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SPECIAL ISSUE

Article invited

DOI: <http://dx.doi/10.12660/joscmv8n2p23-35>

The Development of Logistics Services in the United States

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ABSTRACT: This research studies third party logistics (3PL) providers in the United States to investigate how the industry has strategically developed its service offerings in response to the customers' growing needs in managing global supply chains. Logistics management has significant impacts on various aspects of supply chains such as response time, total supply chain cost, sourcing risk, customer service, security, etc. The results show that 3PL services vary based on industry served, region served, and asset ownership structure. Over the years logistics services providers have served more industry sectors, became asset light, and provided broader services. Two of the five service categories, technology services and special services, have been evolved and expanded rapidly. The development has strengthened the capabilities of the logistics service providers and sustained the growth of the industry.

1. INTRODUCTION

As companies expand into the global marketplace, logistics becomes critical in support of their global supply chains. In order to remain competitive in today's changing business environment, more and more companies focus on core competencies. Instead of developing in-house capabilities in the various logistics disciplines such as transportation planning, warehouse management, and information technology, companies are opting to outsource to third party logistics providers. Third-party logistics (3PL) is the use of contracted firm(s) to supply services in the planning, implementation and controlling of the flow and storage of raw materials, in-process inventory, finished goods, and related information throughout the supply chain. Third party logistics providers may handle all or part of the distribution of merchandise along the supply chain to the consumer. Hence the firms are able to concentrate on their own core business, while the 3PLs concentrate on inflows and outflows of the global supply chain activities.

Third party logistics was identified as a separate industry and service in the late 1980s, and started to gain market share in the U.S. only since early 1990s (Ashenbaum, et al., 2005). Since then, the third party logistics industry has grown rapidly from about US\$6 billion in 1991 to US\$146.4 billion in 2013. In the United States, the logistics cost was 8.5% of the GDP in 2013, and the average 3PL user paid approximately 10.5% of the company's logistics operating budget to 3PL providers. In contrast, the logistics cost was 18% of the GDP in China and the average 3PL user outsourced only 7% of the company's logistics budget on 3PL services in 2013 (Armstrong & Associates, 2015).

3PL relationships are more complex than traditional logistics supplier relationships, which are often transaction based and focus on single function (Simchi-Levi, et al., 2003, p. 149). As 3PLs become more vital to a company's operations, these arrangements require active participation by both parties. In contracting out the logistics operations, the third party provider is now an important partner which has significant impacts on the company's quality, service, and dependability. Boyson et al. (1999) showed that the outsourcing of logistics functions had proven to be effective in helping firms to achieve competitive advantages, improve their customer service levels and reduce their overall logistics costs. Berglund et al. (1999) found that 3PLs can add value by creat-

ing operational efficiencies and by sharing resources across customers. This paper investigates the strategic development of 3PL services in the United States in the last decade and studies the role of 3PLs in managing today's global supply chains.

2. LITERATURE REVIEW

In earlier years, companies chose 3PL providers mainly by cost. However Millegan (2000) noted that more meaningful relationships had been emerging since late 1990s. Bhatnagar et al. (1999) found that other than cost, customer service and flexibility/customization were the most important factors for selecting logistic outsourcing. For example, shippers are choosing their providers based on their emphasis on value, innovation and performance in an increasingly global context. This trend presents a challenge for the logistics service providers. Millegan's study (2000) indicated that customer demands for performance and sophistication had been accelerating. The 3PL providers need to keep pace in service scope.

Lieb and Bentz's (2005) surveyed the use of 3PLs services by large American manufacturing firms. They found that eighty percent of sixty *Fortune* 500 manufacturers indicated that they had used 3PL services in 2004. Major companies outsource logistics services to 3PLs are from demand sensitive, fast-moving industries such as consumer product goods, electronics, food and beverage, and automotive companies. However companies from more specialised industries, such as furniture, cosmetics, and renewable energy, are beginning to outsource logistics services (O'Reilly, 2011).

Various strategies are utilized by 3PL providers. Other than serving the needs of individual customer, some 3PLs take multiple customers within a particularly focused industry sector, yielding greater efficiencies and cost savings. Some 3PLs spend great resources to develop competitive specific channels and then use the channel throughout their customer base. Industry-specific 3PLs often use the same supply chain design and channels for clients that are competitors (Burnson, 1999). As more diverse industries use 3PLs and outsource more logistic functions, the scope of services provided by 3PLs shall be broadened.

