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Joe B. Hanna
Auburn University

Arnold B. Maltz
Arizona State University

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ANALYZING THE EVOLUTION OF CLASS I LTL MOTOR CARRIERS: AN EXAMINATION OF EXPANSION INTO WAREHOUSING

Joe B. Hanna
Auburn University

Arnold B. Maltz
Arizona State University

ABSTRACT

The current research uses Porter's differentiation strategy framework to examine Class I LTL motor carrier service expansion habits over the last twenty years. The examination focuses on carriers bundling transportation and warehousing services together to help differentiate their service offerings from competitors. Results indicate that carriers are expanding service offerings to include warehousing services and are providing significant value-added services to customers. Continuous growth in warehouse service expansion was evident from passage of the Motor Carrier Act of 1980 to the mid-90's.

INTRODUCTION

Since deregulation in 1980 the market environment faced by motor carriers has changed dramatically (Corsi et al., 1991; Feitler et al., 1998; Harper, 1983; Silverman et al., 1997). The environmental changes have altered relationships between shippers and carriers and created a mutual dependence (Crum and Allen, 1991). While the bulk of logistics research has typically focused on the shipper, motor carriers also face many new challenges (Corsi et al., 1991). Attracting and retaining customers is one of the most critical challenges facing carriers

because it is vital to their long-term success (Stock, 1988). Carriers successful in meeting this challenge can build and maintain a solid customer base, enhancing the future outlook for the carrier (Rinehart, 1989).

Throughout the 1980's and 90's significant changes in the strategic orientation of motor carriers has occurred (Feitler et al., 1998; Silverman et al., 1997). Some carriers have attempted to attract and retain customers by pursuing strategies designed to differentiate themselves from competitors. They believe sufficient customization and/or bundling of services

may be one way to differentiate them from other carriers (Rinehart, 1989). There are several reasons why customizing or bundling services may help to retain customers.

First, many buyers of third-party logistics services are reducing their supplier bases (Delaney, 1998). Creating and maintaining a supplier relationship takes up valuable resources. The customer must identify potential suppliers, negotiate agreements, and process paperwork. Unless absolutely necessary, customers are increasingly reluctant to deplete resources to support a myriad of external logistics service providers. Instead they prefer to have a limited number of high quality external providers offer multiple services integrated together. To remain on their customers exclusive supplier list, some carriers are attempting to build long-term strategic alliances with key customers by bundling multiple logistics functions together to expand the availability of service offerings.

Second, carriers face significant competition from other carriers and integrated third-party logistics providers. Previous studies have examined the impact of integrated service providers on both logistics outsourcing usage (Leib and Maltz, 1998; Lieb and Randall, 1996; Sink and Langley, 1997) and motor carrier strategy (Feitler et al., 1998; Harper, 1983). Results of these studies indicate the third-party logistics market will continue to grow (Sink and Langley, 1997) and customers will be increasingly interested in "one-stop shopping" (Leib and Maltz, 1998). Many carriers want to take advantage of these market conditions and establish themselves as a leading edge logistics provider by differentiating themselves from competitors. To establish a credible reputation in the marketplace and remain competitive, many carriers have pursued a strategy of providing a variety of high quality customized services. As a result, some motor carriers have enhanced their competitive position and experienced considerable growth by expanding the number of services offered to customers (Crum and Allen, 1991).

BACKGROUND AND LITERATURE

The *Motor Carrier Act of 1980* was particularly troublesome for the Less-Than-Truckload (LTL) segment of the motor carrier industry (Corsi et al., 1991). The net impact of deregulation on the motor carrier industry has generally been positive (Winston et al., 1990). However, adjusting to the free market environment has been a fatal process for some carriers (LaLonde, 1984-1985). Bankruptcies have increased since deregulation (Harper and Johnson, 1987) and LTL motor carrier profits declined by approximately \$5.3 billion in the ten years subsequent to deregulation (Corsi et al., 1991).

Prior to deregulation carriers had little incentive to expand service offerings to customers. As a result, most regulated carriers were solely transportation providers. Since deregulation, the number of participants in the LTL motor carrier industry has declined significantly (Fietler et al., 1998). In response to a "free" market environment characterized by high concentration levels, many carriers have been compelled to adjust their business strategy to survive.

