E-Commerce: Its Impact on Transportation, Logistics, and Supply Chain Management

The transportation and logistics industries have only intermittently applied B2B e-commerce to their practices. Transportation carriers have had a great deal of trouble utilizing e-commerce solutions to fulfill customer supply chain expectations, primarily with tracking and tracing. Customers want to know the exact location of their shipment and to be alerted when its time-definite delivery is threatened. Although Internet technology is present, old business models prevail and customers are trapped in information silos. Logistics intermediaries arose to manage the functions of transportation carriers. Those intermediaries are now attempting to manage the information flow for customers. E-commerce is now transforming the role of the intermediary.

Around 1990, a confluence of factors began to change the role of logistics in major corporations. Quality initiatives and re-engineering were forcing companies to evaluate entire processes, rather than individual components. Supply Chain Management, the integrated control over goods, information, and money, followed.

Supply Chain Management represented an attempt to develop a unified process by which goods and services would be produced for customer sale and consumption. Logistics was now being considered as more than simply an opportunity to minimize cost – it was developing into a core component of corporate profitability.

More recently, the Internet has become part of our daily lives, and during that time we have watched a progression of Internet innovations. Internet browsers and the development of the World Wide Web made the Internet available. Search engines were developed in response to the proliferation of Web sites. Commercialization of the Internet, initially business-to-consumer, spawned online shopping. Search engines morphed into portals, adding content, shopping, and other items.

Finally, e-commerce came into full flower with the online auction leading the way. E-commerce exists along two dimensions. The first dimension defines the parties: B2B (business-to-business), or B2C (business-to-consumer). The second dimension defines the transactional nature. Here there exist several categories of service types. Sell-side servers are electronic storefronts and catalogues that manage the purchase process from the selection of items through payment. Buy-side servers provide the capabilities for purchase orders to be entered and fulfilled. Usually there are well-established business rules that are incorporated into the e-commerce application. Marketplace applications establish electronic communities which both buyers and sellers can access.

Sell-Side E-Commerce

The use of the Internet to provide sell-side e-commerce has been widely adopted in the transportation and logistics industries – primarily as a means to provide customer service and to “sell” its product. Almost every transportation company offers its customers the ability to log onto its Web site to make bookings, or to track and trace shipments.

Many of these initiatives were developed for fairly simple reasons. When a customer opts to visit a Web site instead of calling the service center, the company usually benefits, as the transaction requires no paid employee. This not only represents a cost savings, but also eliminates the risk of any unfavorable customer/employee exchange. Such a risk is a constant worry in a full-employment society.

Theodore Prince, as Senior Vice President Sales and Marketing, is responsible for all commercial activities of Kleinschmidt Inc., a value-added network providing electronic data interchange and other technological solutions to corporations throughout North America.

He has spent his career in the transportation industry, including 20 years working for a variety of surface transportation carriers.

Mr. Prince has a B.S. in Economics from the Wharton School of the University of Pennsylvania and a Master’s degree in Transportation from the University of Pennsylvania Graduate School of Engineering and Applied Sciences.
where companies are unable to attract and retain qualified employees. The danger increases when the company competes in a global market where calls can be coming throughout a 24-hour day.

The range of these solutions has varied. Some companies have tried to create a competitive advantage with their Web pages by developing signature options unique to their brands. They have developed a customized portal for each customer with sophisticated support capabilities that can also be customized— including offering languages other than English.

Sell-Side E-Commerce Obstacles
Despite the promise, transportation carriers have had trouble utilizing e-commerce solutions to fulfill customer supply chain expectations. The primary problem involves tracking and tracing. Customers want to know the location of their shipment and to be alerted if its time-definite delivery is threatened. This problem can manifest itself in two forms: the shippers and the intermediate carriers.

If a shipper wishes to track an individual shipment, he must go to a Web page for each carrier or logistics provider. Multiple shipments therefore require constant movements between Web pages. Three problems result from this type of setup. First, the shipper must match carriers to shipments prior to tracking, which is sometimes complex and difficult for the customer. Second, carriers usually allow tracking from either the equipment ID or their shipment ID. Carriers do not always retain the unique shipment ID that the customer utilizes (i.e., purchase order, lot number, customs file, Renban number, etc.). In some cases, this makes it almost impossible for a customer to locate the shipment for tracking. Third, and perhaps most important, the customer lacks a single point of focus. All of this leads to sub-optimization for customers. E-commerce has not delivered value to them and, as a result, their supply chain suffers.

