

# Shipping Exchange Analysis of Outsourced Parcel Shipping to LTL Carriers

By  
Jamie K. Curran

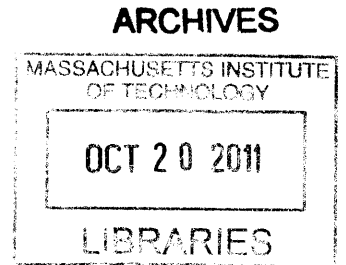
Submitted to the Department of Mechanical Engineering  
In partial fulfillment of the requirements for the Degree of  
Bachelor of Science in Mechanical Engineering

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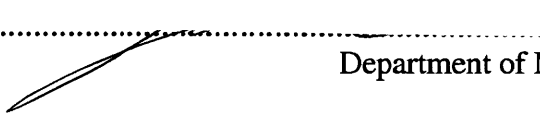
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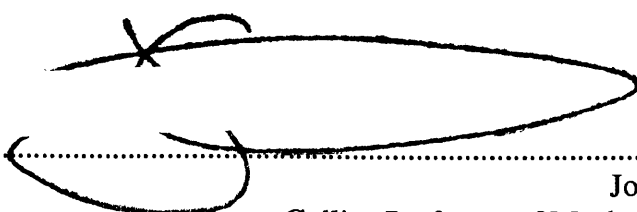
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Signature of Author .....  
  
Department of Mechanical Engineering  
May 16, 2011

Certified by .....  
  
Sanjay E. Sarma  
Professor of Mechanical Engineering  
Thesis Supervisor

Accepted by.....  
  
John H. Lienhard V  
Collins Professor of Mechanical Engineering  
Chairman, Undergraduate Thesis Committee

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Submitted to the Department of Mechanical Engineering  
On May 16<sup>th</sup>, 2011 in partial fulfillment of the requirement for the degree of  
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## **Abstract**

There is a large and intricate network of trucks, warehouses, stores, and companies that support the transportation and logistics industries in the United States. Different categories of carriers transport shipments of all sizes by utilizing complex tracking systems. Further, there is a network of brokers, consultants, third-party and fourth party logistics providers who organize and integrate these resources and services to provide transportation solutions for any shipment challenge. Solutions are created by integrating the capabilities of several carriers and other transportation service providers. Based on this integration, this thesis proposes a business model that will leverage the existing transportation network in US to provide a low-cost shipping option for residential shippers. It is concluded that the business model is possible with strong industry expertise and powerful database development.

Thesis Supervisor: Sanjay E. Sarma

Professor of Mechanical Engineering

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## Table of Contents

|   |    |
|---|----|
| 1. Introduction.....  | 5  |
| 2. Overview of the current logistics system for package delivery..... | 5  |
| 2.1. Clarification of terms.....                                      | 5  |
| 2.2. FTL, LTL, and Parcel shipping.....                               | 6  |
| 2.3. Global to Local shipping – How does it work?.....                | 7  |
| 2.3.1. Pricing.....   | 7  |
| 2.3.2. Key data needed for each package.....                          | 8  |
| 2.3.3. Information system.....  | 8  |
| 2.3.4. Hub and spoke system.....                                      | 9  |
| 3. Landscape of the transportation and trucking industries.....       | 9  |
| 4. Third party logistics providers.....                               | 12 |
| 4.1. Non-Asset based 3PL.....   | 13 |
| 4.2. Fourth party logistics providers.....                            | 15 |
| 5. Collaboration and back hauling.....                                | 15 |
| 6. Business Model: Overview of the business opportunity.....          | 17 |
| 7. What is the service?.....  | 18 |
| 8. Market.....  | 20 |
| 8.1. Market opportunity.....  | 20 |
| 8.2. Customer analysis.....   | 20 |
| 8.3. Competitive analysis.....  | 22 |
| 9. Services and system.....   | 22 |
| 9.1. Information system.....  | 22 |
| 9.2. Website.....   | 23 |
| 9.3. The shipping logistics.....                                      | 24 |
| 9.4. Infrastructure.....  | 25 |
| 9.5. Residential to residential.....                                  | 25 |
| 10. Strategy.....   | 26 |
| 11. Development.....  | 27 |
| 12. Financials.....   | 28 |
| 13. Obstacles.....  | 28 |
| 14. Conclusions: Plausibility.....                                    | 30 |
| References.....   | 31 |

## **1. Introduction**

There are many ways to move a package across the country. You can pay a high price to get the package to its destination in one day or pay a low price to send the package at a slow speed, at which it will reach its destination in up to two weeks. Behind the simple act of shipping a box is a very complex network of trucks, warehouses, stores, companies, and consultants: all of which are responsible for transporting billions of tons of goods around the country and around the world.

This thesis will specifically examine the system of Less-than-Truckload (LTL) and Full-Truckload (FTL) shipping in the United States. It will then research the possibility of creating a business that would build on the question, “How can we use the internet to catalog and distribute empty space on moving vehicles?” The proposed business would sell the empty space in LTL vehicles, as well as in personal vehicles, to users in need of transporting small shipments. It will research the potential market for the company, evaluate different approaches towards the most efficient utilization of the US shipping system, and investigate the plausibility of the business model. Lastly, it will propose that many of the resources needed to begin and sustain this non-asset based system already exist, and the model is plausible with certain conditions.