As environmental conditions changed, carriers responded by making adjustments to their strategy in order to remain competitive. Strategy is a pattern of firm behavior which helps guide the future direction of the business (Hambrink, 1983). Porter asserts that there are three broad generic strategies which can be used to help achieve a competitive advantage (Porter, 1980). The three strategies are cost leadership, differentiation, and focus (Porter, 1980). While three strategies exist, he notes most successful companies typically implement one generic strategy in pure form instead of blending the strategies (Porter, 1980).

Cost leadership is striving to achieve lower costs than the competition. Focus is concentrating on a particular market segment. Differentiation is attempting to offer products or services that distinguish your offerings from the competition (Porter, 1980). The level of differentiation

achieved is the degree to which the product or service and its enhancements are perceived as unique (Hambrink, 1983a and 1983b).

Porter's three generic strategies have all been empirically tested. The results of several studies (Dess and Davis, 1980; Miller, 1987; Miller 1986; White, 1986) support the usefulness of Porter's strategy framework. While all three strategies are an important part of Porter's framework, differentiation is the generic strategy of primary interest in the current research.

There are many ways to achieve industry wide differentiation, including providing superior technology (Porter, 1980), offering unique features (Porter, 1980), and improving performance levels (Rothschild, 1984). Immediately after deregulation some carrier managers began bundling two or more logistics services together to provide the customer a unique combination of services. Bundling is taking place when two or more products or services are sold as a single package (Nagle, 1984). Many carrier managers felt they could differentiate their firm from competitors by offering customers a bundle of customized services at a competitive price.

Bundling can take many forms. However, the primary type of bundling examined in this research is mixed bundling. Mixed bundling is offering to provide each service separately or bundle the requested services together for resale (Paun, 1993). Immediately after deregulation, some LTL carriers began to practice mixed bundling. The researchers believe carriers attempted this strategy primarily for two reasons. First, they perceived the practice as constituting a unique service offering. Second, bundles are typically priced so the sum of the services packaged together is less than the price of purchasing each of the services separately (VanBuer, Venta, and Zydiak, 1997). Therefore, bundling might allow the carrier to offer a more competitive price to the marketplace.

In contrast to the lower prices often achieved by mixed bundling, Porter contends that as more resources are dedicated to achieving a differ-

entiation strategy, the price of the service may need to be increased (Porter, 1980). Higher prices may reduce the ability of the firm to compete in a highly competitive marketplace (Porter, 1980). However, carriers successful in providing several unique competitive logistics services at a competitive price are often rewarded by customer loyalty. As the level of loyalty increases, competitors have a more difficult time convincing the customer to change providers, effectively reducing competition. Firms successfully differentiating their services from others may also notice customers becoming less sensitive to variables like price and length of contract.

Introducing competition to the motor carrier industry is a potential impetus for changes in strategy. The strategic re-evaluation undertaken by many carriers has attempted to address the issue of how to attract and retain customers and enhance profit. Recent studies have shown that pursuing a differentiation strategy is associated with improved carrier performance levels (Feitler et al., 1998). Some carriers believe one potential differentiation strategy for the LTL segment may be to expand and customize service offerings. While many service expansion opportunities exist, past studies indicate many firms tend to group transportation and warehousing services together because of the interface often required between the two services (Lieb and Randall, 1996; McGinnis et al., 1994; Turner, 1997). Additionally warehousing has been identified in prior research as a frequently outsourced logistics service (Holcomb, et al., 1997; Sink and Langley, 1997). Therefore, one relatively popular option for carriers is to augment LTL transportation by bundling it with customized warehousing services.

PURPOSE OF STUDY

The purpose of the current study is to gain insight into the evolution of the Class I LTL general freight motor carrier industry since deregulation. Specifically the research will examine how carriers have adjusted their strategic orientation since passage of the Motor

Carrier Act of 1980. This will be accomplished by examining: 1) the number of carriers offering warehousing services at a given point in time, 2) the types of warehousing services offered by carriers, 3) how each carrier achieved the service expansion, and 4) the growth rates of carriers bundling transportation and warehousing services together.

