

# DRIVERS OF LOGISTICS EXCELLENCE: IMPLICATIONS FOR CARRIERS

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## ABSTRACT

Technological advances have increased customer expectations during an era of increasing cost controls. Shippers are becoming more demanding as technologies being developed offer greater visibility and control in the supply chain. The question remains, however, as to what are the key drivers of this technological change, and where is the market headed. Will these changes merely add cost or will they enable carriers to compete effectively in the market? The purpose of this article is to highlight six major drivers of logistics excellence, and to provide the carrier community with some thoughts as to how to respond to these emerging trends.

## INTRODUCTION

The transportation industry is facing tremendous change. According to Delaney and Wilson (2003) the spending on transportation has declined for the last three years, as a percent of gross domestic product. They also note that overall, motor carrier services have slipped during this period, with LTL carriers falling the most. According to the authors, Donald A. Broughton, an analyst with A.G. Edwards in St. Louis, reports that more than 10,000 motor carriers have failed since 2000. Some of the larger firms that have filed for bankruptcy include: Consolidated Freightways, Simon Trucking, the Morgan. These challenges are taking place under the broader initiative of supply chain management. Here, firms are working to manage their entire channel to be more

Group and A-P-A Trucking. Cooke (2003) reports that newer, cleaner burning engines and new hours-of-service rules are significantly reducing already slim profits. In addition, insurance costs have also seen significant increases since September 11, 2001.

Cost issues are only part of the challenges facing the transportation industry. Another area of change has been the continued development of new tools that enable both shippers and carriers to increase the visibility of their operations. The required investment for visibility comes at a steep price for many shippers and carriers.

effective in the market. In a study by Morash (2001), customer service and quality were two of the most important capabilities in a supply chain, followed by information support

and distribution flexibility. Clearly, transportation providers can impact these capabilities for their customers.

It is clear that technological advances have been coupled with increased customer expectations. For instance, Kent, Manrodt, and Parker (2000) found that 68% of respondents in their study used some form of mobile communication system in their firm.

This indicates that shippers are becoming more demanding with respect to the need for real-time (or near real-time) information about product flows and technologies are becoming increasingly suited to meet that demand. The question remains, however, as to what are the key drivers of this technological change, and where is the market headed. Will these changes merely add cost or will they enable carriers to compete more effectively and efficiently in the market? The purpose of this article is to highlight six major drivers of logistics excellence, and to provide the carrier community with some thoughts as to how to respond to these emerging trends.

### **RESEACH BACKGROUND AND METHODOLOGY**

Examining how the largest companies in the U.S. are meeting the transportation-buying challenges of the 1990's has been the focus of a twelve-year, joint research effort between Georgia Southern University (2000–present), the University of Tennessee, Mercer Management Consulting (1992-1996), and Cap Gemini Ernst & Young, LLP (1997-present). The project has involved an annual survey of the largest domestic The original starting point for selecting target study companies was the top 500 revenue producers as listed in Fortune. These firms were initially identified, and names of logistics executives were collected, from the Council of Logistics Management (CLM) membership directory, as well as the Official Directory of Industrial and Commercial Traffic Executives

companies for the purpose of profiling the transportation and logistics services that these firms seek from providers. Each year since its inception, the study group has grown to more accurately determine unique and common transportation and logistics characteristics across dimensions such as industry type, amount of expenditure on transportation, and even the organizational view of these functional areas. Previous year's respondents (from the company perspective) were targeted and encouraged to participate in the current year's research.

The longevity of this research has enabled a significant accumulation of data from which numerous descriptive statistics have been compiled. The business environment, however, has experienced several unexpected events that have significantly altered strategy and operations. In 2000, the economy began to soften. On September 11, 2001, the terrorist attacks added to the uncertain business environment. Economic malaise on a global basis remains a challenge today. These circumstances have dramatically changed the nature of doing business. The research presented in this paper will only focus on the years 2000 through 2002 in an attempt to better understand how the business environment since 2000 has impacted and continues to impact transportation providers. The continuity of research questions and respondents during this time period has allowed some degree of inference and association to be made.