Another strategy for 3PLs is to consolidate or form alliances with other 3PLs. As mentioned earlier, most of these 3PLs offer a variety of services from

transportation management, contract carrier, warehouse management, and information technology, but no one company dominates the market share in all of these areas. Consolidation or multiple partner alliances are sometimes the only way to provide the range of diverse geographic services demanded by customers (Cook, 1998). Current trend in consolidation and strategic alliances comes from the pressure of 3PL users to extend global capabilities and provide one-stop-shopping. Cost efficiency can be improved as the benefit of scale economy. This trend changes the ownership structure of the 3PL industry. Some examples of consolidation include UPS's acquisition of Fritz, which allowed freight forwarding to be added to the expertise of the transportation and warehousing giant. Fritz was also a significant ocean non-vessel operating common carrier as well as a charter agent. Thus UPS was able to move beyond the small parcel dimension of global trade. Exel, a warehousing and freight-forwarding leader, acquired Mark VII so that it could add domestic surface transportation management to its offered services. In addition to partnerships with other service providers, 3PL providers also enhance and expand partnerships with their users.

Furthermore, as globalization escalates, the 3PL providers seek international partners for overseas coverage. Some 3PL providers target a specialized niche market to differentiate them and then form alliances with other players. HUB Group is a good example of this strategy. Hub Group has decided to focus on intermodal transportation due to its strong relationship with the nation's railroad services in the United States. When a niche player has a customer that is looking for a more comprehensive service, they may partner up with another niche player that complements their own service. HUB Group partnered up with TMM Logistics in Mexico in order to be able to increase their presence in Mexico. TMM Logistics is the dominant logistic provider in Mexico. With this strategic partnership Hub, a niche 3PL player, is able to provide cross-border transportation (Business Wire, 2002).

Most of the extant literature focuses on the perspectives from the customers/users of 3PLs services. For examples, Murphy and Poist (1998) examined *third-party logistics* usage among a group of small to large manufacturers and non-manufacturers. Vaidyanathan (2005) proposed a conceptual framework using IT as the focus to evaluate the core functionalities of 3PL providers for the users. Moberg and Speh

(2004) surveyed the warehouse customers to compare the selection criteria of a regional warehouse and a national warehouse. Some literature studies 3PLs within a specific country context. For example, Lieb and Bentz (2004, 2005) and Langley et al. (2004) repeatedly surveyed the use of 3PL services among large American manufacturers over the years. Separate studies by Piplani et al. (2004) and Wilding and Juriado (2004) investigated customers' perceptions of 3PLs in Singapore and Europe, respectively. Knemeyer and Murphy (2005) studied the users of 3PL services to investigate whether certain 3PL relationship outcomes are influenced by relationship characteristics or customer attributes. Their findings suggest that one relationship characteristic, communication with the provider, showed statistically significant influences on all outcomes. Anderson, et al. (2011) surveyed over three hundred managers responsible for purchasing logistics services and found three distinct decision models. They concluded that the drivers of 3PL selection vary greatly between customer groups.

Murphy and Poist (2000) compared the perspectives of 3PL providers and 3PL users on most commonly provided/used services. They found some overlaps and mismatches between the 3PL services offered and used. There are overlaps on five of the ten most commonly provided/used services: EDI capability, freight consolidation, warehousing, consulting, and freight bill payment. The customers tend to be interested in operational services such as customs clearance, pick and delivery, freight charge auditing, intermodal service, and order picking and packing. However, their sample size was rather small and the comparisons are not from paired samples. Yeung, et al. (2006) investigated the relationship of strategic choices on a composite measure of financial performance for 3PL providers in Hong Kong. They found that the combined strategy of cost and differentiation performing best and pure cost strategy performing the worst.

Little research is conducted from the perspective of the 3PL service provider. Hertz and Alfredsson (2003) followed the strategic development of four different types of logistics firms into 3PLs. They found that the existing network of these firms' customers, customers' customers and partners seemed to have played an important role for the development into a 3PL and also in the continued development. Larson and Gammelgaard (2001) studied Danish logistics providers and found them to be

more niche firms, focusing on the domestic market and limited sets of customers by industry. Lieb and Kendrick (2003) provided some macro level insights into the *third-party logistics* industry; but their results were based on a survey of a small sample of twenty CEOs of the largest 3PL companies in the U.S. Min and Joo (2006) studied six largest 3PLs in the United States for their operational efficiency. Zhou, et al. (2008) conducted a similar study with top ten largest Chinese 3PL providers and identified some sources of inefficiency.

