

# CONTEMPORARY LOGISTICS, FROM PRE-MANUFACTURING TO ACCEPTABLE DELIVERY

*By Charles C. Poirier*

As a business analyzes its costs of operations, logistics typically appears as the second largest element, following the cost of purchased goods and service. Most companies have been pursuing improvement in this critical element of cost for half a century or more, often with very credible results. Many organizations continue the pursuit of logistics excellence with the aid of trusted partners or external constituents, including those companies interested in assuming the responsibility for some or all of the process steps.

From a modern perspective, these costs are now considered as part of an end-to-end supply chain network, and businesses pursue together the means to optimize those costs across the extended enterprise. Some extremely impressive gains have been recorded as these efforts move forward. The purpose of this paper will be to briefly explore this contemporary approach to a fairly standard and stable business practice, that of packaging, loading, storing and transferring goods across an extended supply chain.

For a typical firm, total logistics costs can vary between 5 and 15 percent, or higher, of the total revenues. A recent study showed these costs, after a period of decline, have risen and are now over 10 percent of revenues – for a large sample of companies and industries. Transportation is the largest component of this segment of cost, generally being more than half, and receives the greatest focus. Included in that category are the costs of ownership of the assets involved, equipment maintenance, driver wages and benefits, fuel (a particularly troublesome issue in times of rising oil costs), and miscellaneous items such as tolls and insurance. Warehousing and storage follow that element, including the associated costs for space, taxes, obsolescence, depreciation, interest; and insurance on the inventories held in the system.

Reducing these costs is a never-ending business quest. Most firms are successful in lowering these costs when they move through the early levels of supply chain. As efforts mature, however, a new level of sophistication enters the logistics discipline and companies move to more complex arrangements – including network alliances and multiple business constituencies. These arrangements bring focus to all of the logistics costs that occur before manufacturing, including inbound freight and storage, unloading and handling. They extend through the manufacturing processes, as logistics are involved in the movement of work in process and internal inventories, and then proceed to the final deliveries to customers and consumers. Should any materials or goods need

to be returned, the function continues through reverse logistics and any return shipments, until the cycle is completed. Hence, the area under consideration is termed: from pre-manufacturing to accepted delivery.

The logistics models being applied by businesses are becoming more sophisticated. Early efforts were directed solely toward reducing internal costs, particularly outbound freight. Consideration was given to the many options to be used across multiple serving and receiving locations for a particular business or division of a large firm, and the use of equipment and facilities to make the necessary deliveries. Companies analyzed their distribution efforts by looking at specific internal facilities, perhaps at a divisional region, to determine where to locate a distribution center (DC), and how best to serve that division's customers.

While the original models were primarily strategic in nature, more contemporary models are used for ongoing dynamic tactical planning and execution. Simulations are applied to consider alternative approaches before adopting new strategies and systems. With business complexity now including multi-tiered suppliers, sub-contractors and original equipment manufacturers, this advantage brings a new, higher dimension to the opportunities while lowering the risks inherent with new logistics systems. It also ushers in the need to think well beyond the confines of internal logistics and to consider external partners and network options in a quest to get closer to end-to-end optimized conditions.

Entire extended enterprise networks are now analyzed to consider all aspects of transportation, warehousing and delivery. These analyses are digitally based (on network extranets) and include the impact of inventory and the associated carrying costs. The effect of seasonality is factored into the newer models to create inventory-stocking rules. From a contemporary view, logistics has become a vital tool in extended enterprise efforts, from both a cost and customer satisfaction viewpoint.