First, it is currently unclear what percentage of LTL carriers actually offer true warehouse services and which carriers simply claim to offer warehousing. The number of carriers augmenting transportation with warehousing will be identified. Second, there are many types of ancillary services (e.g., sorting or sequencing, price marking, bar coding and tracking, etc.) each carrier can offer in their warehousing division. The availability of these services and their level of customization will be investigated. Third, insight will be gained into how each carrier acquired the warehousing space needed for the service expansion. This includes examining the number of carriers acquiring warehouse space from each of three possible scenarios (internal, strategic alliance/partner, and external). Fourth, the timing of expansion will be examined by creating an innovation path. The path will illustrate the number of carriers offering warehousing services at a specific point in time. If significant growth levels are evident and numerous carriers now offer warehousing, one must question if offering an additional service like warehousing is truly a "unique" service offering. Offering multiple services may over time become a requirement for carriers wishing to remain competitive in the marketplace. As this becomes the case, service expansion may no longer be an avenue to a successful differentiation strategy.

Service bundling is not likely to be a successful differentiation strategy if several other carriers are also offering warehousing services. Therefore, one way to examine the potential effectiveness of bundling services together to achieve differentiation is to examine the number of competitors offering similar services at fixed points in time. Conceptually this is similar, but

not identical to, examining the diffusion process for a "new" bundle of logistics services. Diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1983).

The researchers treat carrier service bundling (motor carriage and warehousing) in a manner similar to a new service innovation. However, the results are not illustrated by constructing a diffusion curve and no specific decision variables are incorporated into the curve. A diffusion curve illustrates the total *volume* available in the market at fixed points in time (Bass, 1969). In contrast, the current research is interested in determining if bundling motor carriage and warehousing services together achieves differentiation by offering customers a unique bundle of services. The likelihood of achieving differentiation simply by bundling services together is low if several competitors are also successfully bundling transportation and warehousing services. Therefore, the current research constructs a graphical representation to examine the *number* of competitors (carriers) offering warehousing services a fixed points in time. This research will be consistent with past research (Oster, 1990) and allude to this type of graphical representation as an innovation path.

STUDY METHODOLOGY

Porter suggests successful differentiation typically requires additional company resources (Porter, 1980). For this reason the researchers chose to restrict the study to Class I LTL carriers. During the period of study a Class I LTL carrier was a carrier with annual revenues of \$5 million or more. The researchers felt carriers with annual revenues of \$5 million or more were the candidates most likely to have the resources available to achieve a successful expansion into warehousing.

A listing of all Class I LTL motor carriers was obtained from the National Motor Carrier Directory (1995). The Directory included information on the date each carrier was

established and gave the name, position, and telephone number of the primary contact person for the organization. The researchers captured carriers operating in both a regulated and deregulated environment by restricting the study to companies operating continuously from 1980 through the mid 1990's.

Initially we identified 94 Class I LTL motor carriers who had been in continuous existence from 1980 to 1995. Five of the 94 carriers specialized in express delivery and were subsequently dropped from further analysis. The researchers did not believe express delivery carriers were good subjects to examine because the types of services they offer are not comparable to most general freight carriers.

The remaining 89 carriers were contacted by telephone and asked to participate in the research. The initial phone conversation explained the goals of the research and sought the name of the organization representative most concerned with a possible service expansion into warehousing. The initial conversations identified eleven carriers who were no longer performing LTL transportation and fifteen who were no longer independent firms because of mergers or takeovers. Finally, two firms refused to participate. After initial contact, the researchers had a total of 61 Class I LTL carriers who agreed to participate and provide information on their operations (See Table 1).

The survey instrument was reviewed by executives of two large LTL carriers to make sure terminology was appropriate. After refinement of the survey was complete, the contact person for each of the 61 firms was sent a copy of the survey and interviewed in a subsequent telephone call. Interviews to complete the survey typically lasted 10 to 20 minutes. During the interview process several questions were asked about if and when the carrier expanded service offerings to include warehousing. For purposes of this research warehousing was defined as:

**TABLE 1
DATA COLLECTION
AND SURVEY SAMPLE DESCRIPTION**

Carriers contacted and asked to participate	89
Carriers no longer performing LTL carriage services	(11)
Carriers combined through merger or takeover	(15)
Carriers refusing to participate	(2)
Carriers participating in survey administration	61

A business entity with space and services available to serve customers in the receiving, storing, putaway, inventory control, order picking, and shipping of the customer's goods for a designated period of time (Speh and Blomquist, 1988).

