

E-Logistics: Trends And Opportunities

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The logistics industry is estimated as of 1999 at \$920 billion for the U.S. and over \$2 trillion globally.

1. Logistics

Logistics is defined as the broad range of activities concerned with effective and efficient movement of semi-finished or finished goods from one business to another and from manufacturers/distributors/retailers to the end consumers. The activities include freight transportation, warehousing, material handling, protective packaging, inventory control, order processing, marketing, forecasting, and customer service. The logistics market is enormous. It amounts to 10-15% of every product produced and is estimated to be at US\$ 2 Trillion worldwide.

From the above definition, we can classify logistics into two categories: Business-to-Business logistics and Business-to-Consumer logistics. The area of B2B logistics is very important and forms about 80% of total logistical activity and is again divided into two distinct categories: Inbound logistics which refers to the management of material movement and integration from component suppliers to a manufacturer/assembler and Outbound logistics which is the management of movement of final products from a manufacturer/assembler to the distributors and retailers. B2C logistics, also called the retail logistics, is the management of goods delivery from manufacturers/distributors/retailers to the end consumers.

The report is organized as follows. In the remainder of this section, we first state very clearly the role of logistics in a supply chain network, identify the new technologies affecting the logistics industry, and mention the market size. In section 2, we define E-logistics and identify the opportunities it creates for the logistics companies. We also define the three primary value delivery processes for a logistics company. Finally in section 3, we discuss the emerging trends in the logistics: process centricity and collaborative market places, out-sourcing and customer centricity.

1.1 Role of Logistics in the supply chain

An integrated supply chain network is a group of independent companies, often located in different countries, forming a strategic alliance with the common goal of designing, manufacturing, and delivering right-quality products to customer groups faster than other alliance groups and vertically integrated firms (See Figure 1).

Logistics, and particularly E-Logistics, plays a very important role in coordinating the activities within the globally integrated supply chain network.