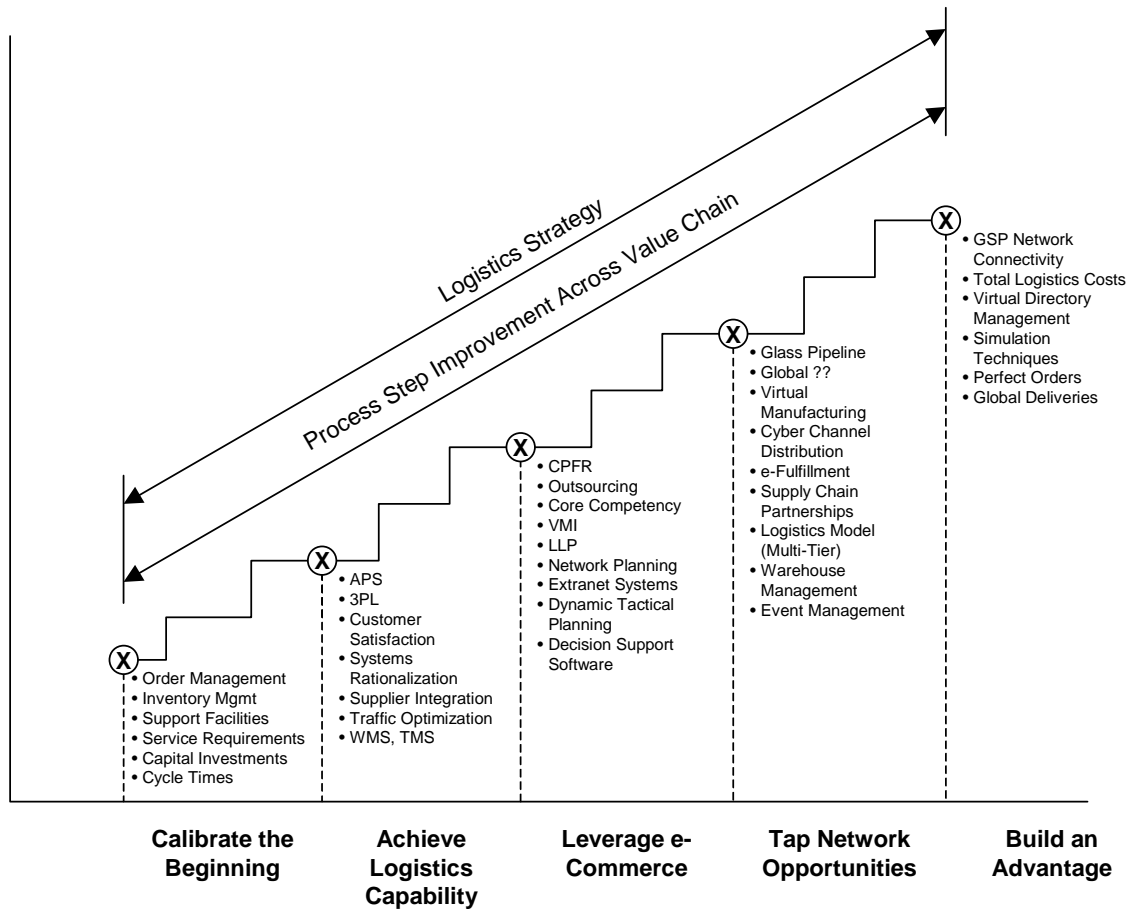
As a firm moves forward with its logistics effort, it generally pursues a transformation, which follows the five levels of supply chain evolution. Exhibit 1 presents a framework based on such a progression, from whatever initial position might exist for a company, to whatever is the most appropriate advanced level of logistics excellence. We call it the supply chain maturity model.

In Level 1, the firm typically begins to focus on reducing the overall costs of logistics from an internal viewpoint. This position is labeled "Calibrate the Beginning" to capture the need to know where the firm is starting and how far it might proceed. A company looks at its cost of shipping and receiving, the techniques used for loading and unloading at various sites, how orders are managed, and how the firm could find better ways to control the amount of inventory used to support operations and customer satisfaction.

The traffic department rises in importance in this level, as solutions are discovered leading to better yard management systems (often reducing the need for equipment), the pooling of freight for pick up, and balancing the miles-per-week with needed pieces of

equipment. Operational metrics such as cost/mile, backhaul percentage, space utilization, percent of trips out of route and number of empty miles all move in the right direction.

