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**AN INDUSTRY IN TRANSITION:  
THIRD PARTY LOGISTICS IN THE INFORMATION AGE**

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## **AN INDUSTRY IN TRANSITION: THIRD PARTY LOGISTICS IN THE INFORMATION AGE**

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### **Abstract**

The third party logistics industry in the US and world wide is currently undergoing a rapid transition. The main drivers of these changes are advances in information and communications technologies, the development of on-line freight markeplaces and the emergence worldwide of the so called "e-tailers or dot-coms". The advances in IT make possible many new strategies and enable integration of supply chains. In addition, the new internet-enabled companies are setting up shop quickly and in some cases outsourcing all of their logistics and transportation functions, increasing the need for both logistics services and a wide variety of new product offerings. In this paper we provide a characterization of the industry and discuss past practice and future research opportunities.

**Key Words:** Supply chain management, Third Party Logistics, 3PL, e-commerce, Information Technology

## Introduction

The third party logistics industry in the US and world wide is currently undergoing a rapid transition. The main drivers of these changes are advances in information and communications technologies, the development of on-line freight marketplaces and the emergence worldwide of the so called "e-tailers or dot-coms". The advances in IT make possible many new strategies and enable integration of supply chains. In addition, the new internet enabled companies are setting up shop quickly and in some cases outsourcing all of their logistics and transportation functions, increasing the need for both logistics services and a wide variety of new product offerings. In the past, third party logistics providers (3PLs) were classified as asset or non-asset owning (Sheffi, 1990). Now many new types of companies are emerging. Some of these are developing on-line freight marketplaces or bulletin boards for posting available loads or equipment. Others are mainly ASP's (application service providers) who are developing and deploying software tools aimed at web-enabling the logistics industry. Many of these are developing private and semi private freight marketplaces for major shippers, carriers and 3PLs. Still others are "infomediaries", providing information to the freight transportation and logistics industry.

In this review paper we examine the current state of the industry from the point of view of shippers, carriers and 3PLs. We discuss the current state of the art in ASP development and deployment as well as the various types of companies emerging in the marketplace. Finally we discuss some research problems and issues that may emerge as important in the near term and we make some predictions about the future of the 3PL industry.

The paper is organized in the following way. After this introduction, the second section reviews literature related to analysis of the 3PL industry (A more general review of research on carrier and shipper behavior modeling, including the third party logistics industry, is presented in Regan and Garrido, 2000). That is followed by a section on the history of the development of the industry and one that discusses the current state of the industry. Then, we discuss important questions for researchers in this area and present our predictions about the future. We end with some concluding remarks. Though primarily a *resource* paper rather than a *research* paper, we attempt to present a snapshot of the industry during this time of rapid change.

## Background

There has been considerable interest worldwide in last few years in the growth of third party logistics providers. These firms typically provide some of the following services: warehousing operations, freight payments and auditing, carrier selection and rate negotiations. In addition, these firms may develop information systems and manage inventory and customer order fulfillment (Boyson *et al*, 1999). The rapid growth of global markets has been followed by the birth of strategic channel intermediaries, such as foreign freight forwarders, non-vessel-owning common carriers, trading management

companies, customs house brokers, export packers and port operators. Several recent studies have addressed the issue of growth in the 3PL market in detail. A study by Murphy and Poist (1998) provides a review and synthesis of research on this topic. They define third party logistics (3PL) services in the following way:

"a relationship between a shipper and third party which, compared with basic services, has more customized offerings, encompasses a broader number of service functions and is characterized by a longer-term, more mutually beneficial relationship."

Their study suggests that while current use at the time of their study (1997) was fairly low, that the majority of users of 3PL services were planning to increase their use in the near future. That study reported that currently eighty-five percent of users of 3PLs spent less than four percent of their corporate revenues on third parties.

Studies performed in Europe during same period reported that market growth had not been as rapid as was predicted a few years earlier (for example, Virum, 1993). Parker (1999) reports that while European users of 3PL services are satisfied with services received that they have not, in general, increased their use of such services during last few years. However, his study found that many companies had increased the breadth of services purchased beyond simple warehousing and transportation. Berglund *et al* (1999) suggest that there are several indications that the 3PL (or TPL as they call it) industry has not reached maturity. The indications they present are that there are still a large number of 3PL providers, suggesting no clear market leaders, there exists an absence of a unique and undisputed terminology (even defining the 3PL industry itself), and that there are fewer market players that concentrate exclusively on 3PL, most are subsidiaries of large transportation companies.

