



Logistics Strategy Improvement Case Studies

Memorandum 708

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For any company that produces or distributes a product to the market, their distribution network is the lifeline via which their products are delivered. As a comparison, the distribution network can be likened to the body's circulatory system. Our bodies require oxygen to survive, just as our customers require our products to maintain their business. To transport the oxygen the body has blood; the distribution network has trucks, trains and boats.

So if distribution networks are so essential to keeping businesses alive, why do so many companies neglect them? These networks are often outdated, inefficient and not cost effective. To change the network requires detailed analysis, research, planning, and some setup costs. The task is not easy; but, if we were experiencing similar physical problems, we would not take years to visit the doctor. If we did, simple curable illnesses may turn out to be much more serious, and possibly grave.

So what drives companies to examine and change their distribution networks?



Many companies realize that inadequate distribution networks result in inefficient methods of storing and shipping their products. Improving their distribution networks can be an opportunity to reduce costs, while at the same time improve service.

Case One

A manufacturer of hardware products wanted to position itself as the customer service leader within the industry. When management undertook the goal of becoming the customer service leader, they realized that their transportation costs might actually increase.

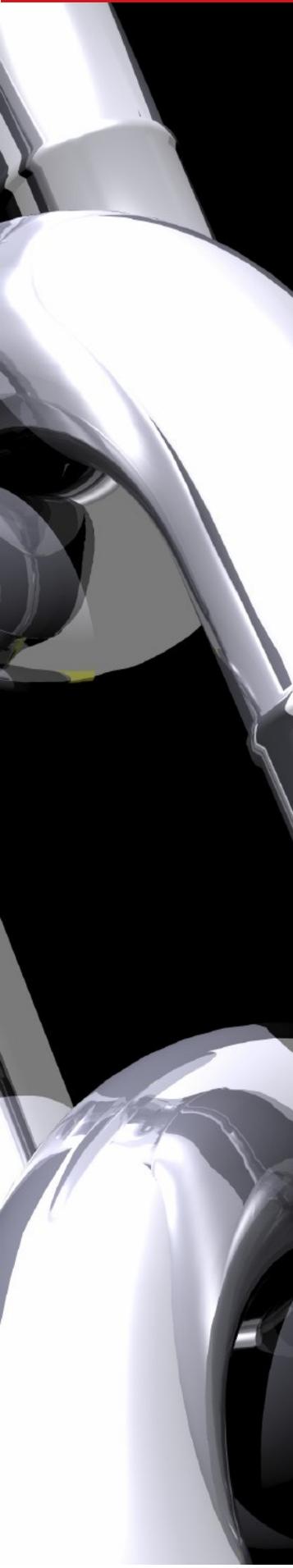
Manufacturing used multiple locations, with all customer orders shipped direct from the plants. Each plant manufactured select product lines, but most customer orders contained items manufactured from several plants. To avoid split shipments, a large number of interplant shipments were made to stock each plant warehouse, allowing each plant to distribute the full product line.

Plants are frequently located in areas that minimize manufacturing expenses. When this company decided where to locate their plants, not much consideration was given to the costs involved in distributing products to customers. This resulted in a number of plant distribution points located far from the market. The distance from the market, combined with the company policy to hold small customer orders until they could be shipped in truckload quantities, resulted in very long order cycle times—typically between 15 and 30 days.

The company had always done a very good job of controlling transportation costs. The policy of holding customer orders for consolidation resulted in almost 50 percent of the shipments occurring in full, single-stop truckloads. Another 30 percent of the shipments were delivered in multi-stop truckloads. Because customers actually ordered in small quantities, the shipments they received contained a number of their orders and took a long time to arrive. This complicated the customers' inventory planning procedures and warehouse operations.



Changes to existing distribution networks do not have to be driven by a desire to reduce operating costs.



The existing distribution network had been created to satisfy a customer base that did not place high service demands on their suppliers. With the successful emergence of large retail home centers such as Home Depot and the trend of homeowners toward do-it-yourself home improvement, the customer base was beginning to mandate extremely demanding service levels as a requirement of doing business. The company knew that to become the customer service leader, they would have to meet these tough requirements. To understand exactly what these customers required, an extensive survey of both the distributor and retail chain customers was conducted. The results indicated that some customers wanted their orders shipped complete and delivered within two weeks, something the company was not capable of providing.

A network computer model was used to determine the optimal distribution network that would satisfy the customers' requirements. The model considered transportation, inventory and warehousing costs, as well as the time required to pick, ship and deliver a customer's order. The optimal network consisted of cross-dock operations located at the plants, supplemented with regional cross-dock operations in major markets. These cross-dock operations allowed customer orders to be combined into a single shipment and delivered within the two-week lead-time.

With no warehouses added to the network and with inter-facility shipments reduced, the new network actually reduced transportation costs by \$3 million! The new strategy resulted in lower freight cost and faster delivery response by using better tools and processes to make efficient shipments from multiple orders.