### Exhibit 1 – A Logistics Framework



- APS - Advanced Planning & Scheduling
- GSP - Global Satellite Positioning
- CPFR - Collaborative Planning, Forecasting & Replenishment
- VMI - Vendor-Managed Inventory
- 3PL - Third Party Logistics Provider
- LLP - Lead Logistics Provider
- WMS - Warehouse Management System
- TMS - Transportation Management System

A side benefit is found as the amount of non-productive time is minimized. Common carrier opportunities are investigated as most large firms combine the control of freight to a central position and measure the performance of many carriers and consolidate their orders with strong regional companies. With central control comes the desire to consider more permanent external partners, which can reliably handle the delivery requirements without disruption to customer satisfaction.

In Level 2, dubbed “Achieving Logistics Capability,” firms establish a logistics center where the total organization’s costs are evaluated. As the firm begins to consider its ability to leverage transportation and storage the same way as its purchasing volume, it moves closer to traffic optimization with attention turned to how the overall capability can be improved. An examination is made of service requirements, on both the inbound and outbound side of manufacturing, to determine if another supply chain partner can make the deliveries on a more economical and efficient basis. Leasing equipment to keep maintenance costs fixed and conserve cash becomes an option. Dedicated carriers having responsibility for heavy traffic routes are used. Work is most often performed in this level as a special “study,” frequently done with the help of a third-party advisor. Significant, deeper data collection typically accompanies these studies.

This type of investigation can extend beyond transportation and the use of trucks, rail cars, ships and planes, as serious consideration is given to the total assets tied up in warehouse space and distribution centers. Now those in the logistics center question: Are the facilities in the right place? Do we have more space than we need? Are the facilities performing the correct function? Do we have the best total cost of delivery and storage? Would we do better to turn over this part of the function to a more qualified partner?

Most firms find ways here to significantly reduce their investments, without harming delivery capability. Software programs are applied to determine where the warehousing should be located, how much space should be involved and which company should have ownership of the facility. Using data on where suppliers are located, where the manufacturing plants are situated, and where key deliveries must be made, this analysis includes how much inventory is required to meet demand, how the goods should be stored and retrieved, and often leads to rationalization of the total system and the installation of a Warehouse Management System (WMS) for those assets deemed important.

Third party logistics providers (3PL), companies skilled at taking over the responsibility for equipment, maintenance, and drivers, and arranging transportation across the system, are brought in to discuss transfer of ownership of this function. Advanced Planning and Scheduling (APS) begins to occur at this time, as these providers are given access to actual planning schedules, so they can have the right equipment and drivers available at the right point of need.

Concepts involved in product flow analysis enter the picture. That means the involved parties consider how much to buy and ship at any one time, adding a dimension around what is the right quantity to flow through the enterprise. Smaller shipments reduce inventory costs but can raise transaction, shipping and handling costs. Working on how to achieve lowest total costs and optimized conditions, business partners begin to share cost information to achieve a balancing of costs across the full business network.

In short, the logistics function becomes a serious part of the firm’s strategic framework.

As supply chain strategy is fused with the business strategy and operating plans in this level of the model, the elements required to attain logistics excellence are fused to the supply chain strategy.

When the firm crosses over the cultural barrier that inhibits use of external resources, it enters the third level of the model termed “Leverage e-Commerce.” The intention is to use Internet technology and cyber-based tools, internally and externally, to enhance logistics processing. Now the company takes advantage of its internal data analysis and, with the help of external advisors, starts its move toward the virtual logistics network. With some of its most trusted allies, a firm performs a network cost analysis and develops the end-to-end visibility so important to a contemporary logistics model. The logistics function considers decision support software that includes real-time data transmission on order and shipment conditions and requires the involvement of supply chain partners to coordinate shipments and deliveries with demand data. Internally integrated modeling occurs to pull the total needs together in a manner that allows the firm to consider many more options than previously accessed. Event tracking of shipments versus what the business plan called for becomes an attribute. Better event management becomes one added feature in this level.