Lieb and Peluso (2000) and Lieb and Randal (1999) discuss insights gained from a multi-year survey of chief executive officers of the largest 3PL providers in the United States. Key findings reported in the paper are the following: most of the companies surveyed are autonomous subsidiaries of companies in the transportation and warehousing business; most have significantly increased their international operations in the past few years; most are increasingly forming strategic alliances with other 3PL companies as well as companies primarily involved in warehousing, trucking, freight forwarding, and customs brokerage. That study followed an earlier study by Lieb (1992) that had as its focus large manufacturers, users of 3PL services. Similarly, Leahy, Murphy and Poist (1995) examine the determinants of successful third party relationships from the provider perspective. Twenty-five potential determinants of success are examined. Among these, customer orientation and dependability emerged with the highest importance ratings. More recently, Sankaran and Charman (2000) performed an exploratory study of the effectiveness of 3PL contracts as well as the process by which buying firms purchase services. Creative contracting may emerge as an increasingly important topic in the study of shipper behavior.

The question of how companies select providers of third-party logistics services was recently addressed by Menon, McGinnis and Ackerman (1998). Their main insights

are based on an analysis of a survey of logistics managers and subsequent factor analysis. They found that the primary factors in the selection process are suppliers' perceived performance and suppliers perceived capability. They found that respondents were less concerned about the prices charged for services. Their study points out that the purchasing decision for 3PL services should be viewed like any other purchasing decision and that companies should begin the process by carefully documenting performance and quality requirements in a scope-of-work document.

For the specific case of less than truckload (LTL) firms providing third party logistics services, Hanna and Maltz (1998) examine (syntax not consistent) two separate outsourcing decisions. First they examine the extent to which shippers are turning to carriers for increased offerings. Then they examine the carrier "purchase or build" question related to providing such services themselves or contracting with a third party to provide warehousing services. The study, which included interviews with the majority of large US LTL carriers found that most were offering warehousing services directly rather than contracting these functions to a third party.

In a recent study in Norway, two stated preference (SP) experiments were undertaken with a sample of 300 wholesale firms in Norway (Fridstrøm, 1998). The SP experiments were analyzed through binary logit models. The models allowed the analysts to draw several conclusions about the shippers' behavior. For instance, different values of travel time (willingness-to-pay for marginal freight transportation savings) were derived for time-savings versus delays—i.e. whether transportation time is decreased or increased. The latter is not surprising because it is in accordance with intuition; however, the quantitative approach followed by the author allowed the estimation of numerical values for that particular market. Another interesting finding was that the value of time differed by commodity type but not by shipment size or value.

While most of the past research use survey based exploratory methods to examine the shippers' and service providers' behavior, some are trying more quantitative methods to better illustrate and model the problems in this industry. A recent effort was made by Lim (2000) using game theoretic model to study the contract design problem of a shipper facing with buying 3PL services. With the emergence of more new problems in this industry, this kind of model may get more attention.

The benefits of outsourcing logistics services in some cases can be very significant. 3PL's have made "build to order" manufacturing systems possible in the computer industry where there would have been otherwise infeasible (Harrington, 1999). Rapidly changing markets suggest that the industry should see phenomenal growth in the next several years.

### **The Origin of Third Party Logistics**

Prior to 1978 the U.S. for-hire transportation industry was subject to significant economic regulation. Rates charged, market entry and exit and service levels were monitored by

the Interstate Commerce Commission for trucking and rail and by the Civil Aeronautics Board for air freight. Since deregulation, third party logistics companies have emerged as providers of a wide variety of logistics and supply chain management functions.

Some 3PLs grew out of the shipper's agents and freight brokerages that existed under regulation. The term freight broker applied to ICC licensed truck brokers that handled general commodity freight. These brokers acted primarily as marketing agents and load matchers for smaller trucking companies while shippers agents were intermediaries who bought large volumes of intermodal services from railroads and then sold these to shippers (Brown, 1984). Until very recently most 3PL companies originated from a parent transportation or warehousing company, many operating as subsidiaries to their parent company. Based on the ownership of transportation equipment or warehouse facilities, 3PL providers were historically divided into two categories: asset-based and non-asset based (Sheffi, 1990). Now the vast majority of 3PLs appear to be non-asset based, but working closely with asset based carriers or warehouse managers. These tend to be either management and knowledge-based consulting companies. Rather than handling the physical distribution themselves, these companies appear to focus on activities on strategic or tactical level.

During the past four or five years, with the rapid development of information technology and e-commerce, new types of third parties are emerging. These provide web-based services and sometimes act as a mere information intermediaries (sometimes referred to as infomediarities).

### **The Current State of the 3PL Industry**

One of the difficulties in estimating the size and scope of the 3PL industry is that it is difficult to draw the line between 3PLs, freight forwarders and carriers who are certainly logistics service providers. A recent study of shippers in Europe (KPMG 2000) makes the distinction between outsourcing and 3PL use based on the number of services outsourced. When this number is large, the company is using a 3PL; when only a few operations are outsourced in order to increase flexibility and reduce costs this is not considered 3PL.

A 3PL company normally provides process-based services rather than a function-based logistics services, which generally aims at the integration and full control of a part or whole process of shipper's logistics network. Indeed, the process expertise, as well as economies of scale, are 3PL's core competencies.

