a pick up time, generally first thing in the morning, which allowed maximum operating time to complete the trip and not incur any additional shipping fees. This same process was done for the delivery of leg one; pick up of leg two and finally, the delivery of leg two. Strict timing must have been in place at each different location as if delays occur, the program was not going to be successful. Delays at any location would have caused detention time to be incurred, which would have been additional expenses to the customer. Delays also could have caused the carrier to miss the delivery cut off time on the second leg and then the freight would have had to been held until the next business day before the final delivery, which was considered a layover. Layover charges, an applicable charge to the customer, were a second additional expense that potentially would eliminate the benefits of the supply chain program. The times were established by calls or emails to each pertaining location in the supply chain program and an example of the times that were targeted for each location of the program were pictured in Table 4.
Table 4

*Example Supply Chain Program Times*

<table>
<thead>
<tr>
<th>Leg 1- Pick-up</th>
<th>Leg 1 - Delivery</th>
<th>Leg 2 - Pick up</th>
<th>Leg 2 - Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00AM</td>
<td>9:00AM</td>
<td>10:00AM</td>
<td>12:00PM</td>
</tr>
</tbody>
</table>

There were multiple carrier aspects that must be put in place to ensure success of the program, equipment guidelines, shipment tendering process and service expectations. These aspects were each laid out in an implementation meeting that was held at the carrier’s headquarters involving all parties that were involved in the supply chain program from the carrier standpoint. The first aspect that was laid out was equipment guidelines. Since food grade product was being hauled, semi trailer condition must have been ten years or newer as far as life span. Inspections were done to ensure no holes, cracks or leaks were noticed in the trailer, which would cause for trailer rejection. Trailer rejections would have delayed pick ups and thus deliveries, as carriers would have needed to reset schedules to provide proper equipment for the required shipment. These delays were unmitigated disruptions in the supply chain and were considered service failures imposed on the carriers.

The next aspect of proper supply chain program implementation involved setting the tendering process and expectations. The tendering process involved establishing how much lead time the carrier would be given from the third party logistics company of a shipment. Lead time was considered to be the amount of time in which a carrier was notified by a shipper or logistics provider that a shipment needed to be picked up. A secondary aspect of the tender process was whether a load tender would be sent via electronic data interchange, email or by alternative means. After the shipment tendering process was in place, the final and most important facet was established, service expectations. Service expectations were established between the
customer and third party logistics company and after, passed along to the carrier, these were referred to as the key performance indicators. These benchmarks served as the focal point for the service aspect of the supply chain program. These indicators marked previous service levels and would be used to gauge how successful the program was in terms of increased service level and reduced FSMA related trailer rejections.

General service guidelines varied from program to program and were dependent on the need for the product. If the customer involved in the supply chain program was utilizing the just in time inventory system, on time deliveries were expected to be at 98% or higher as the product was used in the manufacturing process upon arrival. If the product was coming out of a manufacturing facility and being shipped to a warehouse, on-time pick-ups were expected to be at 95% or above. This stems from the customers lack of storage space and if pick ups were continuously missed, inventory levels would have grown to a level where production must be slowed. Slight variance of 2% and 5% was allowed as variables occurred with uncontrollable delays occurring within the external supply chain realm.

Summary

The methodology utilized in properly implementing supply chain programs had different levels and involved extensive internal portfolio analysis. Third party logistics offered benefits in the sense they had extensive shipping lanes to pair up inter customer to create cost efficiencies as well as streamlined operations within the program. It also alleviated back end preceding work to get the operations properly established and set up for success. Chapter IV details four different programs that were proposed accepted and implemented for a multitude of customers. Previous shipment data has been made available to establish cost savings and service improvements for the selected customers.
Chapter IV: Results

Third party supply chain programs consisted of multiple elements that must have been done in chronological order for success to be obtained. These programs were designed to resolve problems that existed within the supply chain such as rejected trailers due to improper equipment condition, missed pick-ups and deliveries as well as increased freight costs. These external supply chain problems transcended into other areas like production that caused increased expenses due to down production lines, finished product delays and decreased finished product quality. These issues led directly to the purpose of the implemented programs, alleviated issues and streamlined supply chain operations. The creation of supply chain programs followed regimented steps; first, the customer and third party logistics company worked to achieve a level of trust, this allowed for information transparency and sharing. After data and information was exchanged, third party logistics companies analyzed the information and developed a program solution for the specified customer. When the solutions and programs were developed, the programs were presented to the customer, upon accepting, the supply chain programs were implemented. The purpose of these developed programs was to optimize the customers supply chain. Optimization was summed up as increased supply chain service levels; decreased equipment rejections and reduced overall spend for the shipping lane. The designed and implemented programs provided external supply chain solutions for four separate customers on shipping lanes where opportunities existed for programs.

