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Innovative Shipper Transportation Options: The Post-Deregulation Experience

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ABSTRACT

Transportation deregulation has allowed carriers to offer a variety of new and original distribution services that result in substantial savings in overall logistics costs as well as improvements in service quality. This paper describes and assesses the impact of a variety of these new options on both transportation carriers and shippers. After reviewing current trends in carrier-based product delivery offerings, the paper examines a number of innovative distribution services, including linked ocean/rail services, domestic containerization, shipment transloading, assembly and distribution, contract logistics, and logistics data interchange. The final section explores how transportation carriers will have to align their future operating strategies to conform to an evolving shipper distribution marketplace.

I. CURRENT TRENDS IN CARRIER-BASED DISTRIBUTION OFFERINGS

Regulatory reform, increased shipper sophistication in product distribution, new entrants into the transportation industry, and an enhanced interest in marketing have led domestic carriers to broaden the scope of the services they offer. However, many of the new product delivery offerings now becoming available to U.S. shippers have long been used by European and Far Eastern shippers, where transportation systems have historically operated under lower levels of government regulation. Both European and Far Eastern transportation carriers have tended to offer broader distribution service packages than those in the United States. In fact, many European and Far Eastern companies depend entirely on their carriers for the pickup, storage, and delivery of their products from plants to customers.

For example, a major multinational consumer products firm uses contract distributors for its British and German operations. These carriers are responsible for the product from the end of the production line to customer delivery. Rates are negotiated annually, on a cost-per-ton basis, and the firm delegates its entire physical distribution function in Europe to these carriers.

Domestic carriers are now moving closer to the European model of providing complete distribution services to shippers. In terms of pure transportation offerings, carriers are working with shippers to develop customized product delivery services. Carriers offer highly reliable, premium transportation at high rates to those shippers who need it; they also offer slower, less expensive transportation to those with different requirements.

In addition, to better meet the needs of their customers, carriers are offering consolidation and other unique services for specific customers. Information management has also become a competitive weapon, with some carriers offering shippers on-line tracing as well as hard-copy shipment detail and summary reporting, including actual customer service data. Other carriers offer analytical tools and consulting skills, assisting shippers in selecting warehouse sites and managing distribution on a day-to-day as well as strategic basis.

II. CASE STUDIES OF INNOVATIVE DISTRIBUTION OFFERINGS

A. Ocean/Rail Services

Partly because of the availability of new railroad intermodal technology, ocean carriers and railroads have developed new joint services that offer better service than traditional minilandbridge operations at lower costs. By using stack-train technology—by which specifically designed railroad cars carry two ocean containers each, one on top of the other—carriers can afford to offer minilandbridge service at a cost competitive with all-water transit. Such offerings are growing rapidly and are now available on a variety of traffic lanes, as illustrated in Figure 1. From the shipper's point of view, the entire operation is under the control of the ocean carrier, with single bill of lading through-service from overseas origin to domestic destination.