The services are usually customized to each particular shipper and the number of services being outsourced by shippers is significantly higher than for a provider of

separate transportation or warehousing services only. The prerequisite for this is often an integrated information system, covering the whole logistics network.

The past research also found the 3PLs often form strategic alliances with their customers with comparatively long-term arrangements, normally from 1 to 3 years by contract.

Generally, a 3PL company provides services including whole or at least part of the listed in table 1 rather than focusing on a single function.

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Table 1. Third Party Logistics Services
Transportation / Distribution
<ul style="list-style-type: none"> <li>▪ General Trucking Service (TL, LTL);</li> <li>▪ Intermodal Transportation service (rail, ocean, air freight);</li> <li>▪ Specialized Services (bulk, tank, hazardous material, refrigerated goods etc.);</li> <li>▪ Time-constrained services (JIT, over night, same day etc.);</li> <li>▪ Shipment tracking &amp; tracing;</li> </ul>
Warehousing / Distribution
<ul style="list-style-type: none"> <li>▪ Public / Contract / Regional warehouse;</li> <li>▪ Operation Technology (bar coding, radio frequency, VMI etc. );</li> <li>▪ Value-added services (cross-docking, freight consolidation, pick &amp; pack etc.);</li> <li>▪ Order processing and fulfillment;</li> </ul>
Custom Services
<ul style="list-style-type: none"> <li>▪ Custom Brokerage;</li> <li>▪ Duty Drawback;</li> </ul>
Freight Finance Services
<ul style="list-style-type: none"> <li>▪ Freight Audit;</li> <li>▪ Freight Bill Payment;</li> </ul>
IT Support
<ul style="list-style-type: none"> <li>▪ EDI capability;</li> <li>▪ Logistics information system &amp; other software;</li> <li>▪ Web-based solution;</li> </ul>
Product Support Services
<ul style="list-style-type: none"> <li>▪ Reverse logistics;</li> <li>▪ Value-added services (package, label, mark, test, assembly etc.);</li> </ul>
Logistics Management / Consulting
<ul style="list-style-type: none"> <li>▪ fleet operation;</li> <li>▪ Distribution network design;</li> <li>▪ Carrier selection / negotiation / routing;</li> <li>▪ Facility location analysis / selection / design;</li> <li>▪ Inventory management;</li> </ul>

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Many sources believe the US-based 3PL market is still growing. The same is true for Europe and world-wide. According to Armstrong & Associates Inc. (Burnson, 2000), a Wisconsin-based consulting firm that has tracked the 3PL industry since 1980, third party logistics was an approximately \$46 billion market in U.S. by the end of 1999, an increase of 16.5% compared to the previous year. According to the same study, the net profitability was 5%, net 3PL revenue was \$25 billion. Leahy et al (1995) estimates that the 3PL industry will grow to \$50 billion by 2000.

The size of 3PL companies varies greatly. In the US alone there are hundreds of small logistics management companies with annual revenues of less than \$10 million as well as logistics subsidiaries of large national carriers with annual revenues of several hundreds of millions of dollars. Armstrong divides the market into three tiers. At the top level, companies like Ryder, C.H. Robinson, and Menlo Logistics report revenues of several hundred million dollars; 3PLs in the second tier have revenues of less than \$100 million but are large enough to afford the best software. The third tier includes hundreds of brokers and small management companies with gross revenues in the range of \$10 million to \$20 million.

Sources indicate that there are several hundreds of 3PL companies that are operating currently in the United States. Menon et. al.(1998) quoted a directory list of more than 1500 3PL providers in Canada, Mexico and the United States. "Logistics World" put together a list of several hundred 3PLs in 1998. Another source from Armstrong & Associates Inc. listed over one hundred 3PL providers together with dozens of software and e-fulfillment providers. The list of 3PL companies is growing and new forms of operation are emerging. In Appendix I we present a list of 3PL companies examined in this study and provide some rough information about the service categories in which each company is involved. We did not list the thousands of traditional freight forwarders and brokers since we believe these traditional companies do not fit our definition of 3PLs. In fact, these companies appear to be either evolving into 3PLs or forming partnership with 3PLs.

Lieb and Peluso (2000a) and Lieb and Randall (1997) found that most of 3PLs had initiated services in the early 1980s, a later study by Murphy and Poist (1998) confirmed this point, finding that nearly two-thirds of the U.S. based 3PLs were founded after 1980, the date of the deregulation of the U.S. air freight, truck and rail industries.

The overall market for 3PLs remains in transition, driven by changes in customer needs and values and the expansion of service offerings to include e-commerce and other information technology capabilities.

Several indicators suggest that the industry is not yet stable: there is no universally accepted definition for 3PL companies; there are no clear market leaders; the service menu is changing rapidly; there is a transition taking place from transportation-based 3PL to warehouse and distribution oriented companies; and, new forms of 3PL continue to emerge.