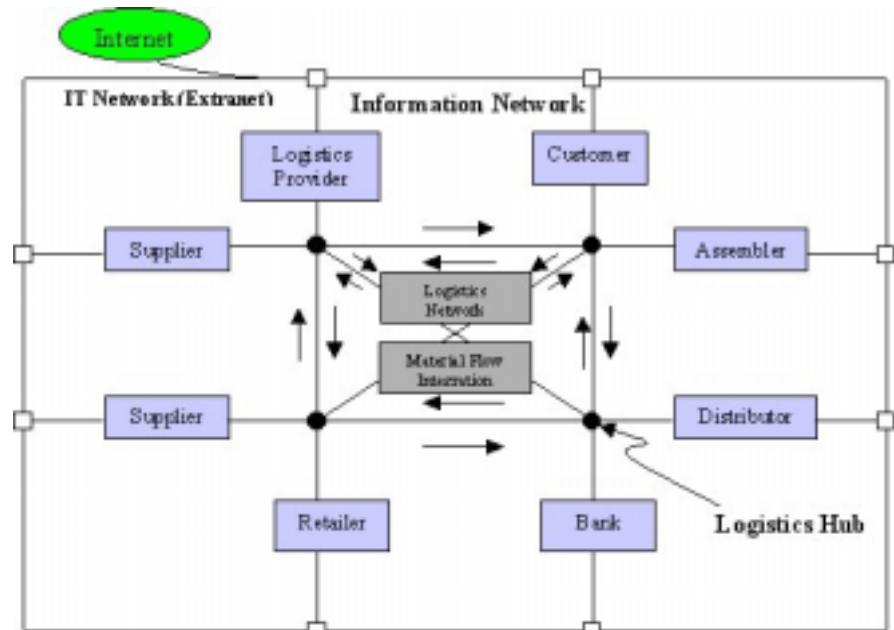


Figure 1: Integrated Supply Chain Network

Such networks are common in the energy, automobile, pharmaceutical, aerospace, electronics, computer, food, and apparel industry sectors. In global manufacturing of this kind, components may be sourced from several countries, assembled in yet another country, and distributed to the customers all over the world. These networks are not generally under single ownership but are group formations of independent companies in alliance for a specific and special purpose. They compete with similar cooperating networks. A well-designed logistics network provides streamlined material flow between all partners, cutting down the lead-time and cost of moving the raw materials, subassemblies, and finished goods to their destinations. A typical customer order triggers several B2B and B2C logistical operations. An extranet, a secure and reliable communications network linking all the companies of the enterprise, provides the information integration. By providing the right information at the right time to all the stakeholders, the extranet enables efficient logistics and effective decision-making. This integration will reduce the inventory levels and also the cost of delivery. Essentially information substitutes inventory. In other words, if one knows when his / her order is scheduled on the assembly plant and on the transport carrier, then the need for inventory and safety stock is reduced.

The Internet has fueled the growth of E-commerce and has revolutionized the so-called front-end systems of order placement, sales, and marketing. Fast and easy ordering of customized goods over the web has raised the expectations of fast, reliable and convenient delivery among consumers. This story of great expectations is repeated in the world of Business-to-Business e-commerce as well. Manufacturers now take ownership of components only when they enter the factory floor and expect the suppliers to own the inventory until then.

As the Internet and e-commerce has evolved, from the likes of Amazon.com and B2B procurement to i2 trade matrix and a B2B marketplace focus, so too has the need for back-end fulfillment and logistics capabilities as companies struggle to

E-Logistics is a holistic methodology in which logistics processes, enabled by supply chain visibility and integration are customer-centric and synchronized with those of the partners.

get products to market. In our view, all successful companies in future will be logistics companies. Companies must not only be able to design and market products, they also must be able to source its components, build it, move it, store it, pay for its manufacture and deliver it to the market — on time and at a competitive price and collect the cash. Thus, logistics becomes an integral and critical part of businesses. It needs to be embedded in all phases of manufacturing from product design (design for logistics) to order fulfillment and installation and service.

1.2 New Age Technologies – Enabling Visibility and Integration

The traditional business of logistics is being transformed radically by the rapid advancement in communications technology, both by presenting new and challenging demands to the companies, and also by providing needed tools to restructure themselves to face these demands. The communications technologies such as the Internet and wireless, information technologies such as XML Java, WAP, etc. have made the ubiquitous flow of information seamless. Also, the digital marketplaces have emerged as key information and transaction nodes in the supply chain. Logistics companies can benefit from this development in two ways: firstly, by aligning their processes to support the needs of this growing market and secondly by participating in marketplace activities to reduce their operations cost, identify new business and to improve their efficiency.

The Internet and the emergence of the digital market places has had widespread impact on supply chain execution by offering easy and convenient access to business partners across the world.

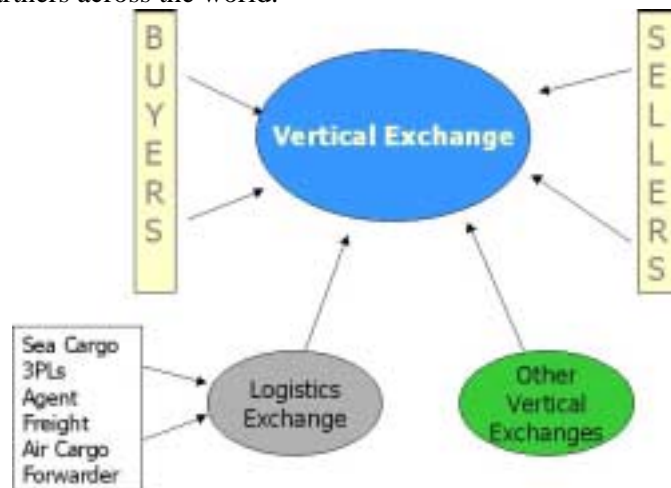


Figure 2: Logistics marketplaces supporting vertical marketplaces.

Electronic marketplaces enable sharing of information and provide the much-needed visibility through the supply chain. The logistics providers, in their turn are expected to partner with suppliers and manufacturers and share information to effectively and efficiently manage their operations. One example of such collaboration is synchronized scheduling of transport operations of the logistics company with the production operations of the supplier and OEM. Another example is merge-in-transit where the logistics provider brings in all the subassemblies just in time for assembly at the customer site.