Case Two

A major supplier of consumer hard goods maintained a system of nine regional distribution centers, in addition to six plants, to meet their goal of delivering to 95 percent of the country within one day of order placement. Although the capability to deliver in one day existed, the actual service provided was unclear because:

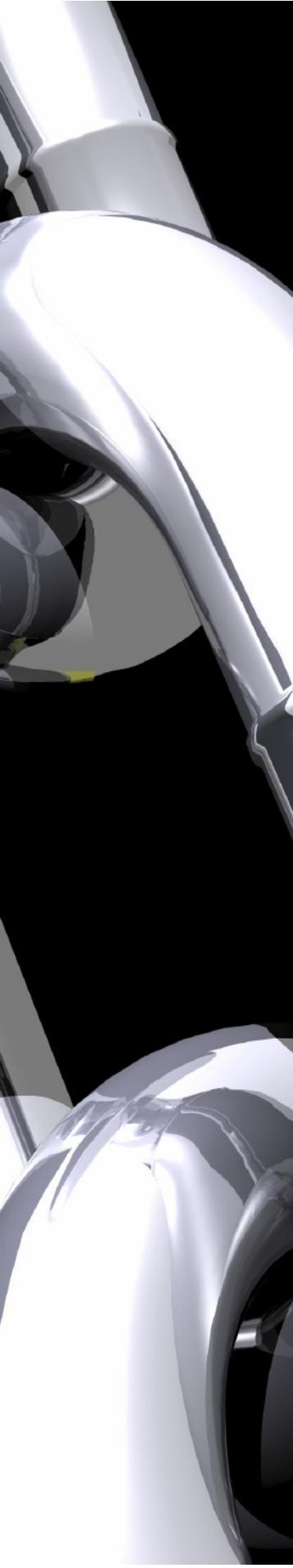
- Customers received 35 percent of their weight directly from the plants in full truckloads. Cycle times could be as long as five days.
- Poor inventory positioning often resulted in shipments originating from alternate facilities, resulting in longer cycle times.
- Actual cycle times were not tracked, even with the ambitious goal of shipping to customers in one day.
- Many facilities had overlapping service areas, which made the decision of choosing the primary shipping point less clear.

A more realistic goal for order cycle time was required. An extensive survey of customers concluded that there were indeed two separate requirements for order delivery: five days for full truckload orders (the same as currently provided) and two to three days for all other orders (one to two days longer than currently provided).

At the same time, logistics costs were high, especially warehousing and inventory carrying costs. A primary factor was that a high percentage of volume shipped during the last three days of each month, resulting in underutilized warehouse labor and stagnant inventory during the early part of the month. Any changes made to the number of facilities in the network would have a significant effect on inventory levels and warehouse overhead costs.



In the face of ever-increasing pressure to reduce delivery times, it can be very difficult for suppliers to keep up with customers. In response to this market pressure, companies can overcompensate.



Thirty-five percent of the business was currently shipping direct from the point of manufacture to customers in full truckload quantities. This portion of the business was already meeting customer requirements for cycle time in a very cost-efficient manner. Therefore, a computer model was developed placing a heavy emphasis on LTL delivery times, LTL rates and potential break bulk locations.

The addition of one to two extra days in available LTL transit time opened up many possibilities for closing or moving facilities. The final network was based on using six regional facilities, reduced from nine, to serve the LTL orders. This network met or exceeded the customers' service requirements at a savings of \$1.3 million in transportation and warehousing costs. In addition, inventory carrying costs were projected to be \$9 million lower with the new distribution network.

There are many factors that drive a company to examine their distribution network. Changing business, cost constraints and consolidating markets may all be reasons for a company to consider changing their distribution network. In many cases, the driving forces may be specific to a certain industry.

Case Three

Different industries focus on varying big logistics issues when considering potential changes to distribution networks. Companies manufacturing prescription pharmaceuticals with high margins and small, expedited shipments have traditionally been driven by manufacturing location and by the costs to carry high-valued inventories.

One such company had three U.S. manufacturing locations, supported by manufacturing in Puerto Rico and imports from Europe. Domestic distribution operations were conducted through warehouses located at or near each of the three plants. When the company decided that it wanted to close down its East Coast manufacturing location, it was necessary to evaluate the cost and service tradeoffs associated with non-plant warehouses in several other important markets, California in particular.

Most of the volume shipped in small parcel or LTL shipments, with a few large customers placing truckload orders once a week. A significant amount of product was also shipping via expedited one- and two-day air. This was occurring because of manufacturing issues and a lack of available product, not because of customer requests. The nominal service goal established from a previous customer survey was a three- to four-day total cycle time.

Aside from its role to provide service to an important portion of the customer base, the Northeast plant warehouse was also serving as the entry point for all of the European imports arriving via ocean freight. Without an East Coast facility, the European imports would have to be shipped from an East Coast port to the next closest plant warehouse in the Midwest. This meant that some of the European imports would be sent to the Midwest, just to be sent back to the East Coast.