The use of 3PL services is heavily industry dependent. The study by Lieb and Randall showed that the automotive, grocery, high tech/computers industry use 3PL

services most commonly. The other users include consumer, chemical, and medical device industry.

Moreover, the dot-com companies should provide new opportunities for 3PL providers. While dot-com companies spent huge money on marketing and promotion, reliable logistics operations are necessary to keep customers coming back. For most companies, profits will be made from repeat rather than first time customers. A new type of 3PLs, some called third-party fulfillment providers (3FLs), are targeting these dot-com companies and provide warehousing, order processing and shipping services.

### **On-Line Freight Marketplaces**

Rapid developments in e-commerce have led to the development of a new kind of intermediary. On-line freight marketplaces interact with shippers, carriers and 3PLs. On the one hand, these “disintermediate” 3PLs by providing many of the services previously handled by those companies. On the other hand, they provide a forum for 3PLs to operate more efficiently and to provide more lucrative value-added services to their clients. There appear to be five types of companies emerging: spot freight markets, auction and request for quote (RFQ) markets, exchanges, ASPs and, purchasing consolidation markets. We define each of these below:

- 1) Spot market: A spot market allows shippers and carriers to post available loads or capacity on the web. In a passive spot market shippers and carriers “post and browse” for matching capacity/loads. In the simplest case this is a bulletin board service. In more sophisticated cases shippers and carriers may be notified of matching capacity/loads from which they pick the best carrier or load. In an active spot market the equipment/load is matched automatically.
- 2) Auction and RFQ: An auction space provides automated RFQ and auction capability.
- 3) Exchange: An exchange may provide spot market and auction capabilities but must also provide creative e-commerce solutions for shippers, carriers and 3PLs. It must do more than move paper or telephone based processes to the web. It should be an active participant in the business processes of its partners and member and should drive the creation of new, more efficient business practices.
- 4) ASPs: Application service providers are primarily developing web-enabling and e-commerce enabling technology for the logistics industry. Many of these are also developing spot and auction markets and some are developing exchanges. We suspect that the most successful of these may in fact give up their own marketplaces and partner with companies whose primary product is the marketplace itself.

5) Purchasing consolidation sites: These sites provide an opportunity for member companies (typically small carriers) to purchase equipment and supplies at bulk rates over the internet.

The lines between spot marketplaces, auctions, exchanges and applications service providers (ASPs) are somewhat blurred right now. Exchanges are typically also ASPs or teamed with ASPs. Exchanges also offer spot market and auction services. Some examples are 3PLEX, Nistevo, Leanlogistics and Trantislink. Transplace, a leader in the spot market and auction space that was formed through a consortium of six major trucking/logistics companies including J.B. Hunt, Covenant, M.S. Carriers, Swift, U.S. Xpress and Werner, does not appear to be an exchange at this time but likely will be very soon. Logistics.com and Celarix, leaders in the auction and RFQ space appear to be ASPs more than freight marketplaces. They will face stiff competition from companies previously in the off-line logistics solutions business (I2 and Manugistics for example) and from new logistics ASPs like Accuship.

Of significant interest will be the extent to which the spot markets developed by NTE (formerly National Transportation Exchange) and Datconnect will be successful. To our knowledge, NTE was the first on-line marketplace and its exchange, developed in the mid-1990's was operating off line before that. Dat industries has a huge presence in truckstops so their exchange, Datconnect may continue, at least in the short term, to be attractive to owner operators and carriers seeking help moving booked freight. If they can establish a market presence during the period when a sufficient number of owner operators want to book freight at truckstops, then they could survive when those functions move to the vehicle and take place using in-vehicle or handheld communications devices.

Of interest too will be the extent to which the purchasing cooperatives like TruckersB2B will be competitive or whether carriers will prefer one-stop shopping and expect the exchange or marketplace to which they belong to provide these services. Some, like Transplace, provide these services already.

Consolidation and collaboration in the industry will occur at a rapid clip during the next year or two. There is significant evidence of this already. TruckersB2B provides load matching through NTE, NTE is extending its spot market to the auction space through a partnership with Freightwise, a marketplace backed in part by the BNSF and CN Rail Corporations. NTE also recently acquired openship, an ASP that was previously running an auction/RFQ marketplace. Logistics.com merged with Quoteship to extend the reach of its ASP services to an auction/RFQ marketplace.

Another type of ASP includes those companies providing web-enabling technology to handle the package and LTL shipments generated by e-commerce companies. Examples of these are GoShip and Intershipper. These work with a large number of couriers and develop solutions for clients who ship large or small volumes of packages each day. These companies compete directly with UPS and FedEx who provide

similar web solutions to e-commerce companies but presumably solutions which feature their services.

In addition, there are also lots of web sites providing mode or mode-interchange specific information or other industry-related information. Examples includes eModal which serves trucking companies using maritime container terminals in the western United States, and traffic.com which provides traffic information to individuals and logistics business via a variety of sources including the web, radio broadcasts and hand held wireless devices.