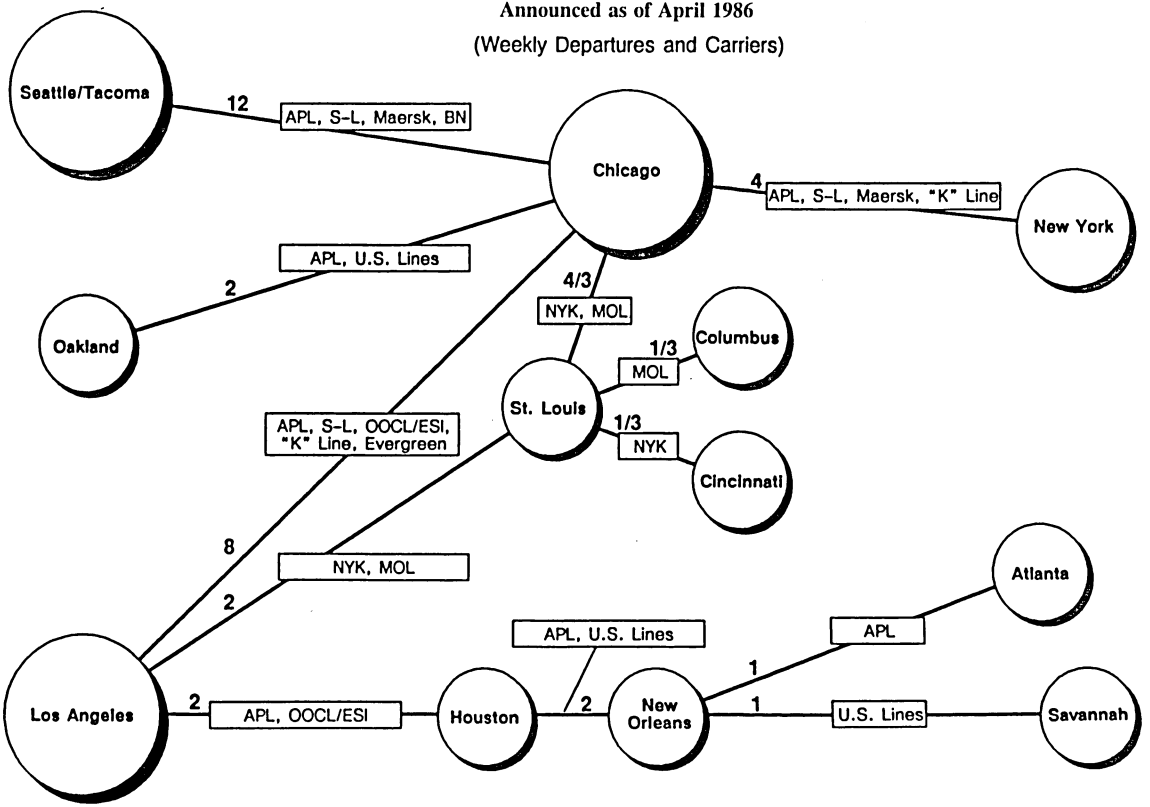
Stack-train technology is generally substantially less expensive than other competing forms of intermodal transportation. As shown in Table 1, stack-train service is more economical than either conventional or lightweight trailer-on-flatcar (TOFC) piggyback operations.

In conjunction with the Union Pacific and other railroads, American President Lines (APL) offers an ocean/rail stack-train service, marketed as Linertrain. By using run-through train service, APL can provide shippers with seven-day, coast-to-coast service on ocean containers, compared with 15- to 17-day service for all-water routings. Rates for the minilandbridge operations are competitive with all-water services, even including those using mega-container ships (4,300-TEU vessels).

An East Coast fashion retailer can serve as an example of how this service operates, and how it can be integrated with other innovative carrier offerings. The retailer purchases substantial amounts of designer clothing from a variety of sources in Far Eastern countries. Instead of working with independent consolidators overseas and in the United States,

Figure 1

DOUBLE-STACK UNIT TRAINS
Announced as of April 1986
(Weekly Departures and Carriers)



Note: Train sizes range from 150 to 280 units (FEU).

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Table 1

COSTS OF INTERMODAL TRANSPORTATION OPTIONS

(dollars per vehicle-mile)

Length of Haul (miles)	Conventional TOFC	Lightweight TOFC	Stack-Train Service
500	$1.30	$1.30	$1.23
1,000	.92	.91	.81
2,000	.74	.71	.61

Note: All costs assume average utilization of car and trailers/containers.

Source: TBS analysis.

the company uses a "full-service" distribution package offered by an ocean carrier. The carrier handles overseas consolidation of garments using an in-house assembler. Garments are consolidated by size, style, type of garment, and destination store. They are then tagged, priced, pressed, and placed on hangers for container shipment. The containers move via ocean carrier and APL Linertrain service to the East Coast, where they enter the carrier's East Coast consolidation facility. The containers are then broken down, with shipments from separate countries assembled into store lots for movement via local carriers to the retail stores.