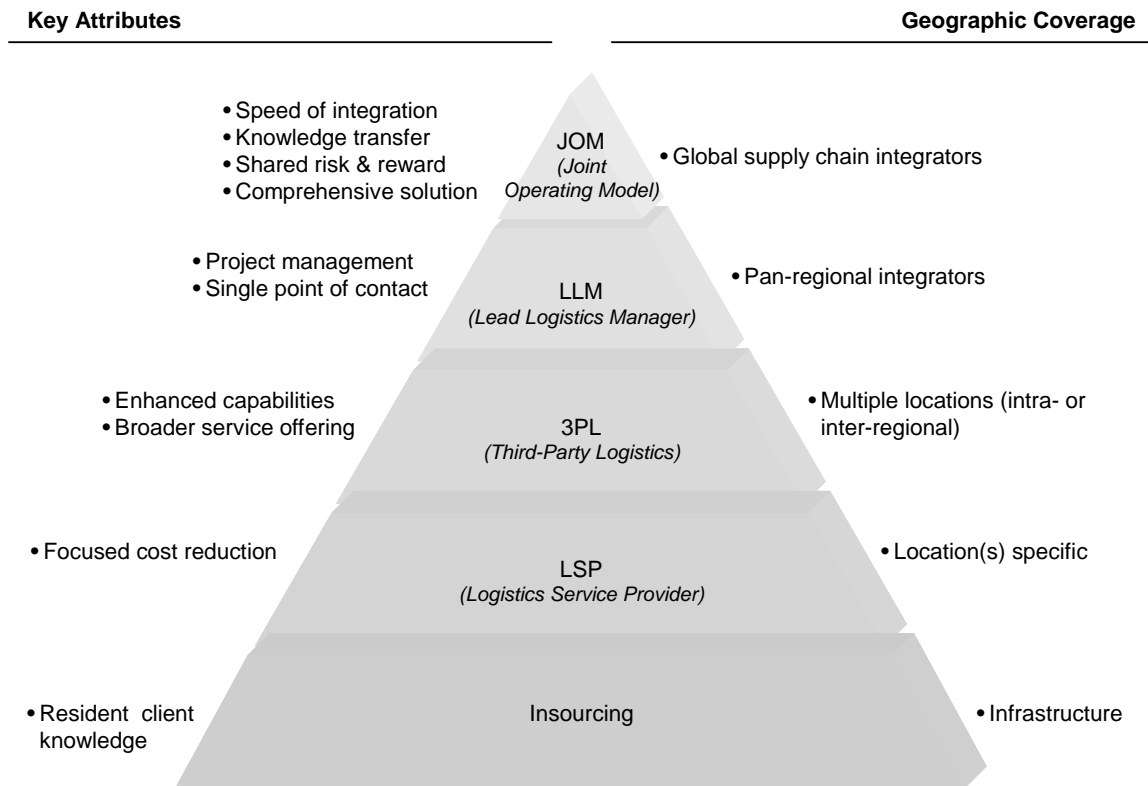
Dynamic tactical planning tools are applied in Level 3 to match manufacturing and delivery schedules with actual consumption and come up with executable plans. This planning is set up on a quarterly, semi-annual or annual basis, and allows the firm to track results against a more reasonable budget. As implied, the tactics are adjusted as market conditions change and special needs with key customers arise. Electronic communication systems with enterprise partners come into existence as the firm begins serious collaboration with its best suppliers and customers, often including some key distributors. Together, these partners look at network planning and delivery as a means of distinguishing the collaborating firms in the eyes of the final customer or end consumers.