While the on-line freight transportation industry is immature, it has a bright future. In addition to enabling communication between shippers, carriers and service providers, eventually technology should enable the integration of these online systems with the shippers' ERP systems. Orders will automatically be entered into these online systems from a shipper's ERP system, proceed through a transaction management system which will automatically determine the appropriate price, select a carrier, confirm the order, arrange for pick-ups, transact the resulted fees and charges. (Logistics Management & Distribution Report, April 2000). Though a perfect characterization of these on-line freight transportation companies is not possible due to the current unstable state of the industry we provide a table in Appendix II that lists many of these companies and their primary markets. As a disclaimer we must point out that though extensive, the list is not exhaustive; in addition its likely that by the time this paper is published that many of these companies with either be out of business or merged with other on-line ASPs and marketplaces. Table 2 also provides some examples.

Table 2: Examples of Online logistics providers:

<b>On line freight marketplaces</b>	
Spot markets	NTE
	DATconnect
RFQ and Auction	Logistics.com
	Celarix
Exchanges	3PLEX
	LeanLogistics
	Nistevo
	TrantisLink
<b>ASP (Application Service Provider)</b>	
For 3PLs	3PLEX
	TrantisLink
For e-merchants	Goship.com
	Intershipper.com
	Accuship.com
For the general logistics industry	I2
	Manugistics
	CAPS Logistics
For online freight marketplaces	Logistics.com
	Celarix.com
<b>Co-ops</b>	TruckersB2B
	SubmitOrder
<b>Infomediaries</b>	Emodal
	Traffic.com

### Predictions

The 3PL industry will continue to grow and will be more effective in the future than in the past. The development of private, semi-private and public freight exchanges for single modes and intermodal freight transportation opens up a world of possibilities for the industry. Spot markets and auction and RFQ systems will disintermediate traditional third parties, freight forwarders and brokers, but currently these represent a relatively small fraction of the logistics and transportation industry. The development of collaborative marketplaces should increase the efficiency of the whole of the supply

chain. At the same time, the complexity of the supply chain will be dramatically increased, which will increase the need for experts to keep these systems running smoothly.

### **Research Needs/Opportunities**

A thorough discussion of needs and opportunities in logistics research was presented by Mentzer and Kahn (1995). Part of the discussion in that paper was extended considerably by Skjoett-Larson (1999). We present some of the relevant arguments made by those authors here and then attempt to identify research needs and opportunities specific to the 3PL industry and in particular to the new on-line logistics services. Mentzer and Kahn examined logistics research over a twenty five year period and found that most logistics research focused on literature reviews followed by exploratory studies, methodology reviews and hypothesis testing. The articles examined were from the *Journal of Business Logistics*, rather than from the operations research literature, which is of course more mathematical and methodological in general. They argue in favor of more rigorous application of analytical tools (particularly statistical models). Skjoett-Larson examined three basic frameworks for logistics research and carefully reviews the literature for each of these. These are: Transaction Cost Analysis, in which transaction costs are used to explain why firms exist, behave and interact; Network Perspective or Network Theory in which the success and performance of individual firms depend on resources controlled by and interactions with other firms; and Resource Based Management in which firms are viewed as bundles of heterogeneous resources and the ability of firms to add value to products are the focus of analysis. Skjoett-Larson examined how the 3PL (TPL) industry can be explained using concepts from all three theoretical frameworks, laying the groundwork for potentially fertile further research.

### **Optimization**

The increase in time-sensitive shipments, and increase in operations in which more than one, and sometimes many, shippers' goods are managed in a single facility may increase the importance of certain optimization based logistics research. For example, the need for the development of truly dynamic routing and scheduling systems will be of increased importance. Automated bidding and load matching systems will be further developed and analysis of the costs and benefits of these for shippers, carriers and on-line 3PL companies will be investigated.

In the near future, fully integrated system wide optimization systems for logistics management will no longer be the exception but the rule for large manufacturing and distribution operations. While integrated logistics systems have been in development for more than two decades, advances in information technology are making these more common. While systems under development by private companies will likely lead

academic research in this area, academics will have a role in the development of cutting-edge components of these systems and in training the next generation of transportation ASP developers.

### **Behavioral modeling**

Survey based analysis is a traditional method in logistics research. However, analysis methods have typically been fairly shallow. Recent techniques developed for analysis of large scale market research data and transportation demand modeling techniques should be applied to data on the 3PL industry as well as that gathered from interviews and surveys of shippers and carriers. In addition data mining techniques will play an important role in examining shipper and carrier behavior and preferences.

### **Analysis of on-line brokerages**

Information technology researchers have been examining the impacts of e-commerce on firm and market performance for several years. The theoretical foundation for this kind of research lies in the resource based view of the firm (Wernerfelt, 1984, Bakos, 1998). While there has been significant research comparing prices of internet based retailers, little has been done to date examining the impact of the internet on firm performance, either from the perspective of profitability or service quality (Zhu, 2000). The new on-line load matching and freight brokerage services offer an ideal industry in which to examine these questions using various forms of analyses. Nault and Vandenbosch (2000) recently developed a game theoretic model of market entry and competition under conditions of high fixed and low marginal costs. Similar research in the freight transportation industry which has very different conditions would be of significant interest.