The emerging trends in E-Logistics along the three enterprise-level horizontal processes of the customer management, service innovation and infrastructure management are customer-centricity, outsourcing and end-to-end value delivery through collaborative exchanges

1.3 The Logistics and E-Logistics Markets

The logistics industry is estimated as of 1999 at \$920 billion for the U.S. and over \$2 trillion globally, with less than 5% outsourced worldwide. The greatest opportunities for the logistics industry today are a result of the growth of E-commerce activities worldwide. E-commerce is facilitating increased outsourcing of logistical functions and the growth of third party logistics. The logistics market forecast related to e-commerce at \$42 billion in 2000 is on its way to \$274 billion in 2004, with third-party outsourced expenditures of \$11 billion in 2000 rising to \$100 billion in 2004, a compound annual growth rate (CAGR) of more than 70%.

2. E-Logistics

Before we discuss the trends in E-Logistics it is important to define the term. E-Logistics is a dynamic set of communication, computing, and collaborative technologies that transform key logistical processes to be customer centric, by sharing data, knowledge and information with the supply chain partners. E-logistics also enables synchronization of events and right decision-making. The ultimate objective is to deliver the right products in right quantities at the right place and time to the right customers. The transformation of logistical processes through electronic means of moving, storing, and manipulating data, information and knowledge or e-logistics, will equip companies with greater agility to deliver customer-configured products and value added services faster than competition and also enable the companies keep the promises of 2 day deliveries for PCs and 5 day deliveries for cars. The whole fulfillment system needs to be managed in a way that meets customer expectations while controlling inventory and transportation costs. This will ultimately determine which of the old and new-economy companies will survive and prosper and which companies will fail in an increasingly “plugged-in” marketplace.

It has been known for a long time now that good information and predictable deliveries can replace the inventory. Thus information sharing would reduce the inventory and hence the cost of combined category of taxes, obsolescence, depreciation and insurance, which forms more than half the inventory carrying costs. All in all, the continued deployment of the technology will give logistics companies the tools to analyze the process of fulfillment and restructure it for the rapid, high-velocity delivery now demanded by both businesses and consumers in the Internet era. However, the impact of these tools, and the trends we will discuss in the later part of this paper, on the logistics provider needs to be considered in context of the three primary processes in a logistics company as discussed below.

2.1 Process-centric framework

Most logistics companies can be considered to be a bundle of three primary processes: a customer relationship management (CRM) process, a product innovation process, and an infrastructure management process (See Figure 3). Each plays a unique role, employs different kinds of people, and has different economic, competitive, and even cultural imperatives. The role of CRM is to

find customers and build relationships with them. In the case of B2B inbound logistics, this means managing relationship with suppliers, and manufacturers and defining and operating a high velocity fulfillment system. Also, the vertical exchanges (See Figure 2) are emerging, as a powerful medium for B2B commerce activities and it is important that the logistics companies establish relationships and participate in their e-fulfillment activities. The role of the service innovation process is to conceive of attractive new products and services that help the customers, such as synchronized scheduling, collaborative forecasting, merge-in-transit, cross-docking, track and trace, etc. And finally, the role of an infrastructure process is to build and efficiently manage facilities such as warehouses, vehicle fleet, loading and unloading equipment, etc. It is possible that a company owns one of these processes and out-sources others. For example, the fourth party logistics providers (4PLs) outsource the infrastructure process and several others out-source parts of it such as warehousing or freight management.

Information visibility through collaborative exchanges will be the key to synchronized supply chain management.