B. Domestic Containerization

Increased competition from the motor carrier truckload sector, coupled with inadequate profitability in conventional TOFC piggyback operations, continues to challenge railroads to develop more efficient intermodal transportation options. Many analysts believe that domestic containerization, the movement of domestic shipments in container-on-flatcar (COFC) service, has the greatest potential for meeting these challenges because of its lower cost structure and its improved service times.

Containerization is common in international transportation but rare for domestic shipments. Currently the only major use of domestic containerization is for backhauls on minilandbridge, particularly stack-train, lanes.

As shown in Table 2, domestic containerization could be considerably less expensive than movement in conventional trailers for many shipments. Since domestic containerized movements (generally from the East to the West Coast) have been introduced, conventional rail TOFC and over-the-road truck movements have been the major source of traffic, primarily because of the low backhaul rates charged for Linertrain moves.

Currently, domestic container piggyback services do face several significant barriers to success. First, effective containerization requires careful management of a chassis fleet to ensure availability at a reasonable cost. Second, railroad intermodal serv-

Table 2

COSTS OF TRUCKLOAD TRANSPORTATION OPTIONS

(dollars per vehicle-mile)

Length of Haul (miles)	Conventional TOFC	Lightweight TOFC	Stack-Train Service
500	$1.10	$1.30	$1.23
1,000	1.05	.92	.81
2,000	1.03	.74	.61

Note: All costs assume average vehicle utilization.

Source: TBS analysis.

ices, while improving, are still often inferior to competing over-the-road transportation in service times and reliability. Third, only a few domestic lanes currently offer any dedicated container service, and high volumes are required for both low costs and high service frequencies.

The operator of one of the largest stack-train operations, APL, recently bought National Piggyback Services, Inc., in part because of its confidence in the future for domestic containerization. This freight forwarder now has a clear incentive to encourage the use of containers by its customers, at least for those lanes in which APL Linertrain and minilandbridge services now operate. According to recent market research, shippers are indifferent to loading containers rather than trailers; in fact, most are unaware of whether their freight arrives in a trailer or container; and all like the lower cost and reliable service provided by existing domestic container operations.

C. Transloading

The largest portion of land transportation costs are often associated with the movement of the vehicle itself rather than the amount of freight it contains. Therefore larger vehicles tend to be more economical than smaller vehicles when sufficient freight is available to fill them. Standard international freight containers are substantially smaller than most domestic trailers and all railroad boxcars. Transloading, as discussed here, is the transferring of freight from an international container to a larger vehicle in order to reduce costs on the domestic portion of an international shipment.

Containers used in international service generally are one of two sizes: 20′ × 8′ × 8′6″ or 40′ × 8′ × 8′6″. These have capacities of 1,200 and 2,400 cubic feet, respectively. Trailers measuring 48′ × 8′6″ with a full 13′6″ height are commonly used domestically, and their capacities average 3,500 cubic feet. Compared to an international 40-foot container, such a trailer affords a 45 percent increase in capacity. Since most truckload costs are relatively independent of the payload, transloading can represent a 45 percent cost savings on the linehaul and destination portions of the trip. For a typical over-the-road haul of 2,000 miles at a rate of $1.03 per mile, transloading can yield a linehaul cost savings of more than $600 per 40-foot container. To remain competitive, domestic motor carriers often absorb the transloading costs associated with shifting freight from ocean containers to over-the-road trailers.

One of the country's largest retailers of shoes formerly transloaded incoming merchandise from the Far East on the West Coast into two trailers for every three containers. The introduction of stack-train service, discussed above, eliminated the justification for such transloading. Recently the company has begun transloading lower priority product shipments into boxcars instead, fitting the contents of three containers into each 60-foot boxcar. In this latter operation, the transloading operation has been more than justified by the $400 per boxcar savings in linehaul charges. The transloading operation typically costs then one-half day of service, while the boxcar linehaul adds one day (relative to TOFC) on a typical 1,200-mile haul.