Some transportation movements are intermodal— they involve more than one carrier and different modes. Often an intermodal trucker is involved. Truckers, usually the last link in the intermodal chain, must know when equipment is ready for movement. But they too suffer from disaggregation of information.

For example, a Chicago trucker must maintain eight separate railroad Web pages to keep current. This is laborious, as the trucker must inquire about one piece of equipment at a time. Although the railroad may have generated an e-commerce cost savings, there is none for the trucker. Most railroads have not developed sites where truckers may view all their moves at one time. (Some carriers provide such capability to customers.)

Major port areas experience the same problem. Truckers are forced to browse numerous Web pages for different steamship lines and marine terminals. But without complete information, these truckers are unable to optimize their movements. For example, they may depart a terminal empty without realizing a return move will be available. Additionally, a concentration of moves during daylight, which could effectively be spread out over more hours, continues to plague the business.

So there is a real cost to this peak demand. Better information could lead to more level utilization, which would allow truckers to be more profitable without raising rates. Carriers would benefit while terminal assets would become more productive. Customer service would improve without any additional infrastructure capacity.

Shippers have also been reluctant to complete the supply chain loop. Although information about goods may be exchanged, integration of financial transfers has lagged behind. Although electronic funds transfer has become routine, it is often a standalone application. Funds are transmitted separately from remittance advises instructing the recipient on application of funds.

In many cases, such transfers increase the very workload they were meant to alleviate. The recipient may just deposit the cash to a customer clearing account. They may find themselves with large unapplied balances at the same time they have apparently overdue invoices.

The Rise of Intermediaries
At much the same time companies came to recognize the need for logistics’ awareness, an increased awareness of core competencies developed. As more sophisticated financial tools, such as activity-based costing (ABC) and economic value-added (EVA), entered the corporate mainstream, management became focused on the return of assets. Outsourcing allowed an organization to concentrate on its core competencies and customers, and to take advantage of greater operational flexibility.

The quest for supply chain improvements that could support overall corporate performance inspired many companies to seek help achieving these results. As the scope of operations grew to be global, outsourcing became more common. It has been estimated that more than 60% of Fortune 500 manufacturers used some form of third-party logistics services (3PLs). And many use more than one.

Using 3PLs enabled businesses to improve their financial positions by reducing operating and capital expenses. It also simplified transportation purchasing decisions by providing scope and scale unavailable from individual carriers. Successful 3PLs boast service throughout the world and can do so across various modes: surface, ocean, and air. Scale provides the volume to handle business in a very cost-effective manner.

Information technology allows 3PLs to manage the business and take full advantage of scope and scale. Some customers believe that 3PLs can provide better service than can the underlying carriers because they have the systems advantage, including customer service operations. Often, the merger of systems and scope enables the 3PL to perform helpful functions such as regulatory compliance and determining the total delivered cost of goods for sale.

Some recent surveys suggest that the rush to employ 3PLs has subsided. The current trend is to develop a lead logistics provider (LLP) or Fourth-Party Logistics Provider™ (4PL)*. A 4PL is treated as a strategic partner, rather than a tactical one (such as the 3PL). A 4PL is a supply chain
integrator that synthesizes and manages the resources, capabilities, and technology of its own organization with those of complementary service providers to deliver a comprehensive supply chain solution.

The skill sets necessary for a 4PL are unique and differ significantly from the operating expertise needed for logistics outsourcing. Strategy consulting, business process review and redesign, technology integration, and savvy people management are some frequently cited prerequisites for 4PLs, as are global capabilities and the organization to manage multiple service providers. A 4PL that can also provide 3PL services has become known as an “infomediary.”

Not by coincidence, 4PL/infomediary growth accompanies the explosion of e-commerce. Customers are being forced to develop solutions in Internet time. There is a dawning recognition that the first mover accrues most financial benefits from innovation and that the benefits of simply catching up are even smaller than they used to be.