(or "Bluebook"). The respondents were senior transportation and logistics managers, with job titles ranging from vice president to manager. A requirement for inclusion in the first study was that the transportation structure be centralized to ensure that the results would also reflect the corporate perspective.

An examination of this influential segment of transportation and logistics purchasers (as defined by the firm's revenue base), makes it possible to gain valuable insight concerning trends and issues that are reflective of the entire population. Given their unique size and presence in the marketplace, expectations and requirements of this group will impact carriers as well as other shippers. In fact, this information has also been used as a benchmark for smaller firms as they mature and integrate these functions into their firm's core competencies. Overall, the compilation of the annual profiles enables the measurement of change that has occurred in the past. Given the documented, rapid change of technology—and its importance to transportation and logistics—it is essential to understand how quickly these functional areas are changing as they adapt to their "new" environments.

Each year the study has used the previous year's participants as the starting point for developing the current study sample. In subsequent years, the *Fortune* listing and the CLM directory have been supplemented by utilizing *Logistics Management* to locate an individual who had moved, or when a contact name was needed for a particular company. The overall goal of this process remains the identification of the most senior person in the company responsible for purchasing transportation services. In fact, most individuals completing the study instrument are at the senior management level. A significant number of individuals have participated every year since the beginning of this research effort.

After the individual(s) within each company was identified, a letter was sent requesting assistance in this study. If an individual could not be contacted after a reasonable number of attempts (via both letter and telephone), that individual was deleted from the distribution list. In the past, since the majority of the study participants preferred returning the survey in the mail, this was the principal method used. Facsimile was an alternate method used by many of the respondents. In general, this method and the Internet will be employed much more widely in future efforts.

### STUDY PARTICIPANTS

A breakdown of the respondents by industry classification for 2000–2002 is shown in Table 1. The majority of respondents across the annual studies have been involved in manufacturing. It should be noted that the percentage of respondents from the manufacturing sector reflects their proportion of the population in the Fortune 500 listing. This industry sector spends a larger fraction of the revenue dollar on transportation and logistics. They also account for a sizable share of the total dollars spent on transportation in the U.S. As such, it is important to capture a significant component of this sector due to its influence on trends and future innovations.

In addition to industry classification, the study participants were also categorized by size of company (based on annual revenues). These data are presented in Table 2 for the time period 2000 through 2002.

**TABLE 1  
RESPONDENTS BY INDUSTRY**

<i>Industry</i>	<i>2002</i>	<i>2001</i>	<i>2000</i>
Manufacturing–Consumer Products	17.5%	23.1%	19.7%
Manufacturing–Industrial Products	16.0%	11.9%	10.5%
Manufacturing–General	15.7%	12.8%	14.1%
Consumer Products/Retail	15.7%	8.9%	17.0%
Manufacturing–High Technology	8.9%	4.2%	5.8%
Transportation	8.0%	11.2%	9.7%
Energy/Chemical Utilities	7.4%	6.5%	5.1%
Life Sciences	3.1%	0.9%	1.9%
Communication/Media/Entertainment	2.2%	2.3%	1.7%
Mining or Petroleum	1.5%	1.4%	1.0%
Service–distribution	NA	NA	4.6%
Other	4.0%	16.8%	8.9%

**TABLE 2  
RESPONDENTS BY TOTAL ANNUAL SALES**

<i>Total Annual Sales</i>	<i>2002</i>	<i>2001</i>	<i>2000</i>
< \$250 million	24.0%	28.1 %	33.7%
\$250 - \$500 million	13.0%	14.4 %	16.0%
\$500 - \$1 billion	13.0%	12.5 %	16.2%
\$1 - \$2 billion	12.0%	13.1 %	13.2%
\$2 - \$3 billion	10.0%	6.3%	7.0%
\$3 - \$5 billion	6.0%	7.5%	4.7%
\$5 - \$9 billion	5.0%	6.3%	2.0%
> \$9 billion	17.0%	11.8%	7.2%

**RESEARCH FINDINGS**

industry?”