## **2. Overview of the current logistics system for package delivery**

### **2.1 Clarification of terms**

A parcel is typically a package that is less than 150 pounds, while freight consists of packages over 150 pounds (“Less”). A “carrier” is the company or person doing the transportation service. The “shipper” is the company or person wishing to transport parcels or freight.

## **2.2 FTL, LTL, and Parcel shipping**

A parcel carrier only transports shipments under 150 pounds, either in the form of packages or freight broken down into smaller pieces. Parcel carriers, as well as LTL carriers, operate with a “hub-and-spoke” network. (Hribernik)

Full-truckload carriers often contract an entire trailer load to one company that is shipping homogenous cargo in pallets. The cargo is either picked up at the company or at a warehouse. This truck will travel directly from the point of departure to the destination, and the cargo is not usually handled in between. Some carriers specialize in a certain kind of freight due to the equipment needed, regulations, or insurance. Examples include perishable items needing refrigeration or hazardous items that cannot be mixed with other cargo (“Less”).

Less-than-truckload carriers typically do mix cargo from several companies, preferably packed in shrink-wrapped pallets, in trailers. Cargo is often handled during the journey as it may be moved between trucks to consolidate freight and optimize routes. There is typically a truck that performs freight drop offs in the morning and pick-ups in the afternoon. The picked up items are taken to a central warehouse (a “hub”), inspected, sorted, labeled, and then sent outbound. It is during this sorting that paperwork is filled out and invoices can be sent to the shipper. Transit time for freight is longer than for FTL because it is not just moving from point A to point B, but rather will make several stops along the way, depending on the carrier’s network of trucks and warehouses. However, LTL shipping is much cheaper than FTL shipping, and it can include special services, such as residential pickup or drop-off (“Less”). LTL shipping is also significantly cheaper than parcel shipping, which helps LTL carriers remain competitive for transporting larger packages.

## **2.3 Global to local shipping – How does it work?**

Freight for LTL and FTL shipping must be properly prepared so that it will be protected from damage by rough handling, bouncing, stacking, and moisture. Freight is typically packed into corrugated board boxes or crates. This not only protects the cargo but also helps keep all parts of the shipment together (“Less”).

### **2.3.1 Pricing**

Pricing schemes differ from company to company and can become very complicated. One way to get a good sense for the factors that affect pricing is to observe the inputs of the pricing model for a parcel being shipped by the United Parcel Service, better known as UPS. The final price of shipping the parcel is based on its distance to travel (often determined by “zones”), its weight, its dimensions, whether it was packed by store or customer, the day of the week it is being sent out, its declared value (particularly if it is over a \$100 value), and the day it needs to be delivered. Other add-on services that increase the price are the ability to track the package, delivery notification, and insurance (Farnsworth).

For freight being shipped by UPS, the price is based on the distance to travel (this may include border crossing fees), the number of packages in the shipment, the package type (whether a pallet, carton, box, roll, or a crate), the dimensions, and the description of goods. Extra fees may be added if the shipment contains freight of an excess value, fuel costs (which are based on the Department of Energy price index from the day before), or if the carrier determines that the package does not conform to normal freight. Other chargeable services that may be included in the price are having a lift gate at pickup, a lift gate at the drop-off, inside delivery, and residential pick-up or delivery (Farnsworth).

An important determinant of cost for shipping freight by LTL is the National Motor Freight Classification. This classification system includes 18 classes that are based on density (weight for its size), stowability (ex. if the shipment has unusual dimensions), handling, and liability. The higher the classification, the higher the price is to ship. It is difficult to determine the exact classification of a shipment, and companies often rely on freight brokers and other experts to help determine a shipment's classification. ("Help")

### **2.3.2 Key data needed for each package**

The parcel and freight carriers will report daily, and sometime hourly, data on their fleets of trucks and their contents. Thus, carriers know at almost any time the location and destination of a shipment, the number of parcels in the shipment, and the total weight of the shipment (Hribernik). For an individual parcel, the important data that is tracked includes its destination state and zip code, its tracking number (if applicable), and the Carrier Code (2 to 4 letter code) for the carrier ("Less").

### **2.3.3 Information system**

Companies have internal continually-updating databases to track all of their packages. Some of the databases used by smaller companies are updated by hand. Large companies use bar codes and handheld barcode readers to track their packages. When each package is scanned, the information automatically updates to the network. The packages are scanned at each stop at a hub, which indicates where the package should go next, and when the package will reach its final destination.

Companies that ship large amounts of goods, such as an electronics distributor or a soft drink manufacturer, report upcoming parcel data to their trucking partners regularly, which allows



managers at the headquarters of the trucking company to project the capacity of their trucking network, as well as identify underutilized areas in the network (Hribernik).