Buy-Side E-Commerce

Although sell-side e-commerce may define the manner in which services are provided, buy-side e-commerce will determine the ultimate configuration of the market and industry survivors. Forrester Research estimates that e-commerce transactions will double every year, reaching $1.3 trillion by 2003. (This sum increases tenfold if traditional electronic data interchange transactions are included. While most new transactions are Internet-based, the embedded base of EDI over private networks is expected to remain in place for many years.)

Most industry focus has been on the business-to-consumer (B2C) market in the form of initial public offerings and market valuations. There has been great interest in which portions of the transportation and logistics industry will benefit from this new form of distribution. Despite all this publicity, 90% of this market is business-to-business (B2B).

Buy-side e-commerce is compelling to businesses for the economies that seem apparent. It offers a convenience, timeliness, and choice that may not always be available. In many cases, multiple vendors offer sales to multiple customers. Although e-commerce is still in its infancy, some companies have already generated significant savings by moving their purchasing to the Internet. This can also be a means by which 3PLs can assure themselves an adequate, cost-effective supply of underlying carrier transportation capacity.

While they show promise, buy-side transactions are not largely employed amongst transportation carriers. Many carriers seem to think they are engaging in e-commerce if they have a Web page showcasing their newest equipment. This is not the case, and they are overlooking a multitude of opportunities.

Marketplace E-Commerce

The growth of buy-side e-commerce in the transportation industry is similar to but more accelerated than the development of other areas of the industry. Early on, logistical operations involved a complex chain of transportation transactions, a large number of participants and handoffs, and a multitude of redundancies and reworking.

The transportation world was easily broken down to three groups. At the basic level an asset-based carrier provided services directly to a customer. Here, one saw a series of many one-to-one relationships. Customers had numerous bilateral contracts with carriers, and carriers had many one-to-one contracts with customers. Contracts involving multiple carriers and multiple customers were almost non-existent.

Beyond this basic arrangement two other marketplace solutions formed. Bulletin boards developed on which truckers posted notes at truck stops offering capacity and responding to notes seeking capacity. This method required an actual presence at the truck stop. Over time, truck brokerages performed load matching by improved communications (i.e., phone, fax, e-mail). Truck brokerage evolved into 3PL.

The e-commerce methods available through the Internet built upon the former methodologies. The bulletin board is the simplest. Here, the provider gathers and posts information about available loads (from carriers) and desired loads (by customers). When customers or carriers see an item, they can contact the other party.

The business model is fairly simple. The bulletin board provider charges a monthly subscription fee and offers levels of service, remaining mindful of the goal of offering the preeminent bulletin board. Users will rarely look at more than one or two sites. A first mover advantage exists for the provider who quickly becomes the largest.

To grow revenue the provider has two options. It can either expand into other modes of transportation, which may not be easy, or it can offer additional value-added services. One bulletin board for motor carriers provides credit checks, handles fuel purchases, and obtains group discounts. Often these are services rendered by a third party who offers access to their services through the bulletin board, and pays a fee to the bulletin board.

Another type of marketplace e-commerce is the auction. These sites perform a freight rate auction marketplace. Shippers either place their desired bids on the site (for carriers to view and offer bids) or they may just request the carriers’ best rates. Some carriers might advertise capacity and seek bids for it. The process is blind. At a predetermined date and time, the winning parties are advised of the “winning bid.”

Although this system sounds straightforward, it carries numerous potential problems. Customers may wish to limit the bidders. For example, the customer loses out if the winning bidder is a company with which he does not necessarily conduct business. Carriers have similar concerns. More sophisticated auctions offer filters for bid specifications.

Here, the business model is a combination of subscriptions and transaction fees. A big problem, however, is that there is no guarantee of a final bid which will move freight (and generate a fee). Some auction sites attempt to solve this by requiring freight payment through them.

The e-commerce marketplace also offers the exchange method, a process...
similar to that of an auction, but with several distinguishing features. For example, one can see the moving rate as the market moves to a price. It is like a commodities exchange. Currently, however, only providers offer capacity, and speculators will be kept out by preliminary screening of participants by the exchange operators.