Given the changes over the past several years as related to transportation spending, a key question to ask is “What are some of the factors that may be related to these changes? That is, how is the shippers’ world changing, and what are the implications of these changes to carriers across the

Manrodt, Holcomb, and Thompson (2000) identified six key drivers to fulfillment excellence. They suggested that customer demand and technology advances would drive the implementation of adaptive networks that would provide greater visibility and control over supply chain, transportation and distribution activities. They also predicted a continued migration toward the

application service provider (ASP) model, in which providers host and maintain leading software applications on the Internet, enabling firms to collaborate with suppliers and logistics partners on a common, ubiquitous platform.

While these trends have shown considerable progress, actual implementation of newer tools and methods have fallen short of expectations set during the height of stock market growth. Since then, the softening U.S. economy has introduced uncertainty into the technology sector, leading some firms to delay spending increases of any kind.

Despite the cautious tone, many leading firms are investing more aggressively in newer logistics systems in an effort to trim costs, improve efficiency and respond faster to changes in market conditions. In fact, the focus on costs has increased during the past several years. This has been paired with increased consolidations within the software market, and a decrease in new technology entrants.

Regardless of the economic conditions, these drivers are still critical to firms that are attempting to be more responsive and flexible in a dynamic environment. These drivers—collaboration, optimization, connectivity, execution, speed and visibility—and their impact on transportation providers, are provided below.

**Collaboration**

Collaboration is the act of leveraging supply chain assets with key customers and suppliers to achieve a common goal. Its value is realized throughout the supply chain, as it enables companies to improve their operations and more efficiently serve customers. A

necessary first step for collaboration is to identify key suppliers and customers that are critical to the long-term success of the firm. These firms will link together to form a complete “supply chain to supply chain.” This first step is realized in part through supplier rationalization and customer profit-ability analysis. This critical assessment of suppliers and customers will enable the firm to determine which companies they should engage in collaboration. Because it is not possible to collaborate with every supplier and customer, the firm needs to ascertain which key suppliers and customers will result in the creation of greater value for all members of the supply chain.

Survey participants were asked whether they had evaluated their products, customers and suppliers over the last two years to determine which were most beneficial to the firm. The results are shown in Table 3. Surprisingly, less than one-third of the companies surveyed have attempted to identify key customers, or analyze their profitability. This is problematic, since a “best customer” based solely on sales volume or strategic importance may be relatively expensive to serve and provide a smaller profit margin compared to other customers.

**TABLE 3  
PERCENTAGE OF  
COMPANIES SURVEYED IN  
2001 THAT PERFORMED  
ANALYSIS IN THE PAST TWO YEARS**

<i>Analysis</i>	<i>%</i>
Product rationalization	29.5
Customer profitability analysis	29.5
Supplier rationalization	25.9

As few as one-fourth of all respondents have implemented key (or strategic) supplier

programs. These numbers are unexpectedly low, possibly because many firms are using cumbersome lower-level tools, such as spreadsheets or manual methods, to analyze supplier performance and profitability. Firms may also be struggling with the accuracy of their data, or finding it difficult to make this data readily available across the enterprise.

Whatever the reason, customer, supplier, and product rationalization is not being conducted to the extent needed. Previous studies have shown that “instinct” or “feelings” are no match for formal analysis in understanding the importance of both suppliers and customers. For instance, Kraus and Ellram (1997) found that firms who reported satisfactory supplier development were more likely to put effort and resources into supplier development, and were more willing to share information with their suppliers. Since collaborating with less-than-optimal partners may result in substandard performance and weak relationships in the long term, companies would be well advised to perform more analysis in this area.

#### **Implications for transportation providers.**

The drive for supplier rationalization and other analyses should not come as a surprise for transportation providers, as they have already experienced firms employing core carrier programs. Given the new environment, the key question for transportation providers is how these changes may impact them.

In part, the ability of a transportation provider to be more collaborative may not be direct, and may depend upon the visibility of transportation costs as well as the level of sophistication of the customer. If the transportation costs are bundled as part of the product cost, and the level of sophistication on the part of the customer (as it relates to understanding transportation

costs) is low, transportation providers may be handicapped. Obviously, there are significant differences between FOB origin and FOB destination, and the customer needs to know them prior to making a decision.