#### **2.3.4 Hub and Spoke**

The hub-and-spoke system, which is so critical to the success of today's shipping industry, was developed for the shipping industry by FedEx in the 1970's. At the time, the hub-and-spoke system was considered a very important advance in logistics science ("FedEx"). Under this system, LTL and parcel carriers employ a small fleet of trucks to pick up packages and take them to the nearest local hub. Here, each package is checked in, weighed, processed into the system, and checked for the security of its packing. The packages are then sent to the regional hub that is closest to the final destination. In between, the packages may transfer between trucks in order to optimize the route. From the regional hub, they are sent on trucks to a local hub, and then are delivered to the final destination. These packages are handled many times, unlike FTL packages (Murray).

### **3. Landscape of the transportation and trucking industries**

The total transportation industry is estimated as having a value of about \$255 billion. Trucks deliver 70% of the freight that is shipped in the U.S. each year. The industry employs 8.9 million people, including 3.5 million truck drivers. It utilizes 15.5 million trucks, including 2 million which are tractor trailers. There are over 500,000 trucking companies and in 2006, 433 billion miles were logged ("Trucking")! The transportation and logistics industry is enormous, and it is also critical to the success of U.S. business.

The transportation industry, like most other industries, was very affected by the downturn in the economy in 2008. Although people and companies shipped fewer packages, carriers maintained

the same amount of infrastructure, which means less profit. The volatile nature of gas prices and the overall increase in gas prices have also had a large effect on the industry. The LTL industry's revenue was down 24.4% in 2009 due to the recession (Cassidy), which suggests that carriers may be motivated to collaborate to cut costs while the economy continues to recover.

The undisputable giants of parcel carrying are the United Parcel Service, Inc. (UPS) and the FedEx Corporation. UPS was started in the early 1900's to compete with the United States Postal Service (USPS), and FedEx was started in the early 1970s. The focus of both companies has been on the residential shipper, as well as the business shipper who needed to send documents and small packages. While the USPS still has a superior network for delivering envelopes to any residence in the country, UPS and FedEx have more competitive pricing for packages over 4 pounds (Farnsworth). UPS and FedEx, in addition to revolutionizing the logistics industry, are considered to be extremely innovative for creating the large and complex information system that allows for "track and trace" capabilities. Lately, more small local companies have come to compete with UPS and FedEx. These local carriers combine track and trace capabilities with faster delivery due to a more localized fleet, plus lower prices ("Package"). As a result, both of these parcel giants have expanded into LTL and FTL shipping, in an attempt to cover every area of the shipping industry. For example, the front of a UPS Store pamphlet for freight service says, "We can ship it. No matter what size it is," and includes pictures of home goods. UPS offers to palletize and shrink wrap any large items like furniture or even a car. These companies have the name brand recognition for quality that is needed to break into the competitive LTL and FTL industries.

There are many regional LTL carriers. These companies employ a hub-and-spoke system, similar to parcel carriers. There are even more small FTL companies than LTL companies. These

carriers typically have small fleets. Additionally, there are many companies that offer both LTL and FTL carrying, and have a larger fleet of trucks to accomplish this purpose. The companies which offer both services may be utilizing their own fleets for transportation, or they might be collaborating with another company in order to utilize a larger fleet over a larger area (“Less”). A national carrier, such as R+L Carriers or Carroll Fulmer Logistics, may offer LTL with expedited service as well as FTL. All of these services have multiple levels of timeliness and insurance, as well as temperature controlled, flatbed, and more service options available. They can ship trans-border anywhere in North America, and they can ship inter-modally if this is more efficient.

Sometimes, an LTL carrier will partner with an FTL carrier in order to make long trips, such as a coast-to-coast journey, especially if the distance goes beyond the LTL carrier’s network of warehouses. Similarly, a parcel carrier will partner with an LTL carrier to make deliveries outside of the parcel carrier’s “zones.” The parcel carrier will enter their packages into the LTL carrier’s system, and then utilize their own network in the “last mile,” meaning the last leg of the journey. This may work in the reverse sense as well, if an LTL carrier would like to take advantage of a parcel carrier’s extensive local fleet and network. There are even companies called “package shipping consolidators” who are combining USPS’s access to residential delivery with private shipping capabilities such as visible tracking. These consolidators create a “workshare agreement” between themselves and the LTL carrier, as well as between themselves and USPS (“Package”).

Other players in the transportation industry include moving companies (essentially FTL carriers), airline carriers, rail carriers, and ocean carriers. Sometimes LTL or FTL carriers will utilize air,

rail, or ocean for parts of the shipment's journey ("Less"). There are endless combinations of ways for a shipment to get from one place to another.

#### **4. Third-Party logistics providers**

If a carrier company becomes more involved with one of their customer's supply chains, they might take on a consulting role to help the customer find the best combination of transportation services to suit their needs. This would make them an example of a third-party logistics provider (or a 3PL). The Council of Supply Chain Management Professional's (CSCMP) "Supply Chain Management Terms and Glossary" gives the following definition of a Third-Party Logistics provider:

A firm which provides multiple logistics services for use by customers. Preferably, these services are integrated, or "bundled" together by the provider. These firms facilitate the movement of parts and materials from suppliers to manufacturers, and finished products from manufacturers to distributors and retailers. Among the services which they provide are transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding. (186)

A 3PL will often utilize their own network of trucks and warehouses to transport their clients' goods, as well as build relationships with carriers to fulfill other transportation services. A company like this is an *asset-based* 3PL.