3. RESEARCH QUESTIONS AND HYPOTHESES

This research explores service offerings from 3PL providers in the United States in the last decade to investigate how 3PL service scope has been strategically developed in response to the customers' growing needs in global supply chain management. The goal is to provide a longitudinal investigation on the strategic development in this industry. Based on extant literature reviewed, the following hypotheses are proposed.

H1: 3PLs service scope gets broader over time.

H2: 3PLs serve more industry sectors over time.

H3: 3PLs get more global over time.

H4: Asset ownership structure of 3PLs changes over time.

H5: Service offerings vary among the asset ownership structure of 3PLs.

H6: Service offerings vary between global and North America focused 3PLs.

4. METHODOLOGY

This study uses secondary data published by Inbound Logistics on their annual survey of American 3PLs, published in its July issue every year. Unlike Lieb and Bentz's survey (2004, 2005), which focuses only on the largest American manufactures' perspectives on 3PLs, this dataset consists of a mix of large, public companies and small, niche providers from 3PL industry, reflecting a broad range of capabilities. Inbound Logistics, established in 1981, is the leading trade magazine for logistics and supply chain managers in various industries. Each year, Inbound Logistics invites companies to submit data using an online questionnaire with an extensive list of questions (Inbound Logistics Top 100 3PL Providers Questionnaire). Then the top one hundred companies are selected from a pool of over 250 companies through survey inputs, phone interviews, and online research. The selected companies offer various operational capabilities and experiences in logistics services. Their database includes information such as regions served, industry sectors served, asset ownership, possible services in five categories, and membership of three certificates-- ISO, Smart-Way, and C-TPAT. Services listed on this database were much broader in scope and in industry coverage comparing to the ones listed on Lieb and Bentz's (2005) survey that contained only 26 services for sixty large manufacturing companies. Table 1 shows all five 3PL service categories and their specific services. All data in the Inbound Logistics database from five points in time—2002, 2004, 2007, 2010, and 2013 are analysed to test the hypotheses. Sample size is 100 per year. Since the number of services varies somewhat from year to year, some raw counts are converted to percentages in data analysis.

Table 1: Major 3PL services categories

Category	Service Types
Logistics Services	Inbound Logistics, Integrated Logistics, Warehousing, Lead Logistic Provider, Inventory Management, JIT, Process Re-Engineering, Vendor Management, Payment Audit Processing, Product Life Cycle Management, Global Trade Services
Transportation Services	Small Package, Air Cargo, LTL, TL, Intermodal, Ocean, Rail, Bulk, Dedicated Contract Carriage, Fleet Acquisition, Equipment/ Drivers, Final Mile
Warehousing Services	Pick/Pack Sub-Assembly, Cross docking, DC Management, Location Services, Vendor Managed Inventory, Fulfilment

Special Services	Direct to Store, Direct to Home, Import/Export/Customs, Reverse Logistics, Marketing Customer Service, Logistics/Transportation Consulting, Global Expansion (sourcing/selling), Security Analysis, Contingency/Crisis Planning, Labor Management
Technology/ Web Services	EDI, Satellite/Wireless Communication, Enterprise Web Enablement, Product Visibility, Customer Relationship Management