The exchange system also is flawed for the following reasons. It can be used unlawfully, or as a means for participants to send pricing signals to each other. (There are such precedents in the airline pricing systems.) Additionally, an exchange could find itself possessing sensitive anti-trust data that could incriminate its customers.

And ever more problematic is the amount of information that the exchange will possess. Although it sanitizes the data of individual parties, it could potentially sell information about market and pricing trends to both customers and carriers.

As with auctions, the business model compensates the site by a combination of subscriptions and transaction fees.

**What Will the Future Bring?**

Many wonder what the advent of the Internet and e-commerce will mean to the transportation and logistics industry.

A large number of carriers fear that the technology will cause further depression of rate levels. This is a valid concern. Internet auction sites have usually yielded two types of results. For products, the price can sometimes rise, but for services, the price frequently has been driven down (perhaps reflecting the “perishable” nature of services).

In today’s transportation market, the cause is not so much e-commerce, but basic microeconomics. If supply exceeds demand, the price will fall. E-commerce sites will not cause rates to fall further than they would — but they may cause rates to fall faster. Better communication and information in the marketplace will allow prices to achieve market equilibrium more quickly.

E-commerce penetration can be determined by supply and demand in addition to market aggregation and intermediation. A market with a few major carriers (e.g., six major railroads) will be harder to penetrate than one with numerous carriers (e.g., 50,000 interstate truckers). Transportation markets with well-established (transportation) intermediaries (i.e., consumer products) will be easier to introduce to e-commerce solutions than markets that do not traditionally rely on intermediaries (e.g., domestic bulk commodities).

Shippers will be forced to consider their options carefully. If they suspect that demand is close to, or exceeds supply, they will want contracts for most of their expected traffic. But if they suspect that supply will exceed demand, they will want to buy most of their capacity on the spot market. A bad forecast for market conditions could have catastrophic results.

3PLs and other intermediaries must make these purchased transportation decisions on two levels because they both buy and sell transportation. For the intermediaries, the possibility always exists for bankruptcy, due to unwise choices made in an attempt to garner arbitrage profits (i.e., sign contracts with carriers and float rates with customers).

The advent of e-commerce suggests a range of possible outcomes. Carriers may find pricing on the spot market unappealing because they lack the necessary information systems and personnel to handle such market dynamics. In such cases, dealing with 3PLs may be the easier option.

Rather than getting caught with capacity that must be sold at a steep discount, carriers may seek contracts with 3PLs for large cargo commitments. These rates may be lower than those for some cargo, but such action also requires less employees, less time and less information technology. Overall, the economic result may be more sensible. Customers have often proven themselves ingenious at using spot market pricing tricks to establish a basis for ongoing rate levels. Carriers may just wish to avoid subjecting themselves to this rate whipsawing.

Some 3PLs may feel large enough to move from e-commerce marketplaces to buy-side solutions. This would offer them the benefit of auction-type economics, without requiring them to share the economic benefit with other parties, some of whom may be industry competitors.

The long-term possibilities of developing a true transportation commodity exchange are intriguing, and we could see further movement in that direction in the future. The natural gas and electricity industries (which, like transportation carriers, are also asset-based, network-operating companies) are seeing the development of commodity exchanges as the industry divides between providers and marketers. There have been some efforts to provide transportation futures, but they have never operated through a formal exchange. Naturally, a fair number of regulatory issues must be resolved for this development to take a serious turn.

Information is a critical component of the supply chain and will continue to drive change in the transportation and logistics markets. E-commerce will be a major component of this transition.

Due to e-commerce, an inevitable market shakeout awaits the transportation industry. The number of transportation and logistics e-commerce products proliferates daily. Despite their success in attracting venture capital, most will succumb to the handful of survivors, who will, in turn, be absorbed through mergers and acquisitions. And while many B2B sites claim to eliminate the need for intermediaries, many are becoming intermediaries in their own right. Sites that claim to embrace intermediaries risk becoming trivial as the intermediary, with its existing customer base, lowers the site’s price by leveraging it against other sites.

The e-commerce business models will prevail, and, like Internet time, the shakeout will be brief — but memorable.

**Note**

*Fourth-Party Logistics*™ is a registered trademark of Andersen Consulting.