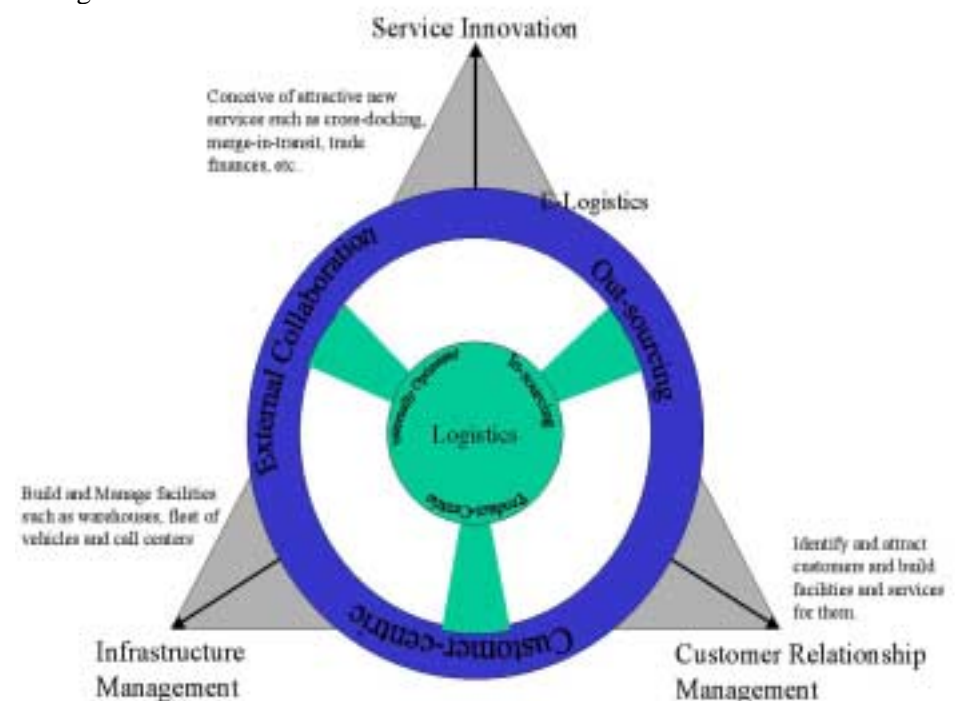


Figure 3: Three core processes for a logistics firm.

3. Emerging Trends towards E-Logistics

Given the rapid pace of change in business paradigms and the potential of the E-Commerce related logistics market, it becomes critical to understand their implications and the emerging trends in E-logistics, in order for logistics companies to fully benefit from the new opportunities. As stated before, the emerging Internet technologies shall play a pivotal role in driving growth and the transformation of logistics companies into new economy firms. There are several things happening concurrently at high speed. These fundamental trends brought about by E-Logistics and further reinforcing the shift to E-logistics based activities are namely a focus on end-to-end value delivery processes, outsourcing and customer centricity. We will discuss briefly these trends in this order.

Outsourcing by large manufacturers and exchanges is a growing market for logistics providers, who have the requisite capability to integrate with clients and to manage outsourcing relationships.

2.2 End-to-end value delivery through collaborative exchanges

In the case of third party logistics companies, the main value delivery process is the infrastructure process and has to be carefully managed. Most of the large logistics companies currently have software such as warehouse management systems (WMS) and transport management systems (TMS) to manage their warehouses, transportation and other activities. Added to this, the Internet has made possible quick and easy transfer of information between these systems. As a result the B2B logistics infrastructure process can now be deconstructed and reconstructed as a collaborative marketplace, leading to increased visibility and better decision-making. We discuss this issue below.

Consider an international B2B inbound logistics process as shown below in Figure 4. The activities in the process include: warehousing, freight forwarding, and custom's clearance at seller end, air or sea transport, customs clearance, freight forwarding, and warehousing at buyer end and finally delivery to the buyer. Most of these activities and their associated subsystems are computer controlled using WMS, TMS, etc. The information associated with these facilities is stored in these information systems. Suppose we separate the physical aspects of facilities and products from their informational components. We connect all the informational components by an extranet and provide visibility of capacity, inventory, price and schedule information to all the companies and the shipment details to the customs and the customers. Then the value chain gets reconstructed as a collaborative market place where each partner has information on all the stakeholders and the shipments. Now, a distributor can make sales plans around not just the product in his warehouse, but also on the product waiting for clearance from customs, on the product in the manufacturer's shelves, on the 3PL trucks, etc. The Internet thus enables frictionless B2B commerce and improves the visibility along the B2B delivery process. This enables synchronized scheduling between the suppliers, logistics providers and manufacturers with a consequent reduction in inventory and lead-time.