D. Assembly and Distribution

Another innovative motor carrier transportation option that has been encouraged by deregulation is Assembly and Distribution (A&D). In particular, many shippers seeking to operate just-in-time product delivery systems have turned to A&D services in recent years. A&D operations represent an extension of traditional logistics channels.

Assembly services are commonly associated with inbound material or product flows to manufacturers or distributors. They involve the collection of vendor or plant freight within a region for staging at a consolidation points for outbound truckload (TL) shipments to other plants, distribution centers, or customers. *Distribution* services are commonly associated with outbound material or product flows. They involve the delivery of less-than-truckload (LTL) freight from a consolidation point to plants, distribution centers, or stores within a region. *A&D* services refer to the performance of both the collection and delivery activities for a shipper, either out of the same terminal or out of different terminals in separate regions, and sometimes including the linehaul transportation between terminals or to or from a customer or shipper facility.

In the past, freight consolidation services have generally been provided by facility-based operators. Deregulation has allowed transportation carriers, especially truckers, to enter the freight consolidation marketplace. Two key aspects distinguish the innovative carrier-based A&D operations from the more traditional facility-based or pure LTL carrier consolidation offerings; these aspects also make them a preferred option in many circumstances.

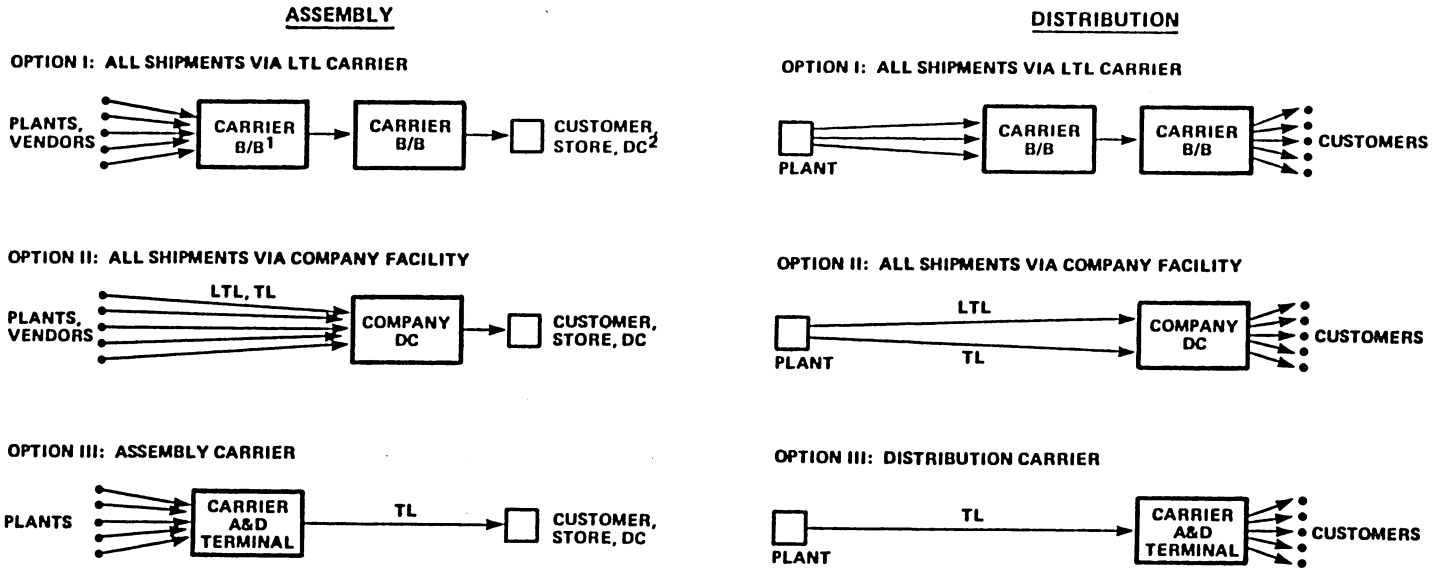
First, unlike traditional freight consolidators, A&D carriers control the consolidation and pickup and delivery operations directly, permitting higher service levels and greater dependability. Second, as shown in Figure 2, A&D carrier operations involve one less breakbulk and pickup and delivery operation than traditional LTL services, enabling carriers offering A&D services to charge lower rates and offer better service to qualifying customers. Table 3 shows these potential savings over traditional LTL carriage.