When a customer suggests that they are considering a supplier rationalization strategy, it may be beneficial for the transportation provider to work with the supplier to provide an analysis of transportation costs—especially given that these changes will greatly impact their operating costs. Such an analysis would be beneficial to the provider—to identify the most profitable lanes—and would be seen as a “value added” service by the customer. These savings—due to overall supply chain efficiencies—could be shared by all of the participants. In fact, such partnerships might allow suppliers to compete for or retain business they might otherwise have lost.

#### **Optimization**

Optimization refers to the tools and processes that lead to fulfilling a supply chain strategy in the most efficient manner. While there are many tools and processes currently being utilized, this study focuses on ERP, order fulfillment, transportation management systems (TMS), and distribution or warehouse management systems (WMS).

Overall, companies are showing a continued healthy trend of moving away from older approaches to newer, high-end software tools. These findings correspond to the increasing number of firms making a transformation to adaptive networks that can handle the speed and complexity necessary to respond to more sophisticated customer needs.

Over the last year, respondents who purchased or used commercial TMS software to manage transportation rose to 36.5%—a significant increase from 29.8% in 2000. Conversely, those using spreadsheets or manual methods fell to 11% in 2002, down from 27% in 2000.

However, TMS still lags behind the implementation of WMS packages. While over 75% of firms surveyed are using either commercial or internally developed WMS software solutions, only 69% are using TMS systems. This may be due to the maturity of WMS packages compared to TMS solutions, the variety of options available, and the relative volatility in this market space.

Although one might expect that many firms are using application service providers (ASP's) instead of commercially available software for shipping their products, this does not appear to be the case. A separate survey question indicated that while 18% of respondents are using ASP's, these firms ship on average fewer than twenty loads per week. Clearly, the ASP and software markets are not fully mature, and companies may still benefit from integrating and utilizing these solutions.

**Implications for transportation providers.** Technology is transforming transportation. The ability to track shipments in real time across the globe is

becoming a reality. Information technology is becoming a requirement for providers as shippers are asking for more and more information about shipments both in motion and at rest. In addition to providing visibility of material flows, currently available technologies have also enabled providers to reduce several operating costs (Kent, Manrodt, and Parker, 2000). Overall, there are several implications for providers as it relates to this driver.

First, the ability to track and trace shipments in real time is fast becoming the expectation of all shippers. These expectations will only increase with time. Carriers will be required to document when a shipment was picked up, where it is (GPS preferred), if it will be delivered on time and, if not, when it will be delivered. These data will then have to be provided to the customer for calculation and verification of overall carrier performance.

As a result of these expectations, carriers will need to be both transportation and information experts. They will have to develop tools or interfaces that will enable customers to seamlessly manage their supply chain. This is an investment that smaller carriers may find hard to bear; they will have to either serve less demanding customers or seek ways to partner with larger carriers that can provide the needed information infrastructure.

**TABLE 4**  
**PERCENT OF RESPONDENTS USING OPTIMIZATION TOOLS, 2000-2001**

<i>Tools Used</i>	<i>TMS</i>			<i>WMS</i>		
	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
Commercially purchased software package	29.8	36.5	35	40.2	40.7	40
Software package developed in-house	25.2	32.1	44	31.9	35	28
Manual/spreadsheets	27.1	18.6	11	19.5	14.3	15
Third party provider(s)	15.2	11.5	7	7.2	8.6	13
Other	2.65	1.3	2	1.2	1.4	3

Third, it is anticipated that carriers will have to utilize multiple technologies in the near future as customers adopt a wide range of technologies. For instance, one customer could be using Nistevo to tender loads, another Elogex and a third Red Prairie. For larger carriers that have a dedicated employee to service a single customer, this is cumbersome. For smaller carriers, this may require an employee to learn three different software packages. It is inefficient not only for the time and effort of learning three different interfaces, but also in having to check three different web sites for status on tendered loads. Some providers are attempting to develop interfaces making this redundancy obsolete, but no true market leader has emerged.

As the actual integration between the shipper and carrier becomes more auto-mated, there will be less personal interaction between them. This could have a tendency to accentuate service failures as more attention is paid to the numbers, or actual performance. Carriers will have to be creative in finding ways to maintain a personal relationship that goes beyond the automated process.