Source: Inbound Logistics, various issues 2002-2013

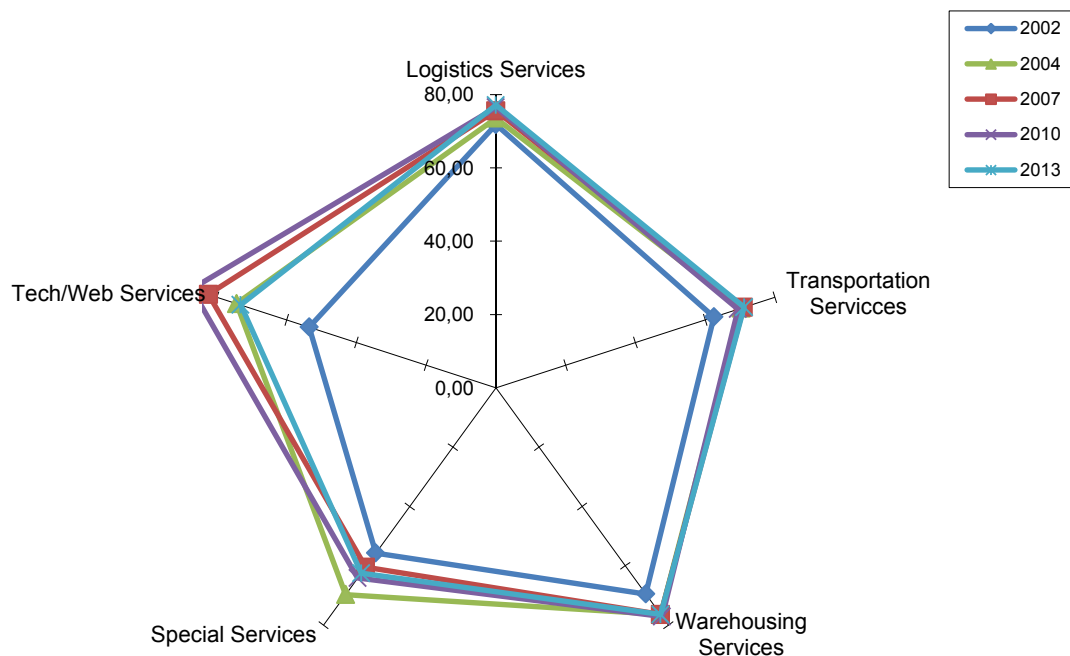
Radar diagrams are drawn to show the levels of the five service categories over years. ANOVA tests are conducted to analyse service scope (H1) and industry breadth (H2) over years as well as the asset ownership impact on service offerings (H5). Chi-square tests are conducted to show changes on region served (H3) and asset ownership over years (H4). Lastly independent t test is used to see if 3PLs with a global focus opposed to a North America focus offer different services (H6).

5. ANALYSIS AND RESULTS

There are five strategic service categories provided by 3PLs—logistics, transportation, warehousing, special services, technology and internet-based ser-

vices. Each category contains four to thirteen specific services. Figure 1 shows the average percentages of services in each category provided each year. Over the years, broader scope of 3PL services are offered. For logistics services, the most commonly offered services are inbound logistics and integrated logistics, and the least offered services are global trade service and payment audit process. For transportation services, TL, LTL, and intermodal are offered by almost all 3PLs and the last-mile delivery service is gaining ground in recent years. For warehousing services, over 80% of the companies offer cross docking and pick/pack subassembly and more companies offer vendor managed inventory and location services in recent years.

Figure 1: Services Provided by 3PLs



Two categories—special services and technology services clearly show expansions over time. Figure 2 and Figure 3 depict the average percentages of specific service offered in each category, respectively. Reverse logistics was offered by 78% of the companies in 2002 and 85% of the companies in 2013. Deliver directly to store service was offered by 69% in 2002 and 83% in 2013. The special service category keeps expanding. New services such as global sourcing and market expansion, security analysis, contingency & crisis planning, and logistics labor

management were added to the list in 2007. On the technology service category, EDI link has been offered by almost all 3PLs since 2002. All other technology related services have shown significant growth. For examples, enterprise web enablement service was increased from 52% of the companies in 2002 to 92% of the companies in 2010; customer relationship management was increased from 24% of the companies in 2002 to 67% of the companies in 2013, while product visibility service was increased from 39% in 2002 to 92% in 2013.