To capture the progression being considered, Exhibit 2 illustrates the elements of an advanced logistics model. Beginning with the supply phase, with its internal logistics house in order, the firm considers the design-source-buy-store sequence of supply chain improvement. This means the company is taking both an internal and external view to logistics and making certain the connections and collaboration extend upstream to those firms involved in designing products and innovations. A cooperative internal arrangement between logistics and purchasing involves key suppliers in the designing and sourcing process, while determination of storage and deliveries are done in an optimal manner. With all of the complexity of today’s business networks, a series of Tier 1 to n suppliers could be involved in this activity.

Depending on the network and its products and services, there could be other players active on the supply side. Wholesalers for beverages and spirits, distributors of food products and supplies, and logistics providers might be very helpful in bringing the necessary upstream materials and products to a manufacturer. In the contemporary view, all of these constituents must be operating with some form of online order processing, order management, and tracking technique, while doing planning interactively. In the

part of the model, inbound logistics is thoroughly considered. Dispatching signals are sent to the key suppliers electronically.

### Exhibit 2 – Moving Logistics to Advanced Levels of Interaction



Source: *Third-Party Logistics Study 2001, Georgia Institute of Technology, Cap Gemini Ernst & Young Ryder System Inc.*

Transportation and distribution are coordinated to meet manufacturing schedules and to match delivery with actual consumption. Tracking of inventory and shipments is online and diversions are made (often in transit) to meet emergency needs. Expediting will always be a part of any model and can be accommodated to meet real emergency needs. Special shipments can be arranged, accessing virtual networks to find open capacity on transportation equipment. At the manufacturing or transformation site, internal logistics takes place in an optimized manner.

The central idea is to match the flow of incoming materials and supplies with the manufacturing schedules. Work-in-process could be a very important feature as it is in large steel and other metal-making operations where huge coils of semi-finished materials are transferred between operations. Order planning and scheduling are shared

with key upstream and downstream partners so all parties are aware of the flows and disruptions that may be part of operations.

Movement and storage are tracked and signals sent to important partners like contract manufacturers, co-packing operations and sub-assembly partners, often using radio frequency identification techniques. Once the products and goods are ready for transfer downstream, the firm and its allies work on outbound logistics. Here the emphasis is again on efficient movement and storage, but a closer look is given to order fulfillment.

With many channels of distribution being considered today, the advanced firm is matching the best delivery method with the needs of its segmented customer base. Just how much time is correct between order and delivery, for example, is defined and execution done accordingly. This means that if 24 hours is the appropriate best delivery cycle for the highest priority customer group, all systems work toward that target. If 72 hours is an acceptable standard, then that becomes the target. The concept is to keep the promises made so customers can plan accordingly and not be burdened with excess safety stocks.

Transportation systems, warehousing and distribution considerations and inventory management reach very sophisticated levels in the model, as order visibility – the ability to view and track shipments, make delivery promises, and manage inventories through an electronic system – becomes a reality. Channel partners of importance and the logistics providers responsible for outbound logistics are key users of this system.

In the advanced model, the firm and its allies add another phase, that of service logistics. Now the focus is on customer and end consumer receipt of the flow of goods and services. The model questions how good that receipt has been, and whether there are maintenance needs on the products delivered. Parts and spares logistics could be a part of the model, particularly in industries like automotive and aerospace. Removal and replacement of obsolete or damaged parts may be a requisite feature. Several large carriers have created new businesses to handle the return, refurbishing and re-shipment of computers and high technology equipment and parts.

Across the top and the bottom of the model there are requirements for success. There must be some form of network connectivity through which communications are channeled. That stipulation demands a compatibility of systems and software, making technology integration a key element. Demand management, or the better analysis of actual replenishment needs, must be coordinated carefully with supply capacity and withdrawals from storage made in synchronization with current planning needs. Inventory deployment, storage and management must be a network responsibility with each player managing its part of the sequence, from supply to final delivery. And above all, there must be online end-to-end visibility of what is going on across the extended enterprise. That leads to collaborative excellence, a mark that will distinguish the network in the eyes of the final customer or end consumer.