Information Sharing

Information sharing served as the first step of supply chain program development. Preceding this step was having an established trust with a customer, implementing a non-disclosure agreement protecting any information that was shared as well as having obtained
shipping lane data. Shipping lane data was collected through two separate methods, bill of lading information provided by the third party logistics company warehouses and information that was manually sent over by the customer. Information that was collected came from six organic customers who were in the third party logistics company’s database either through transportation services or warehousing. Out of the six customers that data was collected from, four had multiple shipping lanes that qualified for supply chain programs. Out of the multiple lanes, four specific lanes were identified as lanes where cost savings could be shown as well as increased service levels due to geographic location; available truckload carriers and current lane spend for the customer. Available truckload carriers presented additional beneficial opportunities such as increased service levels stemming from reduced equipment failures and including increased on time load completion. After the shipping lane data was collected it was compiled and sorted based on volumes over the previous three month period. These four shipping lanes were identified as qualifying lanes for establishing supply chain programs based on internal lane data that paired up with each.
Each qualified lane was not being run through the third party logistics company’s services but was identified as an area where cost savings could be driven. Utilizing the volume from the previous three months and the rate for each shipment, the total shipping lane spend was calculated.

### Supply Chain Network Analysis

After the supply chain data was extracted and the information was shared between the third party logistics company and the selected customers. Internal lanes were identified to match up with the qualified lanes for the supply chain program. Table 6 showed the four designated lanes that were matched as pairs for the predetermined, qualified lanes to set up the program. The shipping volumes for each lane, as well as the pick up and delivery locations synchronized with the shipping lanes, which enabled each to be paired to set up a program.

---

### Table 5

**Supply Chain Data Extraction Sheet**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>112</td>
<td>Dry Van</td>
<td>42,000</td>
<td>$375.00</td>
<td>Sparta</td>
<td>WI</td>
<td>Stevens Point</td>
<td>WI</td>
<td>85</td>
</tr>
<tr>
<td>B</td>
<td>67</td>
<td>Dry Van</td>
<td>38,175</td>
<td>$485.00</td>
<td>Schofield</td>
<td>WI</td>
<td>Union Center</td>
<td>WI</td>
<td>121</td>
</tr>
<tr>
<td>C</td>
<td>61</td>
<td>Reefer</td>
<td>43,500</td>
<td>$845.00</td>
<td>Melrose</td>
<td>MN</td>
<td>Chippewa Falls</td>
<td>WI</td>
<td>194</td>
</tr>
<tr>
<td>D</td>
<td>56</td>
<td>Dry Van</td>
<td>41,500</td>
<td>$525.00</td>
<td>Wisconsin Rapids</td>
<td>WI</td>
<td>Richland Center</td>
<td>WI</td>
<td>95</td>
</tr>
</tbody>
</table>
Table 6

*Internal Shipping Lanes for Supply Chain Program Matching*

<table>
<thead>
<tr>
<th>Lane</th>
<th>Volume</th>
<th>Equipment</th>
<th>Shipper City</th>
<th>Ship State</th>
<th>Consignee City</th>
<th>Cons. State</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>167</td>
<td>Dry Van</td>
<td>Wisconsin Rapids</td>
<td>WI</td>
<td>Sparta</td>
<td>WI</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>86</td>
<td>Dry Van</td>
<td>New Lisbon</td>
<td>WI</td>
<td>Schofield</td>
<td>WI</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>71</td>
<td>Reefer</td>
<td>Chippewa Falls</td>
<td>WI</td>
<td>Melrose</td>
<td>MN</td>
<td>194</td>
</tr>
<tr>
<td>4</td>
<td>93</td>
<td>Dry Van</td>
<td>Muscoda</td>
<td>WI</td>
<td>Wisconsin Rapids</td>
<td>WI</td>
<td>109</td>
</tr>
</tbody>
</table>