If the representative responded they did not offer any form of warehousing, only a short narrative section of the survey was administered. The purpose of the narrative section was to determine why the carrier elected to remain focused solely on transportation. In cases where the carrier did offer warehousing services to their customers, the entire survey was administered.

Included in the survey instrument were several additional questions designed to provide consistent criteria for carriers initially identifying themselves as a warehouse provider. A firm was classified as offering warehousing if it met at least one of the following tests.

- 1) The firm or division falls under the Uniform Warehouse Receipts Act (UWRA) and issues a warehouse receipt when goods are received.
- 2) The firm typically stored goods for 72 hours or more.
- 3) The firm billed customers separately (or itemized a combined transportation/warehouse bill) for warehousing services.

- 4) The firm priced warehousing services separately from transportation.
- 5) The warehouse facility is physically separate from any terminal facilities.

In rare cases it was difficult to determine whether the carriers were providing emergency terminal storage or longer-term warehousing. In these cases the dialog of the conversation was continued until an informed determination could be made on the type of storage services offered by the carrier. In most cases carriers who met the definition of warehousing had separate warehouse and terminal facilities.

SUMMARY RESULTS

The following section summarizes key findings from the research.

Most motor carriers (42 of 61 = 69%) surveyed were classified as providers of warehousing (See Table 2). Of the 61 carriers participating in the research almost half (28 of 61 = 46%) chose to provide warehousing services by acquiring space and labor internally. Interestingly, only 31% (19 of 61) of carriers surveyed indicated they do not offer any warehousing services to customers.

TABLE 2
CATEGORIZATION OF
LTL CARRIER EXPANSION BEHAVIOR

Firms indicating they did NOT expand into warehousing services	19 of 61 (31%)
Firms indicating they did expand into warehousing services	42 of 61 (69%)
Firms achieving expansion by providing the service internally	28 of 42 (66.7%)
Firms achieving the expansion by providing the service by some other means like a strategic alliance/partnership arrangement	14 of 42 (33.3%)

Over the last several years, experts have urged businesses to contract with specialists unless the activity in question is a core competence of the

company. Companies can improve efficiency and productivity if they focus on their core competence or the activities that they do best. These types of activities are often provided internally and remain within the corporate walls if the company can do them more economically than outside specialists. Conversely, functions that are not considered to be core competencies are often outsourced. Interestingly, the current results indicate that roughly half of all Class I LTL carriers offering warehousing services have chosen to provide the additional services in-house. This treatment is consistent with recognizing the service as a core competence. It appears management personnel of many Class I LTL carriers consider warehousing to be within the realm of their core competence.

Seventy-six percent (32 of 42) of the time product stored in the warehouse remained there over 7 days and only 10% (4 of 42) of the time the product stayed less than 4 days. (See Table 3, Question #8). The results indicate motor carriers are making a clear distinction between cross-docking or temporary storage and legitimate warehousing services. Carriers are treating warehouse services as a separate logistics function. The two separate functions are then bundled together to furnish the customer multiple logistics services through one external provider.

Seventy-one percent (30 of 42) of carriers providing warehousing to customers identify the type of service they provide as being most similar to a contract warehouse situation (See Table 3). Another 24% (10 of 42) believe their services are most similar to a private warehouse facility. Only 2 of the 42 firms surveyed (5%) feel they are offering services most comparable to public warehousing facilities. Additionally over half the carriers (55%) cost and price warehousing services separately from transportation and another 38% consider warehousing costs in the overall price of services.