### **Conclusions, Predictions**

The third party logistics industry has entered a period of rapid expansion and transformation. The number of market entrants is enormous, particularly among on-line service providers. While it is generally believed this market will continue to grow, we predict that stability will elude market for several years at least. Some companies will quickly be out of business and new entrants will continue to stream in. However, in the not too distant future a few market leaders will emerge. This transition provides very interesting opportunities for researchers in many fields.

The traditional distinctions between asset and non-asset owning 3PLs are not fine enough to describe today's industry in which a huge variety of both asset and non-asset owning companies exist. With the further development of e-commerce and its impact on third party logistics industry characterizing the industry in transition will be challenging

and interesting. Future research should be executed to shipper and carrier and service providers behavior under these conditions.

With the fast development of IT technology and the spreading of e-commerce, the traditional optimization and management system will not satisfy with the requirements of future system integration and data communication. New optimization tools and integrated management systems as well as new business models, especially for the online brokers, will need to be developed and implemented.

During this period of rapid change, new opportunities will emerge both for practitioners and academic researchers. Observing and participating in the near term development of e-commerce initiatives will be extremely exciting.

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### Appendix I Major 3PL Companies and their Services

3PL Company List	<i>Transportation /Distribution</i>	<i>Warehousing /Distribution</i>	<i>Custom Service</i>	<i>Freight Finance</i>	<i>IT support Service</i>	<i>Product Support Service</i>	<i>Logistics Consulting</i>
A. N. Deringer, Inc.	×	×	×			×	×
ABX Logistics (USA) Inc.	×	×	×		×		×
ACS Logistics	×	×	×		×	×	×
ADCCO Distribution&Transportation Inc.	×		×	×			×
Airborne Logistics Services Division	×	×	×		×	×	
Alliance Shippers	×						×
AmeriCold Logistics, Inc.	×	×		×	×	×	×
AMSTAN LOGISTICS Inc.	×	×		×	×	×	×
APL Logistics	×				×		×
Arnold Logistics	×				×	×	
Associated Global Systems	×				×		×
ASW Logistics, Inc.	×	×	×		×	×	
BAX Global Supply Chain Management	×		×		×		×
Burnham	×	×	×		×	×	×
BUSINESS LOGISTICS							×
C. H. Robinson Company	×		×	×	×		×
California Distribution Inc.	×	×			×		
Cardinal Logistics Management Inc.	×						×
Cass Information Systems, Inc.				×	×		×
Caterpillar Logistics Services, Inc.	×	×			×	×	×
Certified Logistics & Support Serv.	×	×		×		×	
Circle International Group, Inc.	×	×	×		×	×	
Cogistics, Inc.				×	×		
Computrex Inc.			×			×	×
CRST Logistics, Inc.	×	×			×		×
CT Logistics				×	×		×
Customized Transportation, Inc.	×						×
Danzas AEI Inc.	×	×	×		×	×	×
Danzas Corporation	×	×	×		×	×	×
Dedicated Logistics, Inc.	×	×			×	×	
DSC Logistics	×	×			×	×	
Dynamex	×						×
EGL, Inc. (Eagle)	×				×		×
Emery Worldwide	×	×	×		×		×
England Logistics, Inc.	×	×		×			

Erlanger Distribution Center, Inc.		×				×	
Evans Distribution Systems	×	×	×		×	×	
Exel	×	×			×		×
FASTRANS Logistics	×	×					
FDSI Logistics Inc.				×	×		×
Fedex Logistics	×				×		×
Fritz Companies, Inc.	×	×	×		×		
GATX Logistics, Inc.	×	×		×	×	×	×
Goldstar Logistics, Inc.				×	×		×
Hopkins Distribution Company		×			×	×	
Hub Group, Inc.	×	×			×		
InSite Logistics, Inc.	×	×				×	×
J. B. Hunt Logistics, Inc.	×				×		×
Jacobson Company	×	×			×	×	
Kane Is Able, Inc.	×	×			×	×	
Kenco Logistic Services		×					
Landstar Logistics, Inc.	×						
LMS Logistics Inc.							×
LTD Management	×						×
M.S. Logistics Services	×	×		×	×		×
Maersk Logistics USA Inc.	×	×	×		×		×
MegaSys, Inc.	×	×	×	×	×		×
Menlo Logistics	×	×		×	×	×	×
Mitsubishi Warehouse California Corporation		×			×	×	
Monarch Distribution Services		×			×	×	
MSAS Global Logistics	×	×					×
National Traffic Service				×	×		
NFI Interactive Logistics	×	×			×		×
Nippon Express USA	×	×	×		×		
Noble Distribution Systems	×	×					
North American Van Lines, Inc.	×	×			×		×
ODC Integrated Logistics		×	×				
ODW Logistics, Inc.	×	×	×		×	×	
Orange Courier	×						
Orion Logistics, Inc.		×			×		
Ozburn-Hessey Logistics	×	×	×		×		
Paul L. Broussard and Associates				×			
PBB Global Logistics	×	×	×		×	×	
Penske Truck Leasing	×						×
Professional Logistics Management Company				×	×		×
Regal Logistics	×	×			×	×	
RUAN Transportation Management Systems							×
Ryder System, Inc.	×	×		×	×	×	×
Schenker Inc.	×	×	×		×		×
Schneider Logistics	×			×	×		×