The four lanes listed in Table 6 were correlated to lanes listed in the same row in Table 5. Each adjoining shipping lane was paired together to form round trips, which made them desirable shipments for carriers to be dedicated to. Filing through and aligning carriers for each opportunity was the next step in the process because if reliable carriers were not able to service the lanes, the program would not work. With the four lanes that were the focus of the supply chain program development, all tier one carriers priced and confirmed acceptance of each round trip based on the customer’s acceptance of the proposal. Table 7 illustrated the cost comparison that was developed after talking to the carriers for presentation to the customer for each shipping lane.
Table 7

Cost Analysis Matrix

<table>
<thead>
<tr>
<th>Customer:</th>
<th>A</th>
<th>Mode</th>
<th>Dry Van</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origination:</td>
<td>Sparta</td>
<td>Destination</td>
<td>Stevens Point</td>
</tr>
<tr>
<td>Time Frame</td>
<td>Volume</td>
<td>Current Rate</td>
<td>Proposed Rate</td>
</tr>
<tr>
<td>3 Months</td>
<td>112</td>
<td>$375.00</td>
<td>$310.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer:</th>
<th>B</th>
<th>Mode</th>
<th>Dry Van</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origination:</td>
<td>Schofield</td>
<td>Destination</td>
<td>Union Center</td>
</tr>
<tr>
<td>Time Frame</td>
<td>Volume</td>
<td>Current Rate</td>
<td>Proposed Rate</td>
</tr>
<tr>
<td>3 Months</td>
<td>67</td>
<td>$485.00</td>
<td>$435.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer:</th>
<th>C</th>
<th>Mode</th>
<th>Reefer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origination:</td>
<td>Melrose</td>
<td>Destination</td>
<td>Chippewa Falls</td>
</tr>
<tr>
<td>Time Frame</td>
<td>Volume</td>
<td>Current Rate</td>
<td>Proposed Rate</td>
</tr>
<tr>
<td>3 Months</td>
<td>61</td>
<td>$845.00</td>
<td>$685.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer:</th>
<th>D</th>
<th>Mode</th>
<th>Dry Van</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origination:</td>
<td>Wisconsin Rapids</td>
<td>Destination</td>
<td>Richland Center</td>
</tr>
<tr>
<td>Time Frame</td>
<td>Volume</td>
<td>Current Rate</td>
<td>Proposed Rate</td>
</tr>
<tr>
<td>3 Months</td>
<td>56</td>
<td>$525.00</td>
<td>$465.00</td>
</tr>
</tbody>
</table>

Table 7 was used to draw direct comparisons between the rate the customer was currently running the shipping lane, the cost if outsourcing to the third party logistics program was undertaken and the supply chain program was utilized and finally the DAT Rateview price. The final column included in Table 7 expressed the cost savings that would be the result of each
program for three month period. Figure 3 visualized the data shown in Table 7 and was also presented to each customer in a separate manner when the supply chain program was being proposed.

![Figure 3. Cost analysis of freight spend on shipping lanes from February - April 2017.](image)

Once these solutions were presented to each customer, each agreed to outsource the specified shipping lanes to the third party logistics company and enter into a supply chain program. After the agreements were made, the transition to supply chain program implementation began.

**Supply Chain Program Implementation**

While many facets of the supply chain program must come together for overall success, the times of the program were at the foundation of importance. Since these programs were all
coordinated to be same day runs, times had to be at precise intervals which allowed for enough
time for the carrier to complete the run but also close enough together to allow for program
completion in one day. If delays or timing were off; detention, layovers and ultimately, service
failures would have occurred which once again, meant failure and the loss of benefits of the
program. Table 8 displayed the times that were established for each of the four supply chain
programs that were implemented.