Warehousing appears to be a natural partner to trucking in the supply chain. Carriers typically pick up from, and deliver to, warehouses and

TABLE 3
CARRIER CHARACTERIZATION OF WAREHOUSING SERVICES

Question # 7: Characterize which of the following types of warehousing you consider your firm's services to be most similar to the majority of the time.	
Public	5%
Contract	71%
Private	24%
Question # 8: How long does product stored in your warehouse typically stay in the facility?	
Fewer than 4 days	10%
4 to 7 days	14%
Over 7 days	76%
Question # 9: Indicate which of the following statements best describes how you consider the cost of warehousing in the pricing of overall services.	
Warehouse cost is considered in the price of the overall service.	38%
Warehouse services are done primarily for customer service and the cost is not considered when pricing overall services.	7%
Warehouse service is costed and priced separately from motor carriage.	55%

often manage consolidation and cross-docking facilities. Warehousing is a major expense in the supply chain and shippers often use third parties to perform the function. Many LTL carriers already possess many of the materials handling and facility management skills which may easily transfer to warehouse management. Perhaps this is why many carriers participating in this research appear to view warehousing as a core competence. As a result, we expected shippers to be most comfortable with specialized and/or long-term warehousing. Therefore, it is not surprising that almost all of the carriers surveyed described their warehousing services to be most like a contract or private storage situation. They are attempting to deliver what the customer desires, and it is logical for most customers to prefer warehousing situations most similar to contract or private storage arrangements. Furthermore, the length of time product stays in storage indicates most customers are relatively

comfortable giving warehousing duties to their carriers. Most likely this is because the carriers were already familiar with the operations of their customers.

While outsourcing has typically been studied from the perspective of the firm buying the service, the service suppliers also have important decisions to make. Carriers have to determine if it makes sense to invest capital and other resources in a related business. Should the carrier turn to a warehouse specialist, provide the service internally, or turn down the customer request and stick to transportation? If these results are any indication, most carriers do not see declining the customer's request for warehousing to be an option even though the service is a small contributor to total revenues. The primary decision faced by most carriers appears to be how to comply with their customer requests.

Further investigation was made into the types of value-added services offered in the warehouse (See Table 4). The researchers chose to inquire about seven different value-added services common to warehouse operations. Results reveal at least half the carriers surveyed responded positively when asked about offering each of the seven value-added services. Perhaps carriers feel successful pursuit of a differentiation strategy requires more than merely offering warehousing facilities. Many carriers are responding by claiming to offer customized value-added services within the warehouse. Logistics activities are being redistributed throughout the supply chain, and long-time participants are redefining their roles and responsibilities. Major customers are asking for more integrated services and lower costs. While third-party logistics companies may still have the broadest offerings, the current research indicates that carriers are also moving beyond their traditional functions to provide customers with a number of value-added services.

Not surprisingly several carriers indicated they would like to see warehousing become a significant portion of total profit for the carrier. However, the percent of total revenue provided by expansion into warehousing remains small in most cases (See Table 5). Only 17% (7 of 42) of

carriers indicated total warehouse revenue exceeded 10% of total carrier revenue.

Internal vs. External Sourcing

Carriers were also asked about how they acquired the warehouse space necessary to complete the expansion into warehousing (See Table 5). The classification was determined based on the percentage of warehouse revenue gained from owner vs. independent facilities. If over 50% of a firm's warehouse revenue was from owned facilities, the carrier was placed in the "self-providing" (internal provider) category. Carriers not meeting the above criteria were classified as buyers of warehouse services. Buyers of warehouse services were subsequently categorized as either alliance participants or purchasers of warehouse space. This categorization was based on narrative information provided by each carrier during the telephone interview. For purposes of this study, a strategic alliance is the establishment of, and commitment to, a long-term interactive relationship where both parties benefit by sharing risks and resources (Ellram, 1991; Landeros and Monczka, 1989). Based primarily on this definition, carriers were considered to participate in an alliance if: 1) the relationship was characterized by a long-term commitment and 2) significant

TABLE 4
CARRIER RESPONSE TO KEY WAREHOUSING ISSUES

Survey item # / Item of discussion	% Yes	% No
14a) The warehouse provider offers price marking of shipments	69.0	31.0
14b) The warehouse provider offers specialized packaging/repackaging of shipments	69.0	31.0
14c) The warehouse provider offers sorting or sequencing of shipments	92.9	7.1
14d) The warehouse provider offers labeling of shipments	69.0	31.0
14e) The warehouse provider offers sub-assembly assistance on shipments	50.0	50.0
14f) The warehouse provider offers bar coding or tracking	73.8	26.2
14g) The warehouse provider offers order picking in odd lots vs. full package	78.6	21.4