Thus, for outbound distribution, A&D carriers offer a variety of advantages. In their simplest form, they provide faster and less expensive service than conventional LTL carriers because a truckload from the firm's plant or warehouse may travel thousands of miles before it is deconsolidated near the final destinations. Several firms use A&D carriers to provide special services as well. A&D carriers have been used to install appliances, do simple servicing, hold safety stock inventories near the point of need, and provide other highly nontraditional services.

The disadvantages of the A&D motor carrier are typically its size and regional focus. A large A&D carrier may operate fewer than 50 trucks (often fewer than 20 vehicles) and may be dependent on a few large freight consolidation customers. If the carrier loses one customer, financial problems may arise that could affect service to other clients. In addition, regional A&D carriers rarely offer nationwide service, focusing instead on serving pairs of regions in order to gain balanced flow patterns on their major traffic lanes. A company wishing to operate a nationwide set of logistics channels must deal with and coordinate a number of regional A&D carriers.

Figure 2

COMPARISON OF A&D WITH TRADITIONAL
CARRIER SERVICE OFFERINGS



[1]B/B = Breakbulk facility.

[2]DC = Field distribution center or public warehouse.

Table 3

COMPETITIVE POSITIONING
ASSEMBLY COSTS VERSUS LTL CLASS RATES

(percent savings)

	Transcontinental (2,960 miles)		Interregional (711 miles)	
Shipment Size	Class 77.5[1]	Class 100[2]	Class 77.5	Class 100
150 lbs	34%	29%	8%	8%
500 lbs	52	55	55	52
1,000 lbs	52	59	59	60
2,000 lbs	50	59	62	66

Assumptions: Linehaul load factor of 30,000 lbs.
Single-shipment pickup within commercial zone.
Union Labor.

[1] "Heavy" (high density) freight.
[2] "Light" (lower-density) freight.

Source: Carrier interviews and TBS analysis.

A&D operations have become particularly attractive to shippers operating in a just-in-time environment. By consolidating small shipments from a variety of suppliers near the point of origin and transporting them in the same vehicle to the destination, such carriers guarantee that all the components for a set production period arrive at the same time. Similarly, some A&D carriers operate warehouses near just-in-time plants to permit the staging of supplies to the plants as they are needed.

The following example illustrates a typical use of A&D carrier services. A consumer product manufacturer uses A&D carriers in its distribution operations. The company moves high-value consumer goods in truckload volumes directly from manufacturing facility warehouses to regional pool distributors and local A&D motor carriers for next-morning store deliveries, eliminating the need for regional distribution centers or satellite public warehouses. Although pool distributors and carriers are more expensive than direct LTL shipments to many regions, the company uses them because they more closely parallel company-owned distribution centers in their service reliability than do either public warehouses or LTL carriers.

E. Contract Logistics

Increased competitive pressures in the marketplace are forcing U.S. corporations to focus investments in their primary businesses and simultaneously to consider reducing assets tied up in support operations such as product delivery systems. As a result, corporations are actively exploring potential third-party offerings that could provide alternatives to company-owned and -operated product distribution operations.

Contract distribution is best defined as the use of third parties (distribution companies, carriers) to perform all or part of a company's product distribution function (including transportation, storage, inventory control, customer service, and information networks). Although contract distribution is used extensively in Europe and the Far East to substitute for company-owned distribution systems, U.S. corporations have had only minimal exposure to the concept.

The major reasons for the lack of knowledge about contract distribution among U.S. transportation professionals are threefold. First, until 1980, regulation of the U.S. transportation industry resulted in minimal incentives or capabilities for firms to offer innovative logistics services. Second, although the Japanese, via their General Trading Companies, and European corporations make extensive use of contract distribution in the United States, the concept is little known or understood outside the international distribution community. Third, no major U.S. or foreign company yet markets a comprehensive and nationwide U.S. contract distribution service.