Table 8

*Supply Chain Program Times*

<table>
<thead>
<tr>
<th>Customer</th>
<th>Leg 1- Pick-up</th>
<th>Leg 1- Delivery</th>
<th>Leg 2- Pick up</th>
<th>Leg 2- Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6:00AM</td>
<td>9:00AM</td>
<td>11:00AM</td>
<td>2:00PM</td>
</tr>
<tr>
<td></td>
<td>Leg 1- Pick-up</td>
<td>Leg 1- Delivery</td>
<td>Leg 2- Pick up</td>
<td>Leg 2- Delivery</td>
</tr>
<tr>
<td>B</td>
<td>5:00AM</td>
<td>8:30AM</td>
<td>10:30AM</td>
<td>1:30AM</td>
</tr>
<tr>
<td></td>
<td>Leg 1- Pick-up</td>
<td>Leg 1- Delivery</td>
<td>Leg 2- Pick up</td>
<td>Leg 2- Delivery</td>
</tr>
<tr>
<td>C</td>
<td>5:00AM</td>
<td>10:00AM</td>
<td>11:00AM</td>
<td>3:00PM</td>
</tr>
<tr>
<td></td>
<td>Leg 1- Pick-up</td>
<td>Leg 1- Delivery</td>
<td>Leg 2- Pick up</td>
<td>Leg 2- Delivery</td>
</tr>
<tr>
<td>D</td>
<td>7:00AM</td>
<td>10:00AM</td>
<td>12:00PM</td>
<td>3:00PM</td>
</tr>
</tbody>
</table>

The times were strategically set up to allow more time on each shipment than what may
actually be needed, which allowed room for error or other variables to not have an effect on the
outcome. General time baselines that were used were one hour for loading and unloading at each
facility and sixty miles per hour for drive times. This time allowed the carrier’s sufficient time
on each program to complete the run successfully on days that the supply chain program lanes
occurred.

The next step in chronologically completing the supply chain program was establishing
the tendering process. With each carrier, email tenders were selected as they were the most
commonly used and reliable form for transmitting data and ensuring it was received by the carrier each time a shipment was available. With transmitting tenders, lead time was also established. The lead time minimum that was established for notification was 24 hours from the third party logistics company to the carrier. This gave the carrier ample time to allocate a driver, truck and FSMA approved trailer to the shipment and align the semi driver’s hours of service for the supply chain program. When the preceding steps had been completed, service expectations were established for each program.

Service expectations for each carrier remained uniform across the four programs that were implemented. On time pick up, which applied only to the Leg 1 pick up must have been at a level of 95% or above. On the other end, on time deliveries for the program must be at a level of 98% or above and that applied only to the Leg 2 deliveries. The last established key performance indicator pertained to trailer rejection. Trailer acceptance was required to be at 100% as the trailers that were used on each program were preapproved in the implementation meeting with the carrier. This approval process ensured that each trailer adhered to the FSMA regulations and was of approved quality to move the food grade product that was part of each program. These key performance indicators, along with revealing cost savings were the main benefits of third party logistics programs and ultimately, the purpose behind the research. By outsourcing shipments to the third party supply chain programs, food distributors and manufacturers were able to able to reap the benefits of increased carrier capacity as well as shipment diversity which ultimately led to round trip shipping lanes and a closer state to overall supply chain optimization.
Summary

Although each program was completely separate and designed for unique customers, the programs were similar in nature. The expectations were synchronized so on time picks ups and deliveries had the same percentage levels that carriers must have adhered to. Strict expectations were put into place to ensure success of each program and that each customer reaped the maximum level of benefits available from increased service expectations to cost savings. From initial information sharing stages to finalizing the program implementation, each step involved multiple processes to minimize risk and reduce the potential impact of the multiple variables that were present in the transportation realm. Chapter V reviews the previous chapters and limitations as well as draws conclusions on the study of supply chain programs and the impact third party logistics companies can have on food manufacturers and distributors sup
Chapter V: Discussion

Supply chain optimization has become an increasingly difficult transportation state to reach for food manufacturers and distributors. With volatile freight markets existing and perishable nature of the product being hauled, streamlined external supply chain operations are becoming all too frequent which caused issues in production as well as other aspects of the company. Along with the previous constraints, the Sanitary Transportation of Human and Animal Food rulings has imposed strict rulings on the condition of equipment that hauls food product. This has only further constrained capacity and directly translated to increased freight prices. With the increasing volume of challenges that were present within the external supply chain, the third party logistics provider utilized directed freight resources and carrier capacity to set up programs that ensured controlled freight costs, constant service levels as well decreased trailer rejections due to improper condition. With the consistency of the logistics supply chain programs, freight budget forecasting became easier due to consistent pricing, more consistent production levels due to high levels of service on pick ups and deliveries as well as decreased issues with semi trailers hauling the freight.