TABLE 5
REVENUE PRODUCED (BY METHOD OF ACQUIRING WAREHOUSING SPACE)

Question # 15: Estimate the percentage of revenue provided by offering warehousing services.	
More than 50%	2%
More than 30% and up to 50%	5%
More than 10% and up to 30%	10%
Less than 10%	83%
Question # 17a (For carriers using internal expansion to acquire warehouse space): Estimate the percentage of warehousing revenue generated by offering warehousing services by providing the service <i>internally</i> .	
More than 85% and up to 100%	(20 of 28) = 71%
More than 70% and up to 85%	(5 of 28) = 18%
Less than 70%	(3 of 28) = 11%
Question # 17b (For carriers using a strategic alliance or partnership to acquire warehouse space): Estimate the percentage of warehousing revenue generated by offering warehousing services by providing the service through a <i>strategic alliance or partnership</i> arrangement.	
More than 85% and up to 100%	(8 of 11) = 73%
More than 70% and up to 85%	(2 of 11) = 18%
Less than 70%	(1 of 11) = 9%
Question # 17c (For carriers using a purchase agreement to acquire warehouse space): Estimate the percentage of warehousing revenue generated by offering warehousing services by <i>purchasing</i> the warehouse space.	
More than 85% and up to 100%	(2 of 3) = 67%
More than 70% and up to 85%	(1 of 3) = 33%
Less than 25	(0 of 3) = 0%

amounts of resources were shared between the two partners. Carriers not meeting this criteria were placed in the "purchase" category.

Of the 42 carriers providing warehousing services, two-thirds (28 of 42) acquired the needed warehouse space internally (See Table 2), again consistent with treating warehousing as a core competence. The remaining 14 carriers looked for outside assistance to acquire the needed warehouse space. Eleven of these entities formed an alliance or partnership with another company and only three purchased the warehouse space via an arms-length agreement.

Table 5 further analyzes warehousing revenues by examining revenue generated by each method (internal, strategic alliance/partnership, and external).

When carriers are faced with a make/buy decision for warehousing, they seem to operate much like their shipper customers. Larger carriers appear to be more likely to offer warehousing from their own buildings and with their own employees. Carriers appear to view warehousing as a core competence and tend to provide the service internally. This pattern appears consistent with past research (Maltz,

1994) which found as specialization increases in a private warehousing situation, providers opt to supply the service internally. Perhaps an increase in specialization infers a core competence and, as a result, is more likely to be handled internally. One could argue this may be surprising since carriers are likely to be very knowledgeable about the operations of any potential external warehouse provider. However, one could also argue this knowledge and expertise makes the carrier a difficult customer for any potential warehouse provider. Perhaps carriers are very discriminating customers when examining the warehousing operations of a potential partner and instead elect to provide the warehousing services themselves.

Growth in carrier expansion rates was also examined. Respondents were asked to estimate when the firm they represent first began to offer warehousing services. Table 6 summarizes the results. The results show consistent growth in the number of carriers providing warehousing since 1980 (See Column 2 of Table 6). The percent of carriers in the marketplace who have expanded services to provide warehousing has also experienced growth since deregulation (See Column 4 of Table 6). A graphical representation of the percent of carriers in the marketplace providing warehousing is also shown (See Figure 1). The graph illustrates the dramatic rise in warehouse service offerings by carriers. Carrier expansion into warehousing has experienced healthy growth since deregulation of the industry in 1980. However, the most dramatic growth in service expansion rates has occurred since 1990.

CONCLUSIONS

This research focuses on gaining insight into several key topics. First, carrier expansion habits are not well understood. This research examines the number of carriers expanding service offerings to include warehousing. Second, logistics service providers have many decisions to make about the types of services

made available to customers. Specific services offered in the current marketplace are identified. Third, suppliers must explore how to best acquire the resources needed to achieve a service line expansion. Insight is gained into how various carriers acquire warehouse space. Fourth, growth rates of service bundling practices by carriers since deregulation is examined to see if bundling strategies are being adopted. This exploratory research should interest both shippers looking to reduce their supply base and carriers looking to augment market share.