Figure 2: Value-added Services Provided by 3PLs

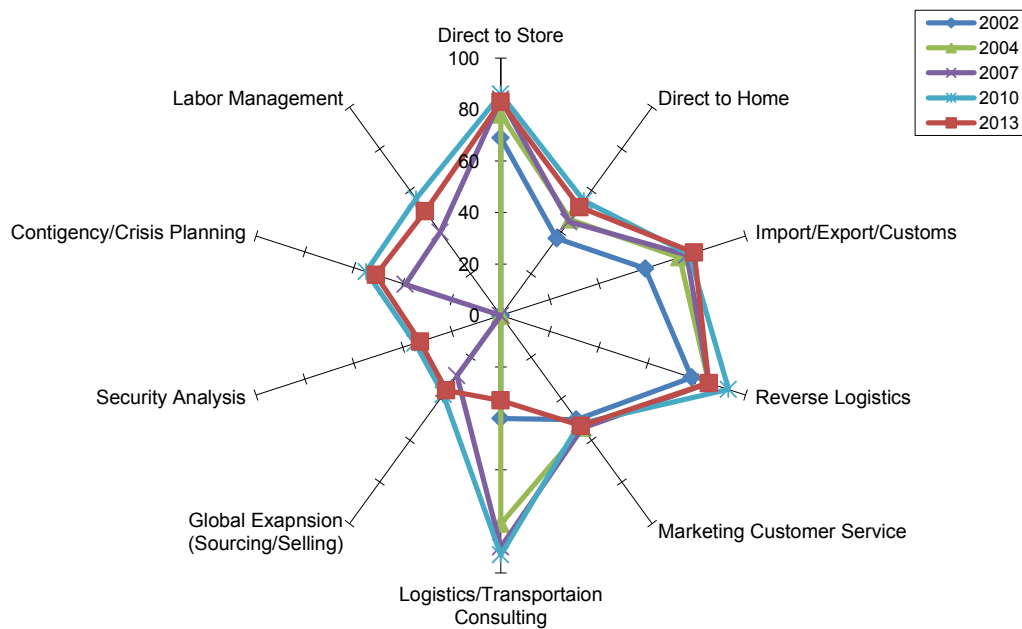
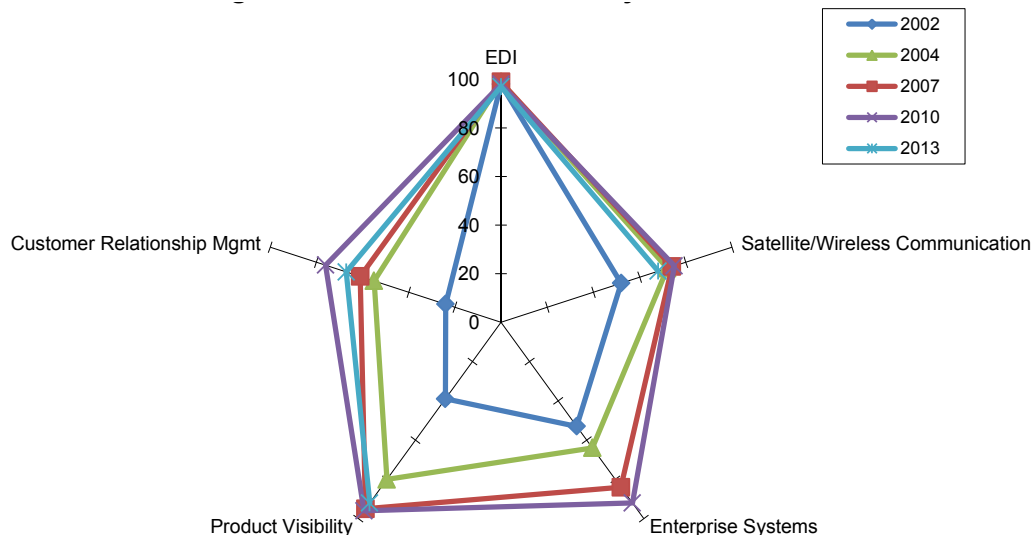


Figure 3: Tech/Web Services by 3PLS



ANOVA analysis (Table 2) on the aggregated numbers of all service categories shows significant growth at $p=.000$ level. Hence Hypothesis 1 is not rejected. Further analyses on each service category find that transportation service, special services, and technology based service show significant growth over the years, with p values of .025, .002, and .000, respectively. The technology related services show double digit growth in most of the years. Although not at the significant level, logistics services are also growing at a steady rate. The service categories that

have even more future growth potentials are in the transportation service and special service areas. Four industry sectors—manufacturing, retail/e-tail, distributor, and services—are reported in the survey. Most 3PLs serve more than one industry sector. Table 3 shows that 3PLs are serving more industries over time. ANOVA analysis reveals that all growth comes from the retail sector, distribution sector, and service sector, with p values of .006, .040, and .004, respectively. Hence hypothesis 2 is not rejected.