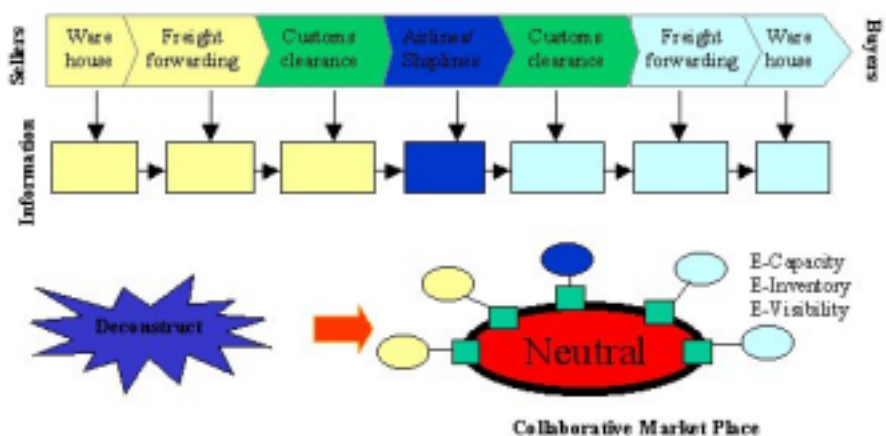


Figure 4: B2B Logistics Value Chain and Collaborative Processes

The key to successful B2B logistics then is collaboration between the clients and the logistics provider, in the form of collaborative transportation management (CTM), collaborative design for fulfillment and collaborative scheduling of

Outsourcing partnerships will be offered to logistics service providers by large manufacturing enterprises and by trading exchanges that require the specialized fulfillment expertise without too much cost and hassle.

logistics activities. These collaborative relationships are just beginning to become popular and will continue to do so through real-time integration between the various logistics providers, private exchanges and independent trading exchanges. Such cooperative relations enabled by technology will provide sustainable competitive advantages to logistics companies.

2.3 Outsourcing

The proliferation of the Internet has also made it easier and cheaper to coordinate activities between business partners. As a result, it has made it competitive for companies to specialize in their core capabilities and outsource their non-core activities to service providers who complement their offerings. In particular there is a trend in outsourcing of logistics to third party logistics service providers (3PLs). The trend towards outsourcing is also supported by recent management theories, which suggest that the corporations should focus on core capabilities, outsourcing activities that can be done effectively elsewhere. In fact the outsourcing of supply chain functions and ultimately the supply chain sub-processes in their entirety will be inevitable for many companies in the future. This is true not only for Internet companies which wish to acquire fulfillment capabilities with little time and money investment, but also for traditional manufacturing companies which wish to cut down on their expenditures on their non-core activities.

Outsourcing partnerships will be offered to logistics service providers by large manufacturing enterprises and by trading exchanges, which will require the specialized fulfillment expertise without too much cost and hassle. A prerequisite for logistics companies to exploit this opportunity is good connectivity with their partners and the establishment of good relations with them. These attributes will be highly desired by the partners, who wish to acquire much needed fulfillment capabilities and also exercises certain degree of control over the execution.

There are already several examples of total outsourcing, where a 3PL (or group of 3PLs) handles the dot-com company's entire backroom operations. The 3PL receives the goods from vendors based on Internet orders and performs warehousing, order picking, assembly, packaging, and shipping, as well as the huge job of handling returns. Other companies outsource portions of the e-business supply chain, such as the warehousing and order fulfillment or the shipping and delivery. With the Internet retail revolution in its infancy, the logistical demands on this industry are going to skyrocket, and 3PLs should be among the major beneficiaries--if they can perform.