Chapter I provided a high level overview of all the foundational aspects of the external supply chain and all the challenges that existed within the transportation realm. Touching on the different aspects that have impacted the market from FSMA to the ELD mandate, available capacity and equipment that were of proper condition to haul food grade product has been decreasing. Along with these challenges that existed within the supply chain, goals for an optimized state were also covered from reduced cost savings to increased service levels. These goals, lead to streamlined operations, which translated to success in other areas for food manufacturing and distributing companies. This optimized supply chain state, the third party
logistics supply chain programs and the benefits each offered alleviated many of the stated issues that faced customers. Each program, set up as a round trip, offered solutions to the customer that provided reliable trailer conditions, pick up and delivery times as well as consistent freight costs. Each value added benefit was meant to push the food manufacturer and distributor closer to a streamlined supply chain state.

Chapter II refocused the study onto the previous research and articles that have been published not only about the supply chain but also about benefits outsourced logistics providers offered within the food product supply chain. Similar to chapter I, Chapter II touched on the issues within not only the external supply chain aspect for food products but also how third party logistics played a role in impacted freight markets. Chapter II started with supply chain network analysis, information sharing and transitioned into how each element has historically played a factor in supply chain program implementation.

Chapter III transitioned away from historical studies on the elements of the research and evolved into the methodology for how the research was conducted. With the first step of information sharing, data was procured from potential customers who qualified for supply chain programs. Once collected, the data was sorted and analyzed for potential qualifying lanes that could be paired up with organic shipping lanes to form a program. A second phase of analysis was undertaken to match internal lanes, which collaboratively formed the round trip shipments that ultimately were the supply chain programs. When information had been shared and analysis performed, implementation was the final step in the research. Supply chain program implementation involved two main steps, setting up shipment times and finally, establishing key performance indicators. Proper times directly correlated to key performance indicators but were
also a factor for why the research was conducted. Along with driving cost savings, improving service levels served as a foundational element for the purpose of the study.

Chapter IV took the methodology from Chapter III and used firm data drawn from information sharing, network analysis and created four supply chain programs, each for an individual customer. Each round trip started by pairing two shipping lanes that formulated a round trip, transitioned into further analysis which revealed cost savings that stemmed from the supply chain program and finally was displayed for presentation to the customer. Once accepted, the program implementation phase began, which started by establishing early morning times for the Leg 1 pick up, moving into mid day times for the Leg 1 delivery and Leg 2 pick up and finally a late day delivery for the completion of the shipment. When times were in place, service benchmarks and expectations were established for the carrier. This phase started by deciding which trailers were of acceptable condition for the shipments and transitioned into established the key performance indicators, which ensured service level reliability for the customer.

Limitations of the Study

Limitations of the study were limited geographically and overall shipment distance. These factoring elements were included in the study for two main reasons. The first was that shorter supply chain programs showed a clearer picture of the program benefits in terms of service levels, cost savings and isolating issues if there are any that were present in the study. The second factor correlated with the first and that was a how longer supply chain program that span multiple days and geographical regions were presented with more uncontrollable factors and the benefits become less clear. Along with a higher degree of difficulty to complete, longer programs that spanned wider geographical areas were increasingly difficult to create due to shipment volume that correlated closely with each other. That was, two shipments that paired a
round trip with each spanning multiple regions or states and had origin and destination points in close proximity. Expanding outside of the geographical core competency area also limited reliable carrier availability, which further exposed variables and potential disruptions of supply chain programs for this research.

**Conclusion**

The results from the research revealed similar benefits with each program; as all plausible variables that could have occurred were accounted for and mitigated as much as each could have been. The first aspect that was the driving point for each customer entering into a third party logistics supply chain program was cost savings. With each of the four programs, cost savings were a result for the specified customer. Customer C was the benefactor of the largest forecasted cost savings of $9,760 over the course of a three-month period. Customer A was the second largest benefactor at $7,280 cost savings, Customer D was the third at $3,360 closely followed by Customer D at $3,350. With each program, outsourcing the qualified shipping lanes assisted in accomplishing one of the main goals for conducting the research, assisting customers in adhering to freight budgets and controlling supply chain spend.