There are new specialty asset-based 3PL's that focus on a particular consumer. For example, a new company called Streamlite has been created specifically to cater to online shippers serving the consumer market. Streamlite calls itself a "national business-to-consumer lightweight package delivery company" (lightweight indicating less than 5 pounds) that utilizes its 20

warehouses across the country and the USPS to achieve “low cost, time-defined delivery – guaranteed” (“The Streamlite”). Packages pass through the warehouses (called distribution centers or DC’s) by contracted carriers, are scanned at every stage, and then put into the USPS system for the “last mile.” Its “asset-light” model helps to keep delivery costs low.

(“Lightweight”). They seem to acknowledge their core competencies as their scanning and info system, customized solutions, and customer service. It is interesting that they apparently have tracking capabilities even when the USPS is involved, so it is possible to maintain scanning capabilities even when other parties are handling packages.

#### **4.1 Non-asset based 3PL**

A fairly new business model is the *non-asset based* third-party logistics provider. These companies do not have trucks or warehouses. Instead, they provide the information technology, tracking, freight brokerage, and consultation that a client needs to make their supply chain more efficient. In some ways, these companies are similar to freight brokers, but they are more involved with their customer and the transportation logistics. The companies are often comprised of transportation experts who promise to increase efficiency and reduce costs.

Non-asset based 3PLs are able to use any company’s warehouses, distribution centers, and trucks, as long as they have strong relationships with these companies. In addition to keeping costs low, this non-asset based model allows them to have enormous flexibility adapting this network to each customer’s needs. One negative aspect of the business model is that these 3PL’s and their costs fall under the influence of fluctuations in the market more than an asset-based 3PL. For example, in a period of tight capacity constraints, a 3PL’s transportation costs could rise. A top 3PL can develop the best plans and contracts for their clients, utilize a customer’s

existing logistics infrastructure to deliver the most efficient service, and manage effective relationships with their partners to keep costs down. (“When Outsourcing”)

The most advanced 3PL’s customize their operations for each customer. Some examples of these are C.H. Robinson, WS Logistics, Procurus, JSI Logistics, and Business Logistics. A top organization in the transportation industry, C.H. Robinson claims to combine experts who have years of experience in the transportation business with in-house software tools to analyze data and model supply chain. They will also broker all types of shipping, including parcels. Another example of a non-asset based 3PL is CEVA Logistics. CEVA provides a client with the logistics software and solutions, managing warehouses or entire supply chains, and data analysis.

Freight brokers are a type of 3PL that are typically less involved with the complete supply chain. Transportation companies provide the service of shopping for space for clients, and negotiate the best price. They can also assist in navigating the complicated freight classification system. For example, a person wants to move a car across country, so the company will “shop” this project to their network of transportation and trucking companies to find someone who has the availability to help you. They then come back to you with a quote for the shipment (Todd). Brokers can often obtain 50% to 80% better prices than if a company contacted a carrier directly (“Cargo”). Large freight companies have in-house brokers for freight, air cargo, and so forth, but the job is very difficult. These brokers coordinate many shipments, but every pallet has a special requirement, so it is difficult to consolidate and coordinate due to time and delivery issues. More and more companies are relying on software to assist them in optimizing loading and consolidation. A broker will use phone and personal contacts, as well as websites, to find a carrier. Some websites, such as [Internettruckstop.com](http://Internettruckstop.com) and [Transcorefreightsolutions.com](http://Transcorefreightsolutions.com) use a bulletin board format in which a shipper can list their truck needs and a trucker can list his availability (Giese).

## **4.2 Fourth party logistics providers**

Fourth party logistics provider (4PL) is a term that was coined by Accenture in 1996, and was defined as “a supply chain integrator that assembles and manages the resources, capabilities, and technology of its own organization with those of complementary service providers to deliver a comprehensive supply chain solution” (“Supply” 84). The CSCMP Glossary gives the following information:

Differs from third party logistics in the following ways; 1) 4PL organization is often a separate entity established as a joint venture or long-term contract between a primary client and one or more partners; 2) 4PL organization acts as a single interface between the client and multiple logistics service providers; 3) All aspects (ideally) of the client’s supply chain are managed by the 4PL organization; and, 4) It is possible for a major third-party logistics provider to form a 4PL organization within its existing structure. (84)

These types of companies are essentially consultants who analyze all transportation options for a client and make an unbiased recommendation. They have no assets and their core competencies are their expertise and their IT capabilities, such as systems and software. Some of these consulting firms that specialize in logistics and transportation are Source Consulting, the BMT Group, Parsons Brinkerhoff, and MVA Consulting in Europe and Asia. Even major consulting companies, like Bain, offer logistics consulting (Todd).

## **5. Collaboration and back-hauling**

Carriers are always trying to cut costs and increase revenue. Sometimes the best way to achieve this is to collaborate with other carriers. There is a professor at the University of Tennessee, John Langley, who has done research in the area of logistics collaboration. He notes in his 2010 3PL

Study that consumer goods companies are interested in sharing transportation and warehousing costs, and it may depend on 3PL's to facilitate this. He states: "68% of shipper respondents and 80% of 3PL's expressed interest in ... collaborating with other companies, even competitors, to achieve logistics cost and service improvements" (9) He also notes that carriers are hesitant to share data and information which makes collaboration and cost analysis difficult (2).