Over two-thirds of the Class I LTL carriers that have survived deregulation appear to offer some form of warehousing services. LTL carriers appear to be increasing their roles in the supply chain which is likely to be good news for customers. As carriers continue to expand offerings, customers interested in obtaining multiple services from select carriers will have sufficient availability in the third-party logistics market.

MANAGERIAL IMPLICATIONS

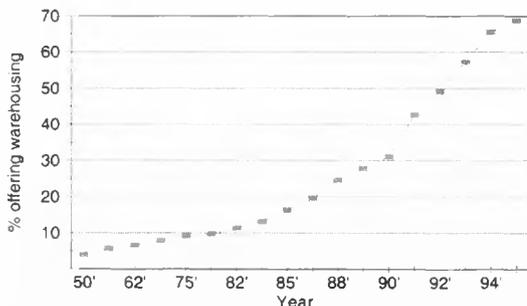
From the provider perspective, the results indicate it is unlikely that merely expanding service offerings to include an additional logistics function will allow the carrier to achieve differentiation. Successful differentiation is likely to require highly specialized, customized services uniquely tailored to the needs of each customer. However, offering highly specialized services to each customer may add to the complexity of carrier operations by requiring a deviation from the core competency of transportation. As a result, offering highly customized services may not always be advisable and needs to be investigated further.

Many types of value-added services are offered by carriers expanding into the warehousing market. In the period immediately subsequent to deregulation, many carriers began offering customized services to attract and retain customers. This was typically done by providing

TABLE 6
TIMING OF MOTOR CARRIER EXPANSION INTO WAREHOUSING SERVICES

Col # 1 Year	Col # 2 # Offering Warehousing	Col # 3 # of Firms in Existence	Col # 4 % of Firms Offering Warehousing
1950	1	26	1 of 26 = 3.84%
1956	2	35	2 of 35 = 5.71%
1962	3	45	3 of 45 = 6.67%
1967	4	51	4 of 51 = 7.84%
1975	5	55	5 of 55 = 9.09%
1980	6	61	6 of 61 = 9.84%
1982	7	61	7 of 61 = 11.48%
1984	8	61	8 of 61 = 13.11%
1985	10	61	10 of 61 = 16.40%
1987	12	61	12 of 61 = 19.67%
1988	15	61	15 of 61 = 24.60%
1989	17	61	17 of 61 = 27.87%
1990	19	61	19 of 61 = 31.15%
1991	26	61	26 of 61 = 42.62%
1992	30	61	30 of 61 = 49.18%
1993	35	61	35 of 61 = 57.38%
1994	40	61	40 of 61 = 65.57%
1995	42	61	42 of 61 = 68.85%

FIGURE 1
CLASS I LTL CARRIERS
EXPANSION INTO WAREHOUSING



customers a wider array of services (Pickett and Kletke, 1984; Rakowski, 1981) or expanding to include more innovative services (Harper, 1983, Harper, 1982). Results of the current research indicates these trends continue in the 1990's. Many logistics practitioners interviewed during the current study indicated they feel pressure from customers to offer multiple logistics services uniquely tailored to the needs of each customer. Carriers appear to be responding by making the commitment to expand offerings to customers and provide specific, customized services.

The sensitivity to current market trends may be an indication that carriers are moving toward a strategy of providing integrated logistics services to their customers. However, the intangible nature of services and diversity of customer demands make it very difficult to arrive at an optimal level of service offerings. As a result, many study participants indicated a difficulty determining which expanded service offerings to pursue to remain competitive, retain acceptable customer service levels, and maintain or increase market share.

How was the expansion achieved by carriers? It should be noted that 26% of the Class I LTL carriers offering warehousing services use a strategic alliance-type relationship with an external provider to achieve the service expansion. This number alone is significant enough to justify further consideration by carrier managers. However, the researchers suspect the number of carriers expanding by entering into a strategic alliance-type relationship with an external entity is much higher among smaller carriers. Past research (Hanna and Maltz, 1998) indicates carrier size is positively correlated with providing warehouse facilities internally.