Table 2: ANOVA test on service category by year

Service Category	2002	2004	2007	2010	2013	F Statistic	Sig.
All services	63.54	74.02	73.11	74.36	71.25	7.086	.000
Logistics services	71.81	73.55	75.56	76.46	77.10	1.062	.375
Transportation services	62.53	70.34	70.98	69.44	71.17	2.810	.025
Warehouse services	69.53	76.43	76.43	77.10	76.43	1.059	.376
Special services	55.72	69.70	60.49	64.14	62.50	4.434	.002
Tech/Web services	53.54	74.34	82.42	87.27	73.20	56.728	.000

Number presents the average percentage of companies providing services in each category

Table 3: ANOVA test on industry served by year

Industry served	2002	2004	2007	2010	2013	F Statistic	Sig.
Manufacturing	98	97	98	99	99	.393	.813
Retail/e-retail	77	87	92	91	91	3.640	.006
Distributor	83	89	92	96	88	2.526	.040
Service	53	71	69	78	67	3.907	.004

Number represents count

As the supply chains getting global, one would expect the 3PLs will also expand their services to global regions. Table 4 shows an increase of globally focused 3PLs over the years. However Chi-square test does not show the increase was at a significant level (p value=.359). Hence Hypothesis 3 is rejected. Asset ownership varies among the 3PL companies. Table 4 shows significant changes (p value=.003)

on asset ownership of 3PLs over the years. Hence Hypothesis 4 is not rejected. Pure asset-owned 3PLs were going down from twenty three companies in 2002 to only eight companies in 2013. The number of 3PLs that leverage both asset and non-asset capabilities grows from thirty-two companies in 2002 to fifty-two companies in 2013.

Table 4: Chi-square tests on region and asset ownership by year

Region	2002	2004	2007	2010	2013	Chi-Square	Sig.
North America	42	51	46	40	38	4.364	0.359
Global	58	49	54	60	62		
Asset Ownership	2002	2004	2007	2010	2013	Chi-Square	Sig.
Non-Asset	44	44	49	50	40	23.021	0.003
Asset	23	20	13	6	8		
Both	32	36	38	44	52		

Number represents count

In general asset-based providers offer dedicated services, primarily through owned or leased assets. Non-asset-based providers offer administrative management services, and tend to subcontract for the necessary logistics assets which are not available in-house. ANOVA tests (Table 5) are conducted on all data and find significant difference ($p=.000$) in the overall service levels among the three types of asset ownership. Non-asset based 3PLs offer an average of 69.42% of all service surveyed. Asset based 3PLs offer an average of 66.08% of all services and the both non-asset and asset based 3PLs offer an average of 75.70% of all services. Hence Hypothesis 5

is accepted. In fact 3PLs that leverage on both non-asset and asset based capabilities provide more services in all service categories, the averages ranging from 68.02% in special services to 81.89% in warehouse services. This result is consistent with Stank and Maltz's study (1996), but it is different from Murphy and Poist's study (1998). Murphy and Poist (1998) concluded that there were no differences in the number of services offered by either asset-based or non-asset-based providers. However, their study compared customers' reported usage of services from asset-based and non-asset-based providers, not the actual services offered by 3PLs.

Table 5: Service category means and ANOVA tests by asset ownership

Service Category	Non-Asset based	Asset based	Both non-asset and asset based	F Statistic	Sig.
All services	69.42	66.08	75.70	10.240	.000
Logistics services	73.87	64.41	78.19	10.034	.000
Transportation services	67.95	58.81	72.15	7.242	.001
Warehouse services	66.49	83.06	81.89	18.475	.000
Special services	59.27	57.71	68.02	5.306	.005
Tech/Web services	71.81	71.61	78.53	6.467	.002

Number represents the average percentage of companies of each asset ownership type in providing each service category

Table 6 indicates that the service levels differ between the global players and North America regional players significantly ($p=.000$). Hence Hypothesis 6 is accepted. Global 3PL companies provide signifi-

cantly broader level of services in all categories except the technology category, the averages ranging from 66.93% in special services to 79.63% in logistics services.