Outsourcing a major logistics contract is a strategic business decision. Thought has to be given to determine the areas where a 3PL provider can add value and lower overall costs, while enhancing elements like cash flow, inventory investment and, especially, customer service. The decision to outsource any function can have a profound impact on a company. A poorly chosen provider can create havoc, but a well-constructed outsourcing partnership can have a positive impact on cash flow, inventory costs, customer satisfaction and profits.

Customer-centric approach towards service delivery is a very important means of establishing long-lasting and mutually beneficial relationship with key customers.

2.4 Customer-Centricity

The demand for greater value from the customers has resulted in the trend of logistics companies providing customer-centric services and solutions. In fact in their pursuit of achieving operational excellence in their areas of expertise, customer companies now expect increased participation and greater responsibility from the logistics service provider in the supporting activities within the supply chain. As a result, companies such as FedEx, UPS, Circle, MSAS, DHL and InSite offer professional logistics and supply chain services, customized to the business user requirements, operating philosophy, and business strategies.

Instead of trying to fit the customer needs into a standard transportation and warehousing model, they work with the business customers to develop a customized logistics solution that maximizes service, based on transit times, product considerations, and costs. Additionally, some provide professional assembly and installation for a wide variety of items including PCs, printers, sporting goods, home furnishings, and office furniture/systems. All items are tracked and managed by the companies, using a state-of-the-art information system from pickup to delivery. Furthermore, given the central role of the logistics provider in the supply chain, the logistics service providers are expected to and often do deploy information-based services to strategically manage the inventory levels across the supply chain, increasing the customer service levels while reducing inventory and warehousing costs. The NEC warehouse managed by FedEx in Singapore is a best of the breed example of customer centric logistics.

The Traditional Supply Chain *Starts with Assets. Core Competencies*



The Customer-Centric Supply Chain *Starts with the Customer*



Figure 5: Customer Centricity.

Customer-centricity of logistics providers in the context of their involvement with vertical independent trading exchanges will result in the development of vertical logistical solutions, catered to a specific industry, for the users in the trading exchange. Vertical logistics is expected to be a major growth area for logistics companies to establish and maintain their competitive advantage.

However, with increased customization at each stage of operation it becomes difficult to manage the various activities efficiently. Hence, the business

E-Logistics is the key to the success of businesses in the new economy.

processes of the logistics service provider need to be flexible enough to meet the varying and diverse needs of the various clients. This is where investments in new warehousing, transportation and information technology can play an important role in making it economically feasible for logistics companies to develop customized logistical solutions and to manage the resulting complexities efficiently.

4. What do the trends imply?

As discussed before a logistics firm is made up of three fundamental processes. To look into the future nature of the logistics industry the questions to be answered are, in light of the above-stated emerging trends

- 1) How are logistics activities going to be managed differently ?
- 2) What new services will be available to customers ?
- 3) How are customers going to be treated differently ?

The following table summarises the discussion so far.

	Infrastructure Management	Service Innovation	CRM
End-to-end value delivery	Build E-Business infrastructure including collaborative exchanges. Build capabilities for value added services such as end customization and supplier hubs	Innovate services such as merge-in-transit, trade finance, etc. Provide services such as collaborative planning and integrated scheduling through partnerships.	Visibility and integration for the customer, through services such as track and trace, one stop delivery and payment etc. Customised offerings from a dynamic network comprising of strategic partners.
Outsourcing	Scalable & flexible infrastructure. Information infrastructure to provide visibility across the supply chain to enable seamless integration.	Modularized service offerings that are completely integrable.	Abilities to manage multiple partners and provide the communication platform for product and service integration.
Customer-centricity	Infrastructure needs to be flexible to cost-effectively manage different requirements.	Innovating and designing services working together with customers.	Close collaboration through joint teams in the development of services.

5. Conclusion

The above discussion brings out the growing importance of logistics as a coordinating mechanism among multiple partners of the supply chain and, ultimately, as a source of value and competitive advantage. As competition shifts from head-to-head competition between firms to competition between supply chains, competitive success will depend increasingly on the ability to coordinate and integrate the production activities at geographically dispersed and organizationally distinct locations. The “new” logistics or e-logistics will play a fundamentally important role in the future of businesses.