Considering the growing trend toward the use of third-party distribution services to supplement or replace a company's product delivery systems, it is likely that more firms will offer contract distribution services in the United States in the near future. Although some contract logistics offerings, such as

substituting contract motor carriage for private fleet operations, can save a company as much as 40 percent of its transportation costs, some offerings merely replace company logistics operations with the same or higher cost third-party options.

The reason is that different companies can receive different benefits from contracting out for distribution services. For those whose current distribution function is ineffective or inefficient, delegating product delivery may reduce costs and improve customer service levels. For firms which do not have a critical mass of demand in each service region, contract distributors can use their economies of scale to provide full delivery service through their own warehouses and with their own vehicles. Firms whose distribution systems now operate satisfactorily may want to use contract distribution for rolling out new products, avoiding new capital investments, or allowing top management to focus on key business areas.

A typical example of the use of contract distribution today is found in the food service industry. A major fast-food chain has a contract distribution subsidiary which owns both a large fleet of trucks and more than a dozen regional warehouses. This distributor services the outlets owned and operated by the company. In addition, it services many of the franchise outlets and a significant number of restaurants which are not part of the primary chain. In doing so the carrier provides a substantial portion of the chain's revenue and, through economies of scale, offers better service to company-owned stores than the chain could have achieved with a smaller, proprietary distribution system.

F. Logistics Information Services

The effective use of outside distribution services described above requires precise and comprehensive information to support logistics decisions and to monitor third-party performance. Because this information often comes from sources outside the shipper's own system, managers have begun to explore opportunities for logistics data interchange (LDI).

Logistics data interchange is the use of any computerized network system to electronically transmit logistics information within a company or with external suppliers, carriers, or customers. The sharing of this real-time data is permitting firms to enhance customer service and reduce costs, and LDI thus is rapidly becoming one of the faster growing applications of communications technologies in the United States.

In an effort to differentiate their transportation service offerings, many motor and rail carriers are developing logistics information systems that allow customers to track their product movements within the carrier's shpment network. Although some are merely telephonic inquiry systems on shipment status, others are sophisticated two-way communication networks that allow shippers to download data on in-transit or delivered freight shipments into their databanks and transmit data on pending or available company shipments by location to carriers.

A number of major U.S. regular route motor carriers offer logistics information system packages that allow shipper to obtain information on any or all shipments that have been tendered to the carrier. Using standard equipment, a shipper can access shipment-related data on a real-time basis. These systems offer a number of additional on-line freight planning services to shippers, including freight bill facsimiles and lists of all inbound and outbound shipments by origin or destination, delivered shipments by customer or location, and manifest and freight bill charges.

As an example, a distributor of promotional items switched to a different major LTL carrier because of its information management capabilities. The shipper's and carrier's computers communicate directly, providing the following logistics-related information to distribution managers:

- Automatically produced invoices
- Bill-of-lading paperwork
- Real-time shipment tracing
- Estimated delivery times
- Overages and shortages information
- Electronic freight payment

III. FUTURE TRENDS IN CARRIER-BASED DISTRIBUTION OFFERINGS

As more carrier-based distribution services are made available and become commonly accepted, shippers are likely to become more willing to delegate major distribution tasks to their carriers. By contracting out for all or part of their distribution operations, firms will be able to realize the economies of scale that these carriers can obtain, while simultaneously reducing day-to-day distribution staff, tasks, and assets. This trend, in turn, will tend to force carriers to offer more diverse and complete distribution packages to their customers, and to provide the distribution information (control and planning) reports needed by shippers' managements.

This trend toward broader distribution service offerings carries with it major strategic concerns for carriers and other distribution service providers. As with intermodal services, distribution providers will be faced with the need to focus on either retail or wholesale business, targeting either shippers (retail strategy) or other distribution providers (wholesale strategy) as their market.