An example of the collaboration that often takes place is "back-hauling." When a carrier transports freight to a destination, they will lose potential revenue if the truck is driven back empty. Back-hauling involves finding a customer who needs freight moved back to the original location. Carriers trying to back-haul may collaborate with another carrier to find cargo. For example, if a truck owner in Boston is planning to send cargo to Philadelphia, he may choose to collaborate on a regular basis with a trucking company in Philadelphia, who regularly sends product to Boston (Giese). There are bulletin board style websites that assist carriers in this task, such as Hotshotcarrier.com. Another of these sites, 123Loadboard.com, calls itself a "freight matching service," and explains that the company "[helps] carriers, brokers and shippers excel in the trucking industry [by providing] all members with real-time information about loads and trucks throughout North America." The CSCMP can also assist companies looking for partners to share logistics work. They help create informal networks for backhauling among independent freight brokers.



# Business Model

The second part of this thesis will present a business idea and model in a form similar to a business proposal.

## 6. Overview of the business opportunity

As shown already, there are countless options for shipping a package across the country. There are a range of transportation modes and prices. As is the case with most service industries, affordability varies with quality of service as seen in Figure 1.

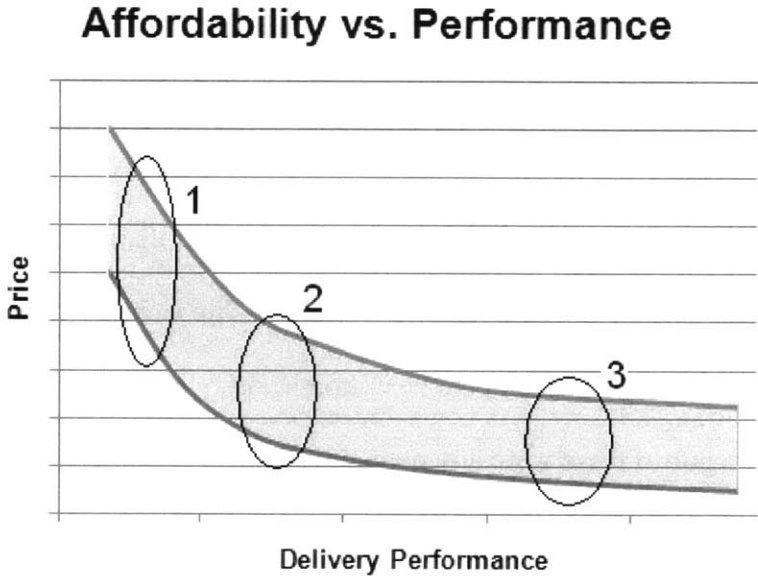


Figure 1

Generally, the price to ship a package skyrockets when the demand for service is high (zone 1), meaning moving that package in a day or two. Very low costs are found when demand for service is low (zone 3), and the box moves slowly to its destination. This company will focus on zone 2: reasonable service with lower costs. One way this will be achieved is by taking

advantage of the low prices of LTL carriers and avoiding the high prices of parcel carriers. We will examine below different ways customers (both residential and small business) can access the LTL carrier networks. In addition we will explore another alternative which avoids commercial LTL networks: connecting traveling residents with residents looking to ship a package.

## **7. What is the service?**

Our service potentially has many aspects. Firstly, we would serve the residential shipper who desired to send a parcel, like a book in a small box, to a particular destination. This shipper could log onto our website to find an inexpensive alternative to ship this parcel. The first, and cheapest, option would be to search for another resident who happened to be traveling from the shipper's general location to the shipper's desired destination. Our website would offer individuals the ability to register their vehicles and their travel plans. The website would be sortable by destination and parcel size. For example, the shipper could enter their desired parcel size, shipping target and time frame into the website. "I need to ship a chair with the following dimensions to Los Angeles sometime in the next month and I, the shipper, am in San Francisco." The site would then report if there were any potential shippers in San Francisco going to Los Angeles with available vehicle space suitable to meet the shipper's needs. The potential shipper could be an individual who traveled frequently for personal reasons with a half empty van between SF and Los Angeles. The website would include a standard rate sheet explaining the price as a function of weight, dimension and distance. It would also provide a response function so the shipper and carrier could make contact.

The website could also offer the customer an LTL option. The website would link with available LTL carrier's data and allow potential residential shippers to search for a LTL carrier with a

shipping schedule that matched the desired beginning and end locations of the shipper's package. For either alternative, the shipper would choose any option that best fits his or her needs concerning price, time to deliver, drop-off convenience, and insurance of delivery. From there, the website would facilitate the transaction between the shipper and carrier, as well as provide instructions for where to bring the package for pickup if necessary. If the shipper chose the LTL option, he or she would then print out a unique label to attach to the package. Next, either the package would be picked up from the shipper's residence by the LTL shipper or individual shipper, or the shipper would take the package to a specified drop-off location. The package would then make its way to the final destination.