The second conclusion that was drawn stemmed from the key performance indicators that were constructed into each program, trailer condition that adhered to FSMA standards as well as on time pick up and delivery. By pre checking trailers that would be used on the supply chain programs for each customer, all risk of trailer rejection due to unacceptable condition was mitigated. This consistency ensured an ease of mind approach for each customer as the reliability of the freight that was expected to move, actually moved each time a shipment was procured or distributed. This same approach stemmed from the established service times for each program. With a 95% level set for Leg 1, risk was mitigated on failures for the remaining
three stops that were part of the supply chain program. Set times were not established for the
Leg 1 delivery, nor the Leg 2 pick up but they were established at 98% for the Leg 2 delivery.
All four stops did not have service guidelines tied to them because the supply chain program is
considered one entity. If failures occurred, the whole program would be reanalyzed to isolate
and identify where failures occurred. If common themes existed, steps would have been taken to
alleviate the issues and ensure entire program success.

Recommendations

Many different findings were applicable from this study not only for the external supply chain for food manufacturers and distributors but also for third party logistics programs. The risk mitigation factors that were established in the program times were one main facet that can be applied to eliminate problems in other areas of the supply chain. For food manufacturers and distributors, going out and physically examining the trailers that will be used by core carriers eliminates the potential to have trailer rejections due to FSMA related qualifications or other potential issues. The second main risk mitigation tactic was establishing firm times for each shipment. This establishes a level of chronological organization where once a shipment is entered, the warehouse workers are queued to pick the shipment from the warehouse racks and stage it for loading. With this action being done and not having to wait for a pick up appointment being established for each individual shipment, there are no delays as when the carrier arrives, the product is staged, packaged and ready to load. Simply put, all the backend work is done prior to the carrier arriving and the risk of incomplete paperwork or missed communications of times to complete actions is eliminated.

The second key element that can be applied to future studies are the key facets expressed in the information sharing and the analysis phase. With firm levels of trust established and
preemptive data being shared before forming a supply chain partnership, chances of a successful collaboration are greater. Expectations are established, potential risks are identified and problem areas are revealed prior to operations commencing and are not discovered during transit in the case of the external supply chain. Information sharing and analysis also can lead to a greater volume of opportunities for optimizing the supply chain and reaping potential benefits that could be offered. With a greater level of data exchange with a trusted partner, higher potential for supply chain programs is created, especially of the longer nature, which can lead to increased cost savings as well as service levels.

Supply chain programs offer benefits on multiple levels. Increased service levels, supply chain cost efficiencies and less trailer delays were three of the main benefits that were elements of the study. These benefits flow over into other areas of the company and have far reaching effects outside of the external supply chain. Consistent deliveries with reliable carriers also reflect positively on the customer that entered into the supply chain program. Vendors and suppliers that are a part of the program, but are external entities also reap benefits of increased product delivery quality; potential decreased product cost as well as consistent and increased customer service. Third party logistics programs and the benefits that are offered, have far reaching effects that are not isolated to the direct business aspect they intend to optimize.
References


Appendix A: MercuryGate Microsoft Excel Data Extraction

Shown below is an example of the MercuryGate Microsoft Excel reporting feature that was utilized to perform certain aspects of research. Each report that was listed stemmed from a certain customer profile that contains reference numbers that identify each shipment, quantities that are ordered (actual weight and actual quantity), expected ship dates as well as the location for pick-up and delivery. The reports shown below is frequently extracted and sent to shippers as a tool for individuals to analyze lane data and identify the cost performance for specific areas of the transportation portion of the supply chain.

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<th>Load #</th>
<th>Ref BOL</th>
<th>Ref. PO Number</th>
<th>Actual Quantity</th>
<th>Actual Weight</th>
<th>Customer Rate</th>
<th>Target Ship (Early)</th>
<th>Shipper City</th>
<th>State</th>
<th>Target Delivery (Early)</th>
<th>Consignee City</th>
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Appendix B: DAT Rateview Shipping Lane Analysis

Dial-A-Truck (DAT) RateView is an intuitive system that presents semi-truck market rates for specified shipping lanes. The main dashboard will present current market rates (Top portion of page) as well as yearly trends and how the lane has been impacted over the last 15 months (Lower portion of the page). The small box in the upper right corner shows suggested price to pay to trucks as well as an estimated range the price should fluctuate due to multiple variables that exist on each shipment (Weight, pick-up or delivery location, delivery hours).