A distribution provider following a retail strategy could solicit business primarily from its traditional customers. Either the operator could continue to offer exclusively its primary services, or it could subcontract to providers of other distribution services for those services that it does not offer but that its customers desire.

A distribution provider following a wholesale strategy would focus on other, retail-oriented distribution providers for its business. A railroad that wanted to offer stack-train ocean/rail service might operate such a train but have the ocean carrier responsible for marketing it to shippers. Similarly, a local drayage carrier might contract out its services to a warehouse operator, in order to jointly offer assembly and distribution services, with the warehouse operator responsible for marketing to shippers.

Distribution providers will likely expand their offerings in one of two ways. One possibility, as exemplified by several LTL motor carriers with their information offerings and by Leaseway Transportation with its consulting offerings, is to provide extra services in order to generate increased revenues in

the core distribution business. Alternatively, some distribution providers, as exemplified by the purchase of Sea-Land by CSX, are increasing the variety of core distribution services they offer, hoping to generate new profits directly from the additional services rather than primarily through drawing new customers to the core business. The new offerings in either case may be new start-up offerings or the result of purchases of or mergers with existing providers.

Both retail and wholesale strategies carry benefits and risks. Retail-oriented distribution providers directly control the relationship with the shipper, so they are in the best position to understand specific shipper requirements. They can offer additional services based on their perceptions of these opportunities, and their customer relationships allow them to market their services effectively. However, retail-oriented distribution providers compete directly with third-party distribution providers, who control a substantial portion of the market and depend on other providers to transport and warehouse the freight. These third-party providers will be reluctant to offer their business to those distribution providers who compete with them for end customers. Also, retail-oriented providers who offer a variety of services cannot be specialists in all of them; providers who specialize in single services are likely to be more efficient or to offer better service in that specialty. Retail-oriented providers thus may be unable to compete profitably with specialists outside their core service areas.

Wholesale-oriented distribution providers are more likely to attract the business of third-party providers. The combined sales forces of a provider's third-party customers are likely to be substantially larger than those that the provider can support on its own. These third parties, however, have much greater bargaining power than most shippers because each controls so much volume. Wholesale-oriented providers are therefore likely to obtain smaller margins on their offerings than are retail-oriented providers. Also, the size of typical third-party volumes means that wholesale-oriented distribution providers would be more vulnerable to the loss of a single customer than would be most retail-oriented providers. The loss of direct contact with the end customer, as implied by a wholesale strategy, means that wholesale-oriented providers will increasingly depend on the retail providers who constitute their direct customers.

To achieve success under any of these strategies, distribution companies will have to continue to innovate, in terms of both the physical services offered and how they are marketed to customers. These innovations can lead to new technologies, new uses of existing technologies, and applications of currently used technologies to different customers or for different purposes. Such innovations may lead to services similar to existing offerings but at lower costs (stack-trains), services similar to existing offerings but at higher service levels (assembly and distribution), and entirely new customer services (information management).

The availability of new innovative service and of more services from a single provider means that shippers will have significant opportunities for improving their distribution cost and service performance. The availability of new services offered to increase sales of other distribution services means that some services may become available to shippers at significantly less than full cost. However, these secondary providers may be unwilling or unable to match the service performance of existing providers. Shippers thus must carefully monitor the cost and performance of the available distribution service options. Since larger providers may bundle several services under a single price, cost evaluation will become more complicated.

IV. CONCLUSIONS

The distribution marketplace will continue to evolve as carriers and other distribution providers offer more innovative and complete distribution services. The changing offerings in the marketplace will in turn lead to changes in the ways customers purchase and manage their distribution operations. Once a few firms contract out for some of their distribution needs, third-party distribution management will become more acceptable. This acceptance will then lead other, more risk-averse shippers to contract out for their distribution needs as well. As a result of these dynamic changes in the U.S. logistics environment, carriers and their customers will become more independent, and, as in Europe and the Far East, the distribution function will become more commonly delegated to outside firms.

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ENDNOTE

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