Class I LTL carriers are larger carriers with significant resources. As a result, many of the carriers (66.7%) in the current study expanded by investing resources in internal assets and providing the additional service "in-house." However, in addition to Class I LTL carriers, hundreds of smaller carriers (Class II and III) feel the pressure to expand service offerings to customers. Many of these carriers may not have the resources to expand internally.

Many smaller carriers must examine other approaches to providing warehousing services to their customers. One alternative is to have the carrier act as lead integrated service provider. The lead provider (carrier) then determines the best way to provide the additional services required by their customer. Many smaller LTL carriers electing to pursue a differentiation strategy may find participation in a strategic

alliance allows them the opportunity to provide additional value-added services.

Successful examples of beneficial and profitable strategic alliance-type relationships within the logistics industry can already be identified (Dyer et al., 1998, Lemmink et al., 1996; Rogers and Daugherty, 1995). A clear trend of pursuing a differentiation strategy by entering into a strategic alliance-type relationship with an external logistics provider is becoming apparent. However, before an alliance-type relationship can be successfully implemented, the partners must move away from treating business associates as adversaries; a dramatic contrast to past business practices which have traditionally viewed other entities as competitors.

Growth rates of service bundling practices are on the rise. Prior to deregulation less than 10% of carriers offered any type of warehousing services. However, since deregulation introduced competition into the market and forced carriers to compete for customers, service expansion into warehousing has exploded. Currently over two-thirds of all Class I LTL general freight motor carriers surveyed offer some form of warehousing services. While sufficient carrier growth into warehousing can be detected from 1980 to 1990, the most dramatic growth has occurred since 1990 (See Table 5 and Figure 1). Stiff competition from other carriers coupled with sophisticated and demanding customers has either enticed or forced carriers to expand offerings. Carriers are attempting to remain competitive in part by expanding services available and customizing those services.

Many shippers continue to reduce their supplier bases. Class I LTL carriers appear to be responding to the trend by offering more services and moving towards becoming integrated logistics providers. If carriers can remain sensitive to customer demands in the future, perhaps they will not only be able to provide multiple logistics services but will be able to accommodate customer demands throughout the entire supply chain. Understanding the current

conditions of the evolving marketplace is critical to improving shipper and carrier performance levels and warrants in-depth investigation.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

There are many possible extensions to the current research. This research focuses entirely on Class I LTL carriers expanding to provide warehousing. First, the population of Class I LTL motor carriers in business prior to 1980 and as of the end of 1995 could be expanded to include all Class I LTL carriers currently in operation. The research could also be expanded to include smaller LTL carriers or carriers in the TL segment of the industry.

Second, transportation and warehousing are just two of the many functions which could be studied. A similar methodology could be applied to studying carriers providing services other than warehousing (e.g., inventory control, order processing, materials handling, or packaging). Replication of this methodology to study the

bundling of other services could help to better understand the strategic orientation of carriers.

Third, customers have many choices when outsourcing logistics functions. Many successful third-party logistics providers practice bundling and claim to customize services. Therefore, future research should not be limited to motor carriers expanding services. The scope should be expanded to include a diverse sample of external providers.

Fourth, this research focuses on United States firms. Companies in different regions must be sensitive to their operating environment if they are to remain competitive. A global examination of third-party logistics service providers could contribute additional insight into current global outsourcing practices.

Fifth, relatively little research has focused on the provider portion of logistics services. Most research in the third-party logistics market focuses on demand for services. As a result, supply-side research into logistics outsourcing is critically needed.

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AUTHOR BIOGRAPHY

Joe B. Hanna is an associate professor of logistics at Auburn University. He holds a bachelor of accountancy, master of accountancy, and Ph.D. of business (logistics and marketing) from New Mexico State University. He has published in various academic journals and is coauthor of a logistics textbook. Past employment includes experience in public accounting and several years with Phillips Petroleum Company and Phillips 66 Chemical Company.

AUTHOR BIOGRAPHY

Arnold B. Maltz is associate professor of supply chain management at Arizona State University. His primary research areas include outsourcing and third-party logistics as well as strategic issues in the structure of logistics channels. Dr. Maltz spent 15 years in industry before returning to Ohio State University to obtain a Ph.D. in marketing and logistics. His work has been published in leading logistics journals and has been recognized by professional logistics organizations.