Secondly, this business could serve the very small businesses and startups that are looking for ways to save on shipping, but are not large enough to outsource their shipping logistics, or even to form a relationship with an LTL carrier. The website would act as a "parcel broker" to find the best option to suit their needs.

Parcel and LTL carrying are not typically mixed. However, their transportation networks and systems are very similar, and with enough collaboration, it may be possible to facilitate this approach. Because of the mixing of LTL and parcel carrying, carriers will be able to create full truckloads, and generate revenue where they were not previously. Additionally, the website might allow for more collaboration among the carriers themselves, and help them to expand their own logistics networks. At its core, this business would connect residents and small business owners with low-cost shipping needs to other traveling residents and LTL carriers, and it would set up an entire business deal and transaction from start to finish.

## **8. Market**

### **8.1 Market opportunity**

The prevalence of online shopping and business-to-consumer (b2c) commerce, a growing \$7 billion industry, has greatly increased demand for cheap shipping options to get parcels to residents (“Lightweight”). However, our target will be consumer-to-consumer residential shipments and small business-to-consumer shipments.

### **8.2 Customer analysis**

The first target market group would be the residential parcel shipper in the U.S. Nearly everyone ships or receives a package at some point. These customers may need to ship a parcel-sized, low-value package, and will sacrifice speed slightly (no need for it to get there overnight) for a low price. Or, these same residents may have a large item – a chair or a painting – that they need to ship across the country. Shipping this by a traditional carrier, if even possible, would be very expensive, and they may feel intimidated by contacting an LTL carrier or freight broker directly. These shippers may only have the need for our service on an occasional basis. They could use the website for all of their small and large shipment needs if they had a satisfactory experience previously. In return, these users might decide to sign up as a residential carrier themselves and transport others’ parcels when they were traveling.

The second target market group would be small business owners. This user may have begun a jewelry making or specialty cooking baking business. They made their own website and have been filling online orders by hand. Traditionally, they would primarily look to UPS or FedEx to safely transport these packages to new customers of their own. Perhaps the start-up business has grown, and it requires them to send or receive many more or larger shipments. If their shipments are parcel sized, but they do not want to pay the high prices of UPS or FedEx, they would use

our website to look for cheaper shipping alternatives, including leveraging individuals traveling to target locations. If they have the need to ship large items but are not sure how to find the best LTL shipper, they could leverage our website to find an LTL carrier to meet their cost and service needs.

Finally, the business would be targeting the carriers by creating a network of competitive carriers who see cooperation as a way to maximize their business volume. Strong relations with carriers and their willingness to collaborate is essential to the viability of this business. Our company must have something to offer them in exchange. This company would offer value to the carriers by potentially filling up any empty space that LTL and private parcel companies have in their trucks, which will generate extra revenue without any cost and only have minimal impact on their transportation systems. For example, a delivery company may make a regular delivery run from San Francisco to Los Angeles but with irregular shipments. Some days the trucks are full and on other days they are half empty. Because of the irregularity, the company cannot make a commitment to another business for their available space. However, on a day by day or week by week basis the company would be interested in knowing if there are individuals who have a product to ship going to the same city. Also, the proposed company would have the potential to help match small, local, private parcel carriers to new customers.

The transportation industry was greatly affected by the 2008 financial crisis and is still struggling to recover. These companies are looking for any way to increase revenue without increasing cost very much. Additionally, many carriers are looking for ways to collaborate with others in order to minimize their costs. Our website could be utilized to assist in these collaborations, and help carriers maximize their transportation networks.

### **8.3 Competitive analysis**

In the first part of this paper, we discussed at length the other players in the shipping game. Of course, the giants of parcel carrying are UPS and FedEx. These companies have enormous infrastructure networks and complex, finely-tuned, and constantly updating information systems. They also charge high prices to move parcels quickly. With a powerful information and tracking system, our business could utilize the already giant (but fragmented) LTL shipping infrastructure in place in the U.S. to create a similar network and charge lower prices to ship parcels and freight. We will not be utilizing FTL shipping because infringing on the private contract with a single customer is not a suitable for this proposal.

There also exists indirect competition with the US Postal Service. The USPS has the most competitive prices for envelopes and packages under 4 pounds. We would hope that customers will value our tracking services and the accessibility of the website. However, we recognize that our service will be more competitive for larger packages.

## **9. Services and systems**

### **9.1 Information system**

The most important part of the entire operation would be the constantly-updating database with live reporting. It would need to contain real-time data from multiple carriers on truck locations, routes, stops, and capacities. It would then need to receive from these carriers the data on the location of the trucks and packages, so that the shipper could see where his or her package was at any point in time. The best option for tracking is providing a barcode that could be universally read by carriers. Further, this system would need to integrate information from many companies

together into one system and be able to send and receive data to and from these other systems. It would take some time to collect data, develop, and perfect this information system.