In the short run at least, there is a side effect to increased automation between customers and carriers—increased switching costs. Shippers will not have the same level of flexibility to replace carriers quickly and easily. It is expected that shippers will become increasingly particular as to who will move their goods, and expect that these relationships will have a longer life cycle than in prior years.

Finally, it is expected that profit margins earned by carriers from larger, more sophisticated shippers will decline. Much like the Wal-Mart business model, the margin will more than adequately be replaced by a larger volume of business for the carrier. In many cases, the business interaction elevates to a partnership whereby both parties identify and implement procedures and processes that are mutually beneficial. This will not be the case, however, for some smaller, less sophisticated shippers. Their rates will most likely result in increased margins for the carrier. This will reflect the inability of the carrier to gain the needed efficiencies due to the shipper's lack of technology.

## Connectivity

Connectivity describes the level of integration that enables individuals, organizations and external parties to exchange information in a timely manner. A prerequisite of any adaptive network, connectivity relies on technology formats and protocols shared by all parties.

In 2001, most survey respondents characterized themselves as “somewhat” or “less than integrated” from front-end to back-end operations. The results for 2002 have shown no significant increase in the way respondents describe their level of connectivity.

Over the past few years, little progress has been made integrating transportation management systems (TMS) with warehouse management systems (WMS). TMS and WMS are still largely disconnected from order fulfillment, although some progress has been made to integrate order fulfillment into WMS, as reflected this year by a majority of respondents who indicated this key exchange to be “integrated,” as opposed to “somewhat integrated” last year (see Table 5).

Companies are still relying on alternative means of communication, such as personal communication and other manual methods, to coordinate and integrate their activities. Alternatively, firms may have scaled back their investments for integrating ERP, TMS, and WMS systems as a reaction to economic uncertainty. Unfortunately, the value proposition that moved the organization towards these applications may not be fully realized until these solutions are more fully integrated. Disconnected technology has minimal value.

**TABLE 5  
INTEGRATION OF  
SOFTWARE PACKAGES**

<i>Software packages</i>	<i>Mean</i>	<i>Mode</i>
Order fulfillment–ERP	3	1
Order fulfillment–TMS	3	1
Order fulfillment–WMS	6	7
ERP–TMS	3	1
ERP–WMS	3	2
TMS–WMS	5	7

1 = Very integrated; 7 = Not integrated

### **Implications for transportation providers.**

Clearly, this lack of integration impacts everyone. The lack of internal connectivity can lead to increased costs as expedited freight is used to meet service requirements or agreed upon service levels.

While it may be that carriers cannot change the internal connectivity of their clients, they should at the minimum be aware of the consequences of it. How can the carrier provide services to minimize the impact of this consequence? What information can the carrier provide that could be helpful? And, how will the carrier’s business be impacted when the customer becomes more integrated over time?

### **Execution**

Execution refers to the logistics activities that ensure availability of the right product, in the right quantity and condition, at the right place and time, to the right customer—all at the right cost. It encompasses all aspects

of performance in an adaptive supply chain.

The survey results indicate that there are still many firms who neglect to routinely measure their distribution and order fulfillment performance. From the number of survey respondents who answered each question, the percentage of firms measuring themselves using each indicator was determined (see Table 6). The three most frequently used measures for performance were: 1) lines filled out of lines ordered, 2) available on promised delivery date, and 3) cases shipped to cases ordered. Slightly more than 60% of respondents indicated they measured "lines filled out of lines ordered." Fifty-six percent of respondents measure whether their products/ services were "available on promised delivery date." However, very few are measuring order performance; only 16.3% responded to the category "in-voices shipped complete/total invoices."

For those firms who measured themselves on each criterion, survey respondents gave themselves high marks in logistics execution. The following are 2001 survey results indicating self-reported execution of

logistics performance on a number of widely used measurement criteria.

Survey results also show that most companies have achieved the ability to differentiate "best" and "average" customers. This is a positive development. Since the late 1980's, research findings have suggested that a "one-size-fits-all" approach to customer service is not effective. Langley and Holcomb (1992) provide one of the pioneering articles in this area. Firms are still trying to develop and implement processes and systems that can support differentiated service from an execution standpoint. Table 7 provides the most notable findings.