Table 6: Service category means and independent t tests by Region Served

Service Category	North America	Global	t Value	Sig.
All services	66.61	74.81	-5.422	.000
Logistics services	68.13	79.63	-6.143	.000
Transportation services	61.91	73.94	-6.136	.000
Warehouse services	74.94	75.31	-.134	.894
Special services	56.37	66.93	-4.844	.000
Tech/Web services	74.47	73.78	.311	.756

Number represents the average percentage of companies of each region focus in providing each service category

6. MANAGERIAL IMPLICATIONS

As business goes global, the supply chain networks and logistics complexity increases. Outsourcing logistics functions offers the opportunity for supply chain participants to concentrate on their core capabilities. The growth of the third-party logistics industry makes both the formation and dismantling of supply chain arrangements easier.

This study shows 3PLs have served more industry sectors over the years. Third-party logistics have been commonly utilized in the manufacturing sector. As logistics outsourcing becomes a viable strategy, industry sectors such as retail and e-retail, distribution and wholesale, and service sector have also adopted the best practices, which expand 3PL service markets. The fastest growing market for 3PLs comes from the service sector and retail/e-retail sector. In 2002, 53% of 3PLs served in the service sector and the percentage was increased to 78% in 2010. Retail/e-retail sectors also had significant growth of 14% from 2002 to 2013. Some 3PLs focus on e-retailers and offer warehousing, shipping, and order-management services to support the business-to-customer (B2C) e-business model. As of 2013, the number of industry served per 3PL providers ranged from one to sixteen, with an average of ten verticals. Armstrong & Associates (2009) reported seventy-seven percent Fortune 500 companies used 3PLs for logistics and supply chain functions and many of them used more than one 3PLs provider. For examples, General Motors, Procter & Gamble,

Wal-Mart, PepsiCo, and Ford Motor each used 30 or more 3PLs (Armstrong & Associates, 2009). Similarly O'Reilly (2011) reported seventy-seven percent of more than 5000 3PLs users working with multiple 3PLs partners.

Asset based companies are typically larger firms. They usually enjoy economies of scale, own warehouse or transportation assets, have broader industry knowledge, and have a larger customer base. However non-asset based firms are more flexible and more able to tailor services with specialized industry expertise. This study finds fewer pure asset based 3PLs companies over the years. Asset-based companies have tapped into the non-asset based capabilities to serve their customers. As the customers demand more service offerings from 3PLs, the expanded service scope satisfies customer's desire for "one-stop" shopping. The transportation and logistics market in the United States is highly fragmented. Strategic merger and acquisition has become a strategy as consolidation provides a significant opportunity to build up capabilities and expand markets. Publicly traded logistics companies and private equity firms are seen as the most aggressive buyers, going after smaller private companies or specific niche areas that are highly valuable to profit and revenue (Reuters, 2011). For example, Thoma Bravo LLC, a leading private equity investment firm, acquired UPS Logistics Technologies, a business unit of UPS, in 2010. The newly independent company has been renamed Roadnet Technologies, Inc. with

the goal to provide world-class transportation management applications (PEHub, 2010).

In response to the specific needs of each industry and customer, there is a proliferation of 3PLs services. This study shows that service scope gets broader over time in this industry. The results, in general, continue the trend projected by Persson and Virum (2001) and Lieb and Bentz (2003). Not only 3PL companies offer more services in all categories, the rank orders of the five service categories change also. In 2002 the rank order from the most offered services to the least offered services was logistics, warehousing, transportation, special services, and technology services. In 2010 the rank order was changed to technology services, warehousing, logistics, transportation, and special services.

Van Hoek's (2000) found that traditional third-party logistics services such as warehousing and logistics have become commoditized. To differentiate in the 3PLs market, logistics and supply chain related technologies have helped create niche expertise. This is interesting because in Lieb's 2003 user survey, users of 3PLs generally did not see 3PL providers as leading edge suppliers of information technology. Lieb and Bentz (2004) indicated that 3PLs must decide upon appropriate strategies for strengthening their technology capabilities to convince potential users. This research shows that 3PLs have made consistently and significantly improvement in technology and web service offerings in the last decade. In 2002 only 53 percent of 3PLs companies offered technology services and the percentage was increased to 73.2% in 2013. Technology services related to product visibility, customer relationship management, and enterprise web enablement have shown rapid growth. Via technologies, the buyer, seller, and shipping partners can monitor the status of a shipment in real time from start to finish. For example, FedEx and UPS have modified their services quickly to accommodate their e-commerce customers for package delivery (Armstrong, 2004). Looking forward, Figure 3 shows wireless communication and customer relationship management are the two areas with more room for future growth.