The benefits from executing such a model have been clearly documented. They include:

- Attaining the highest customer service and satisfaction ratings
- Reducing the need for working capital through lower investments in inventory and capital equipment now shared or outsourced with supply chain partners
- Reducing total logistics costs through much greater efficiency in storage, shipment and use of equipment
- Achieving higher asset utilization by aggregating the total needs across the network and taking advantage of the most useful facilities and gaining higher utilization metrics
- Gaining a better measure of risk management, as the network partners are online working real-time to reduce the aberrations and emergencies that plague supply chains.
- Developing new revenues as the superior performance leads network partners into non-traditional markets and increase business with existing customers.
- Bringing greater profits to the operating statement by virtue of being the best and lowest cost network of choice by the best customers

In the fourth level of the evolution, logistics strategy truly becomes a network experience with integration of efforts extending to multi-tiers of partners. Now the firm enters an area called “Tap Network Opportunities.” With the assistance of key allies and data readily accessed internally and externally, the focus moves to the extended enterprise and the shipments and storage occurring across many organizations. The major feature of this level is the “glass pipeline” that develops, through which the partners can view the entire supply chain flow, from the earliest important supplies to final consumption. Global Satellite Positioning (GSP) devices are used here to track shipments and storage of products. Radio-frequency identification technology (RFID) comes into play, with equipment mounted on warehouse trucks to link the communication right to the point of picking the correct items for any order. All inventories of merit are online, accessed through an extranet on a 24/7 basis.

Virtual inventory management becomes a reality rather than a dream as the partners are operating closely to meet delivery needs without excess inventory. The overall focus is on the “perfect order” with all partners working back from consumer and customer needs to provide the best possible solutions. Metrics are established to measure these perfect orders and used to solicit new business from other customers.

Not all firms need to progress as far as Level 5, which has been termed “Build an Advantage.” The opportunity is to achieve more benefits, particularly in terms of customer and consumer satisfaction. This area is for the most sophisticated of networks, requiring the formation of joint logistics models and involves full communication connectivity across the extended enterprise. Total logistics costs are evaluated through the connecting electronic communication system. Since the firms have applied activity based costing and balanced scorecard techniques to determine the costs per unit across the end-to-end network, they work together on the most cost-effective methodology while keeping customer ratings at industry-best standards.

A robust integrated multi-tier capability is what distinguishes the linked players, as all key members are working together online, in a real-time basis to match deliveries with actual demand. Simulation techniques are applied to study, evaluate and test alternative delivery scenarios, and to alert partners of relevant changes occurring within the system. Tight upward and downward propagation with regard to plans and changes are an element that brings further advantages.

In conclusion, logistics is maturing as a business technique, especially as a key element of creating the most effective supply chain network. Most firms progress through five levels of improvement maturity, although not all firms need to achieve the highest level of that progression. Models help guide the progress as firms carefully put the internal house in order and then select trusted partners to build advanced systems. Overall logistics costs decline in the process and customer satisfaction increases as the linked partners find the way to best any competing network in meeting actual delivery and replenishment needs.

#### **About the Author**

Charles C. Poirier is a partner with CSC's National Supply Chain Management practice with over 40 years of experience in a variety of positions including CEO. Chuck is an expert at helping companies increase value through more efficient and effective supply chain management, and is a nationally sought after speaker. His compelling style and real world examples have made his presentations and briefings noteworthy and topical. Additionally, Mr. Poirier has authored a number of books that have guided supply chain professionals for over 15 years. Included in his repertoire are: *Supply Chain Optimization, Advanced supply Chain Management, Using Models to improve supply Chains, The Supply Chain Manager's Problem Solver, E-Business: The Strategic Impact on Supply Chain and Logistics, The Networked Enterprise, Business Process Management Applied, RFID Strategic Implementation and ROI, and The Wall Street Diet.*

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