The differences between best and average customers can also be seen when it comes to calculating the perfect order percentage. To do so, each of the metrics are multiplied by each other (on time delivery x over/short/damage x correct invoice x complete). A firm operating at 90% in all four areas will have a perfect order percentage of only 65.6%. Best customers experience a perfect order (lines filled/ lines ordered, on time, damage free and correct invoice) 85.7% of the time, compared to 80.5% for an average customer.

**TABLE 6**  
**REPORTED LOGISTICS PERFORMANCE, 2001**

Available on promised delivery date	92.6%	Invoices shipped complete/total invoices	90.5%
Lines filled/lines ordered	93.4%	Dollars shipped/dollars ordered	89.5%
Cases shipped/cases ordered	92.4%	Orders that result in a backorder	6.2%

**TABLE 7  
LOGISTICS EXECUTION FOR BEST AND AVERAGE CUSTOMERS, 2001**

<i>Measure</i>	<i>Best Customer</i>	<i>Average Customer</i>
On time delivery	96.39%	93.58%
Over/short/damage	2.03%	3.23%
Correct invoice	98.24%	96.34%
Complete (everything that the customer ordered)	2.29%	2.58%

Comment [COMMENT1]: SLC Karl/Mary?

**Implications for transportation providers.** The perfect order is fast becoming the preferred performance metric. It captures the totality of the interaction between the supplier and the customer, from the time the order is placed until it is delivered.

Clearly, transportation professionals have a profound impact on the perfect order. They must deliver goods on time and damage free. In addition, carriers will be expected to provide the data necessary to calculate the metric in a timely manner.

Regarding actual performance, the delivery of goods will always have some variability, resulting in a less than perfect experience. While most rational executives understand this, carriers will have to demonstrate that these are due to random acts, and not systemic, or process related errors. This will require carriers to become more involved in process mapping and perhaps seek ISO certification as assurance to customers of a reliable process.

The data will also have to be transferred between the carrier and the shipper on a customer by customer basis. The perfect order can be calculated as “the average of the averages” or individually, and then averaged. The later calculation will enable firms to complete a Pareto chart of the number of perfect orders by categories, as The results suggest a dilemma. As firms invest in tools and processes to enable

well as an aggregate number. In addition, the granular set of data can be used to calculate the perfect order for its most important customers.

**Speed**

Speed to market remains the ultimate factor determining whether a firm survives, regardless of changes in the economic landscape. It relies on the ideal connectivity, collaboration and execution elements of the adaptive supply chain.

Survey participants reported in 2002 that the minimum expected time it takes to acquire raw materials into their process— which represents the time an order is placed until it is received—is approximately 18 days. The replenishment cycle is even longer, taking on average up to 30 days. In general, if an order takes longer than 45 days, the customer will order elsewhere.

The demand for speed is evidenced in the frequency of customer orders. Among the respondents, almost 40% report that their “best” customers order on a daily basis, while an additional 22% order two to four times a week. This is almost double the level of activity reported by the majority of “average” customers who placed orders.

customers to place orders on a daily basis, there is still a tremendous lag time of 18 to 30

days before orders are received and the fulfillment process is completed. Based on findings presented earlier in this report, firms are delivering 92.6% of orders on the promised date. A significant gap exists between the frequency of order placement and the time window specified for meeting the customer's requirement. Somewhere in the fulfillment process, speed is lost.

The ability to respond quickly to market conditions and customer demand is crucial. The goal of logistics has often been described as getting the right product to the right place at the right time. The logistics perspective meant that this goal involved only two parties in the supply chain. The goal today is to achieve the right product at the right place at the right time for all members in the supply chain with increasing effectiveness and efficiency. Real-time adaptability provides firms with a tangible advantage by enabling them to get to market faster than their competitors.

**Implications for transportation providers.** No one has felt the changing pressure of speed more than carriers. Speed is a key component of being able to respond to uncertainty in a manner that is both cost efficient and customer effective. Without

capabilities such as connectivity, optimization, or visibility in place, asset utilization will become an even bigger challenge. Furthermore, responsiveness (or speed) will not be the only negatively impacted element. Lack of speed in adapting to rapidly changing market conditions will ultimately affect execution.