Traditionally, turnover rate was high in 3PL market. Mottley (1998) showed that more than one-third

of users had cancelled at least one 3PL contract. However, a later survey by Lieb and Bentz (2004) showed seventy-two percent of the users identified in their survey had used 3PL services for more than five years, which is the highest percentage ever reported in this category in their surveys. This finding indicates that the relationships between customers and some 3PLs are stabilized over time and may be changing from adversary to partnership. However, using a proprietary database Armstrong & Associates (2009) studied 3,936 3PLs customer relationships from 2005 through 2008. It is found that only 18.5% of the relationships were considered strategic and the remaining 81.5% were classified as tactical relationships. To become a true strategic partner to its logistic outsourcer, these high value-added special services could create competitive advantages.

One way to gain reputation as 3PL leaders is through certifications. Table 7 shows three certificates to improve 3PLs' credentials. ISO is a highly regarded international standard for an established quality system in a company. ISO was first published in 1987 by International Organization for Standardization. As shown in Table 7, ISO is most adopted by 3PLs companies serving global region and service sector. Asset-based 3PLs companies do not embrace this quality certificate. In 2004, US EPA launched SmartWaySM — an innovative brand that represents environmentally cleaner, more fuel efficient transportation options. SmartWay brand identifies products and services that reduce transportation-related emissions. SmartWay partners are committed to sustainability through promoting greater energy efficiency and air quality within the freight transport sector (EPS web site). Recently many companies have developed sustainable supply chain initiatives. 3PLs with SmartWay certificate may become a strategic partner to such initiatives. C-TPAT (Customs-Trade Partnership against Terrorism) is a new certificate from the first worldwide supply chain security initiative in 2007. The voluntary government-business initiative is to build cooperative relationships that strengthen and improve overall international supply chain and U.S. border security (C-TPAT web site). C-TPAT is adopted more by global players and non-asset based 3PLs companies. Supply chain security is a growing concern in global business. More 3PLs are expected to provide special services in this area.

Table 7: Certificate adoption by industry, region, and asset ownership structure

Industry served	ISO	Smart Way	C-TPAT
Manufacturing	57.58%	65.66%	59.6%
Retail/e-retail	57.14%	68.13%	61.5%
Distributor	55.68%	63.64%	60.4%
Service	65.67%	76.12%	62.8%
Region served	ISO	Smart Way	C-TPAT
Domestic	50%	46.74%	45%
Global	62.90%	79.03%	70%
Asset Ownership	ISO	Smart Way	C-TPAT
Non-Asset	55.00%	62.50%	62%
Asset	37.50%	62.50%	50%
Both	63.46%	69.23%	59.1%

Number represents the percentage of 3PLs adopted the certificate. ISO and Smart Way numbers are from 2013 survey and C-TPAT numbers are from 2010 survey.

7. CONCLUSION AND FUTURE RESEARCH

Logistics management has significant impacts on various aspects of supply chains such as response time, total supply chain cost, sourcing risk, customer service, security, sustainability, etc. A 3PL study by three professional organizations and Georgia Institute of Technology affirms that logistics is one of the keys to company's success, and many firms give credits to logistics service providers for helping them achieve critical service, cost, and customer satisfaction goals (Lagley et al., 2004). This study proposed seven hypotheses based on extant literature to examine the strategic development of the 3PLs industry in the United States. Using secondary data gathered from 3PLs in the last decade, comprehensive analyses are conducted to provide a longitudinal view.

This study shows that 3PLs services vary based on industry verticals served, regions served, and asset ownership structure. Over last decade 3PLs have served more industry sectors, became asset light, and provided broader services. 3PL companies offer five service categories—transportation, logistics, warehousing, technology, and value-added special services. The first three categories are traditional services. The last two service categories have been evolved and expanded rapidly in the last decade, and the new capabilities have strengthened the strategic position of this industry.

The limitation of this study comes from the secondary data utilized. The dichotomy nature of the data makes it hard to assess the quality and impact of 3PLs services. Moreover, the data represent the provider's view. For future studies, it will be useful to obtain paired data to get outsourcers' inputs. Obtaining financial and assessment data will provide more insights to the development of 3PLs industry. In addition, new issues in global supply chains such as supply chain risks, sustainability, and security have imposed enormous challenges. It will be interesting to conduct a detailed study on the role of 3PLs and its strategies to make profound impacts in these areas.

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