## **9.2 Website**

It would be essential to have a sleek and easy to use website in order to attract shippers to our business. If a user wanted to ship a package, he or she would first enter the package's weight, destination, and other essential information. Next, the customer would be presented with shipping options that will differ between a residential traveler or a carrier, price, drop-off location (how far am I willing to drive to leave this package at a warehouse?), drop-off time (does this truck leave by 5pm?), and the traveler or trucking company rating for reliability (rated by previous users for satisfaction). The website could potentially generate a UPS and FedEx price comparison by using those companies' online calculators (similar to how Kayak compares travel prices to those on Expedia and Priceline). Once the user chooses the best option, he or she would be able to complete the credit card transaction with the carrier online.

The proposed company will have a similar interaction between shippers and carriers as Amazon Marketplace currently has between buyers and merchants today. On Amazon Marketplace, any person or business can create an account on the Amazon website, set their price, and sell their goods. If a buyer makes a purchase of the merchant's goods, Amazon notifies them where to ship their items. The merchant then receives a payment from Amazon ("Selling"). In the case of our proposed company, a credit card transaction through the website is necessary for both the resident-to-resident arrangement, and the resident-to-carrier arrangement. Having the website handle the financial transaction keeps interactions fair and insured.

If the user chose to ship with an actual carrier, he or she would print out a shipping label with a unique barcode and would also receive a tracking number.

### **9.3 The shipping logistics**

Once the shipper has attached the provided label to the properly packed cargo, he or she will drop it off at the agreed upon location. If the shipper is using a residential traveler, the agreement might have included dropping off the parcel at a residence or place of business, or even the traveler stopping by the shipper's residence. The agreement most likely will include a face-to-face interaction. If the shipper is using a carrier, the agreement likely includes the shipper bringing the parcel to a designated warehouse, or possibly residential pickup. Because of the attached barcode, the package can be properly grouped with other items making the same journey. This drop-off will need to occur within the specific time window that was specified on the website agreement, and may need to occur within the same day as the website transaction. In the case of packages traveling by LTL carrier, at the pickup, drop-off, and any transfers in between, the barcode on the package will be scanned to track its progress. The package may follow a route with several truck changeovers at hubs. The user will be able to see this progress online with the tracking number. The package will continue on its journey until either it reaches its residential drop-off or is left at a final warehouse destination. If its final location is a warehouse, an email will be sent to the shipper that it has arrived, and another email is sent to the receiver that it is ready for pickup.

When the shipper has put the package into the hands of a residential traveler, there is trust that it will get to the correct location, and there is direct email contact between the shipper and the carrier to confirm this. When it is dropped off at the correct location, the traveler can send an email and possibly a picture (both by mobile device) to the shipper to confirm that it has reached



its final location. The website can also provide an option for the shipper to purchase a low cost insurance policy to insure the package, and the website can also offer ratings by other shippers who have used a specific individual before. An insurance and rating system are described further below.

#### **9.4 Infrastructure**

The best way to start this company would be as a non-asset based organization, as described previously. This would allow for very little startup costs. It would, however, require the company to have very strong relationships with carriers and warehouse owners. If the company was successful, it could possibly invest in assets such as warehouses and trucks to coordinate residential pickups, or to consolidate packages from several warehouses to one. If the non-asset based system was successful, there might not be any need to expand into asset-based territory.

#### **9.5 Residential to residential**

An obvious problem with the residential traveler system of shipping is security and a guarantee that the package will be delivered successfully. Options for addressing the security issue can be observed in the “crowd-sourcing” models of eBay’s half.com, Amazon Marketplace, and DoMyStuff.com, in which users post chores with a payment offering, and locals bid to complete the chores. The “Do My Stuff” tagline is “Outsource your Life.” These models suggest that this resident-to-resident payment system can work successfully. Important aspects for these models’ successes are having a third party facilitate payment and publishing feedback between the buyers and sellers. For our residential traveler system, we would also facilitate the payment on the website and implement a rating and feedback system so that shippers could see what previous shippers said about the traveler’s carrying services. In addition, links to third party insurance policies could be offered on the website. Shippers would use this option for low-value packages.

## 10. Strategy

We will begin with a classic Strengths/Weaknesses/Opportunities/Threats (SWOT) analysis, which is summarized in Figure 2 below.

|   |   |
|---|---|
| <p style="text-align: center;"><b>Strengths</b></p> <ul style="list-style-type: none"><li>• Reasonable service at low cost</li><li>• Appealing to carriers' desire to increase revenues in difficult economy</li><li>• Facilitating transactions</li></ul>      | <p style="text-align: center;"><b>Weaknesses</b></p> <ul style="list-style-type: none"><li>• Lack of transportation industry expertise</li><li>• Lack of professional relationships with carriers</li><li>• Security and insurance for packages</li></ul>         |
| <p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"><li>• Rapidly developing "b2c" market</li><li>• Several markets – residential, commercial, carriers</li><li>• Helping carriers to expand their own networks</li></ul> | <p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"><li>• Lack of desire from carriers to collaborate</li><li>• Unable to access real time carrier data</li><li>• Lack of capacity</li><li>• Complex shipping schedules</li></ul> |

**Figure 2**

Our company is filling a niche to provide low-cost shipping within a reasonable transportation time. Our company offers services to several markets, including your everyday residential shippers and small business owners. One distinguishing aspect of this company would be the facilitation of transactions between residential shippers and LTL.