Standard Corporation	×	×		×	×	×	×
Swift Transportation Co., Inc.	×				×		
TBB Global Logistics	×				×		×
The Bender Group	×				×	×	×
The CCW Group, Inc.		×				×	
The Terminal Corporation	×	×			×	×	
Tibbett&Britten Group N. America Inc	×	×			×	×	×
TNT USA Inc.	×	×	×		×		×
Total Logistic Control	×	×			×	×	
TransExpress	×	×					
Transmanagement Corp.	×	×				×	
Twin Modal, Inc.	×						×
Union Pacific Distribution Services	×						
UPS Logistics Group	×	×		×	×	×	×
USCO Logistics		×		×	×	×	×
USF Logistics	×	×			×	×	×
Vimich Traffic Logistics Inc.				×	×		×
Wagner Industries, Inc.	×	×				×	
West Brothers Transfer & Storage, Inc.	×	×				×	

Note:

- 1) This list includes nearly 100 3PL companies currently operating in U.S.A.;
- 2) The '×' indicates the major service category that the company is involved;
- 3) The information is collected from the Internet and could be incomplete or incorrect;

### Appendix II List of Online Logistics Services

Company Name	Web site	Primary services
<b>Primary service: Online Freight Marketplace</b>		
3PLEX	www.3plex.com	ASP, exchange (aimed at 3PL industry)
877NetLoad	www.877netload.com	Spot market for trucking, ASP
AgFreight.com	agfreight.com	Spot market for agricultural and bulk commodities
American Load Link	Americanloadlink.com	Spot market for trucking
America's Loads Online	americasloadsonline.com	Spot market for truck load
Backhaul Network Inc	www.backhaul.net	Spot market for truck load
Bear Transportation Service	beartrans.com	Spot market for truck load
Brazos Logistics Inc.	brazoslogistics.com	Spot market (very small)
BullWagons.com	bullwagons.com	Spot market for livestock transportation
C.A.T.T.S. International Ltd.	www.bulkloads.com	Spot market for trucking (UK)
CargoExchange.net	www.cargoexchange.net	Online freight marketplace for container shipping (Asia based)
CargoNet.com	www.cargonet.com	Spot market for marine towing industry
Cargo Online	www.cargo-online.com	Spot market for air cargo
Clicknload.com	www.clicknload.com	Spot market for trucking
DATConnect.com	www.datconnect.com	Spot market for trucking
Direct Freight Services	directfreight.com	Spot market for trucking, general trucking infomediary
Dispatch Solution	dispatchsolutions.com	Spot market for trucking
DriverLink.com	www.driverlink.com	Spot market for trucking
Eflatbed.com	www.eflatbed.com	Spot market specialized in flatbed
EFr8.com	www.efr8.com	Spot market for trucking
ELogistics Ltd.	www.elogistics.com	ASP, possibly exchange for trucking (UK)
ERailXchange	www.erailxchange.com	RFQ for rail freight and general rail infomediary
Expedite Loads.com	www.expediteloads.com	Spot market, ASP for expedited freight market
Freight4us.com	www.freight4us.com	Spot market for trucking
FreightConnect.com	www.freightconnect.com	Spot market and RFQ, multimodal
FreightFinder.com	www.freightfinder.com	Spot market for trucking
Freightgate Inc.	www.freightgate.com	Spot market, developing an exchange for air cargo and