**Visibility**

Visibility is the ability to see and manage the flow of products, services and information in real time. It includes access to inventory in transit, product availability and order status.

Visibility of the supply chain can no longer stop at the shoreline or at our domestic borders; it must circle the globe to manage the flow of products, services and information. Real-time inventory visibility, product availability and order-status information provides opportunities to drive down costs and improve customer service.

Unfortunately, many firms report having little visibility over many critical supply chain activities, including those most impacting customer service—shipment and order tracking. Responses to visibility issues are shown in Table 8.

**TABLE 8  
VISIBILITY OF EVENTS IN THE SUPPLY CHAIN (PERCENT OF RESPONDENTS)**

<i>Attribute</i>	<i>%</i>	<i>Attribute</i>	<i>%</i>
Tracking inbound shipments	61.0	Divergence of shipments	20.3
Alerts to late or delayed shipments	58.1	Routing and scheduling optimization	41.9
Appointment scheduling	57.0	Electronic tendering of shipments	32.0
Domestic visibility of orders	57.0	In-transit merges	10.8
Continuous moves	2.1	Rating/contract management	7.1
Consolidation of orders	51.5	Tracking outbound shipments	65.2
Carrier selection	79.3	Vendor compliance	55.2

The results indicate that visibility still remains a major challenge for most firms. Some

industry insiders insist that it is the next major frontier to be conquered. However, because

visibility involves people, processes, technology and information flow parameters, it is an inherently complex issue.

**Implications for transportation providers.**

For carriers, the issue of visibility is compounded by their customers' difficulty in integrating internal functions. This can create an "over the wall" execution scenario for the carriers, where they may be the last to know of a change in requirements, and are expected to "make up" for speed that has been lost at an earlier phase in the order fulfillment cycle.

How important is visibility? Shortly after the events of September 11, 2001, two global pharmaceutical companies responded to requests from a government agency about diverting to New York a very large supply of antibiotics and other goods they produced. The first firm impressed the government—as well as their own top management—by determining the feasibility of this request in about twenty minutes. The second company did not fare as well, and as a result of this one request, is overhauling its supply chain management processes and systems. Clearly, transportation firms have a unique opportunity to provide visibility between the dock doors.

This is not to say that all of the companies will require this level of visibility. Carriers will have to determine the needs of their individual customers. It is not then a matter of whether or not the shipper wants visibility as to the location of their shipment, but rather how much visibility they want, and their willingness to pay for it.

**CONCLUSIONS**

The pressures faced by today's carriers will only increase. The need to compete effectively, while remaining profitable, will not abate. Hence, successful carriers will have to

become more effective in meeting the needs of the customer, and to provide the value added services that will profitably take inefficiency out of the supply chain.

It is the authors' conclusion that this can be done by focusing on the six drivers noted above. Clearly, transportation providers hold the key to successfully implementing many of these technologies. A few final thoughts for carriers may be in order.

First, carriers should know their strategy. How do they plan to compete? What is the key value proposition that they will be offering their customers today, as well as the future? How is this value proposition communicated internally? Will this change in the future?

Second, identify your customer base, both current and future. Some industries may benefit from your specialized equipment or expertise, while others may be more "commodity-based" in nature. Knowing your strategy and customer base is critical before progressing to the next step.

The third step is identifying the biggest needs in the industry. What challenges face them? Do not just focus on transportation, but in other areas as well, such as government regulation, imports, substitute products, new technologies or demographics. A good industry today may not be as attractive a few years from now.

Fourth, because visibility is the most critical capability for shippers, the implication is that

this will be the same for carriers that desire to have a strategic partnership.

Finally, is the carrier able to meet the needs of the customer by providing the services requested? For instance, if the biggest driver for a firm is visibility, does the carrier have

the needed finances and expertise to implement a solution that will be beneficial? If it does, can these solutions be leveraged elsewhere in the marketplace? Leveraging a driver across multiple industries should provide the greatest return on the investment.

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