Because the collaboration of carriers in a network is essential to the company, there must be incentives for the carriers. They will be able to generate extra revenue at almost no cost, which is hard to turn down in tough economic times. Also, the company's network would help the carriers

to expand their own networks to cut cost and increase efficiency. Another consequence of the need for strong relationships with carriers who are willing to collaborate is the need for very strong transportation industry expertise within the company. A lack of this expertise in all areas of the industry would be a potential weakness. Additionally, strong industry experience will be needed to analyze the complex shipping networks and schedules, and help to create an intelligent information system. One additional weakness is the dependence of these schedules on seasonality and the holiday season. Capacity fluctuates a great deal, and there is not always room for LTL carriers to carry extra parcels.

## **11. Development**

This company idea would need to be brought to fruition by an expert in transportation with many years of industry experience. This person could begin by generating awareness among carriers in his or her personal network. The expert would gauge the interest of the carriers in collaborating and sharing data. If there was some interest by at least one carrier, research would have to be done into the carrier's data to see if a collaborative information system was possible. The next step would be to hire a web developer and a software developer to begin work on the company website and complex information system. Once these systems were mostly in place, the company could begin to run the website in collaboration with one or two carriers. This would allow for testing the entire resident to carrier interaction and would be very informative towards future development of the information technologies. At this level, a lot of the route analysis and route matching could be done by hand, similar the function of current 3PLs, before the systems were perfected.

Future hiring could include a sales manager to continue to build relationships with carriers and warehouse managers. As the website and database improved, more carriers could be added to the network. If the concept proved successful, additional services could be created to leverage underutilized capacity in the rail and air networks.

## **12. Financials**

Since this business model is primarily a non-asset based system, startup costs would revolve around web development, sales and marketing. Revenue would be generated by collecting a portion of the payment between the shipper and carrier. The carrier or traveler sets the price of their service, and we would collect a small percentage of that price. Revenue would also be generated from advertising from trucking companies and others on the website. A detailed financial analysis is beyond the scope of this thesis.

## **13. Obstacles**

There are several obstacles to seeing this business model as a reality. Firstly, there is the seasonality of cargo transportation. Capacity in trucks for additional packages has large fluctuations. For some months, there are many trucks (of all sizes and cargo type) that have empty space. In other months, particularly around the holidays, trucks are packed and delivery schedules are tight as people ship gifts around the world, and companies push to manufacture high volumes of goods (Dunn).

Secondly, there is the time sensitivity of shipping schedules. Every truck is working on a very tight time delivery schedule. Even if the truck is only half full, there might not be time to make extra stops at warehouses or residences to pick up or drop off packages. Another factor is the

government mandated shipping regulation and laws. For example: a truck load carrying any food or medical products, such as baby formula, would not be allowed to pick up a package that contained any hazardous or poisonous materials. There are also pricing laws such that interstate freight shipping rates are mandated by the government, but not intrastate (Farnsworth). This could create a potential problem when trying to offer very low prices to users. A web system to coordinate loads would have to have the intelligence to monitor these co-mingling and pricing complications.

A serious obstacle that was already discussed in part is the security of packages. In addition to security issues involved with the residential traveler, there are similar issues with the LTL and parcel carriers. How can the company guarantee that the goods will not be damaged? In the case of a network of LTL carriers the insurance qualifications of each carrier would be available on the site. In the case of networks of individual shippers, third party insurance could be offered on the website.

Creating the information system would be the biggest challenge. There would be a huge amount of data to organize, coordinate, and utilize. Carriers would have to be willing to share some or all of their data, but carriers are often not willing to do so. Even if we had access to the data of a few carriers, the system would have to compile the data together in a useful way. It would have to search through that data to find routes and trucks that matched the shipper's criteria. And all of this data would be updating constantly.

Additionally, it may be difficult for the carriers to integrate the packages into their own systems. Carriers may be concerned about mixing commercial shipments with small residential shipments. This will add to the difficulty of finding carriers with which to collaborate because they may not

want residential packages mixing with their customer's freight, despite the cost advantage.

Interview data suggest a conclusion, that in spite of their concerns, carriers may be interested in mixing shipments if there is sufficient financial incentive.

#### **14. Conclusions: Plausibility**

Is this non-asset web based shipping company plausible? The answer is potentially yes. This company would essentially be acting as a 3PL with many different customers who all have small shipments. It would require extremely strong relationships with carriers that would only be possible by someone who has been in the industry for a long time. However, as noted, substantial obstacles remain which might make this company not feasible. To be successful the company would have to have numerous electronic links to complex shipping and pricing information. Given the complexity involved, the best option may be for an existing 3PL to start this business as an extension of their current operations.

We have seen that the national LTL and parcel shipping networks have open capacity, especially at particular times of the year. There is a financial advantage to the carriers to maximize their capacity at all times and our company could assist in this endeavor. Collaboration already takes place in the shipping industry and the web links already exist to facilitate this. We have also seen new examples of integrating consumers into web based transactions. Moreover we have seen that the information systems exist to centralize shipping information for numerous trucks and carriers. Investment will need to be made into intelligent systems to integrate state and federal shipping regulations, hazardous materials information, shipping schedules, etc. into a complex system which can successfully align potential shipping partners.

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