		maritime industry
Freight-On-Line	www.freight-on-line.com	RFQ and online freight market, specializing in maritime
freightquote.com	www.freightquote.com	RFQ and ASP
Freight Terminal	www.freight-terminal.com	Spot market for trucking
FreightWise	www.freightwise.com	Spot market, RFQ for trucking and rail intermodal freight
Getloaded.com	www.getloaded.com	Spot market for trucking
GoCargo.com	www.gocargo.com	Spot market, auction, RFQ specializing in maritime cargo
Gologistics.com	www.gologistics.com	Spot market for LTL trucking
GST Corporation	www.gst-truck.com	Spot market for trucking, 3PL TL, LTL and intermodal freight
Hoploads.com	www.hoploads.com	Spot market for trucking, specializing in hopper-bottom trucking companies
InTransit	www.intran.com	Freight broker, also runs a Spot market and RFQ for trucking
iTruckers, Inc.	www.itruckers.com	Spot market for trucking
layover.com	www.layover.com	Trucking infomediary
LeanLogistics	www.leanlogistics.com	Online exchange
loaddispatch.com	www.loaddispatch.com	Spot market for trucking
Loaddock.com	www.loaddock.com	Spot market for trucking
LoadMatch.com	www.loadmatch.com	Spot market, RFQ, infomediary for rail intermodal market
LoadSource Inc.	www.loadsource.com	Spot market, ASP for trucking
LoadZone	www.loadzone.com	Spot market for trucking
Mo-Ark Truck Service	www.moark.com	Spot market for trucking
NetTrans	support.nettrans.com	Spot market, ASP for van, reefer and flatbed
NextStop	www.nextstopfreight.com	Spot market, RFQ for food service industry
Nistevo Corporation	www.nistevo.com	Online exchange
NPassage Inc.	www.npassage.com	ASP, exchange developer for B2B freight transportation
NTE	www.nte.net	Spot market
Online Procurement Inc.	onlineprocurement.com	Spot market, RFQ for trucking
On Time Media, LLC	www.truckit.com	Spot market, RFQ for trucking
ShippingFinder.com	Shippingfinder.com	Spot market, RFQ, multimodal
ShipSolutions.net	www.shipsolutions.net	RFQ, multimodal
Steelroads	www.steelroads.com	Spot market, RFQ for rail freight
System Architects, Inc	www.loadxchange.com	Spot market, RFQ for trucking
TIE services	www.tie-services.com	Spot market for van reefer, flatbed and other specialty



		trucking
TON Services Inc.	www.tonservices.com	Spot market for trucking, some ASP development
Tradiant Inc.	www.tradiant.com	ASP, developer of a multimodal exchange
Transplace	www.transplace.com	Spot market, RFQ, auction, ASP developing an exchange
Transportation.com	www.transportation.com	Spot market, RFQ
TrantisLink	www.trantis.com	Spot market, RFQ, auction, ASP, Exchange
Tranzlink Inc.	www.tranzlink.com	Spot market for trucking
Trucking-Broker.com	www.backhaul.com	Spot market for trucking
Truckload Freight	www.truckloadfreight.com	Spot market for trucking
Truck Net	www.loads.com	Spot market for trucking
Trucksonly.com	www.trucksonly.com	Spot market for trucking
Truckstop.com	www.truckstop.com	Spot market for trucking
TruckTrax	www.trucktrax.com	Spot market for trucking
UHCA	www.uhca.com	Spot market for trucking
Ultra Logistics	www.ultralogistics.com	Spot market, RFQ, 3PL services, multimodal
<b>Primary service: ASP</b>		
AccuSHIP.com	www.accuship.com	ASP for e-merchants
Arena	www.arena.com	ASP for B2B e-commerce, specializing in maritime
Bid Freight Global	www.bidfreight.com	ASP for 3PL
Celarix.com	www.celarix.com	ASP specializing in maritime
Descartes Systems Group	www.descartes.com	ASP for e-fulfillment
DigitalShipper.com	www.digitalshipper.com	ASP for e-merchants
EFX PartnerShip	www.efxnet.com	ASP and spot market
Elogex, Inc.	www.elogex.com	ASP for general logistics applications
EShip, Inc.	www.eship.com	ASP for B2B e-commerce
E-Transport	www.etransport.com	ASP specializing in maritime
Freight Management Systems	www.freight-mngt.com	ASP and Spot market
FreightSource Inc.	www.freightsource.com	ASP, RFQ for e-commerce site
Global Logistics Village Inc.	www.glovill.com	ASP for general logistics applications
GoFreight.com	www.gofreight.com	ASP and online freight market
InterShipper, Inc.	www.intershipper.com	ASP for e-commerce
Link Logistics	www.linklogi.com	ASP and Spot market
Logistics.com	www.logistics.com	ASP, RFQ/Auction
NeoModal.com	www.neomodal.com	ASP, specializing in maritime
NextJet Inc.	www.nextjet.com	ASP for B2B e-commerce

Optimum Logistics	Optimumlogistics.com	ASP, specializing in maritime
Portsnportals.com	www.portsnportals.com	ASP RFP/Auction specializing in maritime
RightFreight	www.rightfreight.com	ASP for general logistics
<b>Primary service: Co-op</b>		
FreightPro.com	www.freightpro.com	Co-op
SubmitOrder.com	www.submitorder.com	Co-op
TruckersB2B	www.truckersb2b.com	Co-op
<b>Primary service: Infomediary</b>		
Emodal	www.emodal.com	Container port information service, ASP
ShipBestWay.com	www.shipbestway.com	General freight transportation infomediary, also runs a spot market for international freight
Traffic.com	www.traffic.com	Real-time traffic information
Trucker's Connection	truckersconnection.com	General North American Trucker's information site, also runs a spot market for trucking