Despite this significant transportation cost penalty, a computer model still indicated that overall distribution costs would be lower if the Northeast demand was fulfilled from the Midwest plant rather than from a standalone distribution center. The higher costs of space and labor in the Northeast were a major contributing factor to this conclusion.

On the West Coast, the solution was different. The model clearly showed that the California demand could be more effectively served from a West Coast distribution facility. However, the West Coast market was relatively small and would not support full truckload replenishments to the warehouse. Therefore, until volumes grew to a level which could support efficient replenishment, the West Coast market would continue to be fulfilled from the Midwest.

Analyzing and improving the current distribution network is a sound way to improve current service levels and reduce costs. This type of analysis can also be very helpful in planning the strategy for the future.

Case Four

Planning a distribution strategy is essential in planning for new businesses, or the expansion of existing business into new market areas. This point was evident when a large manufacturer of consumer goods (Company A) acquired another established manufacturer (Company B), with a customer base located predominately in the eastern half of the country.

Company A had plans to increase the market presence of Company B on the West Coast. While increasing the West Coast market share, the company also wanted to improve the service levels provided to all of Company B's customers. Customer orders were currently being shipped directly from the plant (about 80 percent of the volume) and from three regional distribution centers. The initial order profile indicated that almost all of the volume was shipped in truckload quantities. While the direct truckload shipments from the plant were cost-effective, they could not meet the company's goals for cycle time. Short, reliable cycle times were seen as essential to penetrating a market dominated by competitors. When establishing the strategy for the West Coast expansion, service requirements were defined as follows:

- To account for "emergency" orders, 10 percent of the volume being shipped into the five or six most important market areas had to be delivered the next day.
- Non-emergency delivery time to these target market areas was established at three days.
- The remaining regions would be delivered to in no more than five days.

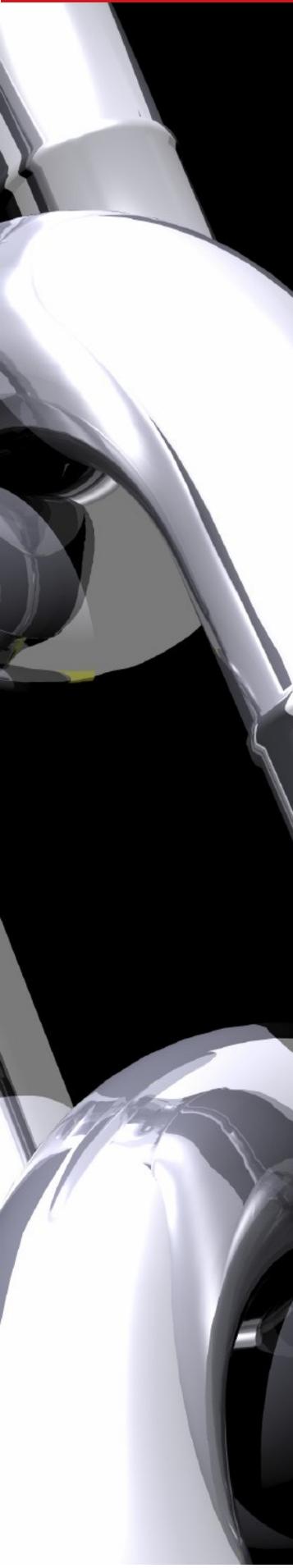
If the projected sales goals were met, additional manufacturing capacity would be required. This additional plant would be used as a shipping point for a substantial percentage of customer shipments, so it was important to consider proximity to markets when selecting the location for the new plant. The other important factor to consider in determining the location for the new plant was the cost for transporting inbound raw materials. All of these materials were available domestically, with vendors located in the Midwest, Southwest and West Coast.

Since California was a major source of raw materials, as well as one of the major markets which required next-day delivery, the model located the new plant in central California. This solution had the added benefit of allowing the closure of the West Coast distribution center. This plant's production capabilities and proximity to major markets would establish the foundation for penetrating the West Coast market.

To meet the second goal of improving overall service times, the computer model indicated that the Midwest plant should be moved several hundred miles east. This would allow both the Midwest and East Coast markets to be served within required service levels without the addition of another distribution center.

Improving the distribution network is not an easy task that can be implemented overnight. There are many information and material flows that must be considered. Many companies can act in haste, altering the network to save costs quickly, but in the long run they wind up increasing costs and aggravating customers. To carefully analyze, plan and implement a new distribution network can take many months, sometimes as long as a year. So what are the steps that need to be taken?

1. Talk to customers to find out what service they require. Don't rely on internal management to dictate what the customer wants. Many times they might not know! When a clear service requirement has been established, the current distribution network can be designed and measured against this standard. Remember, there can be differentiated service levels established for segments of the customer base. The distribution network must be established to satisfy each one efficiently.
2. Gather detailed data on the current operations. Reviewing and understanding the detailed transactions that occur over a significant time frame (at least one year) is key to understanding how the current distribution network is actually working. By analyzing the detailed transaction data, many myths about how the operations are working are often disproved. There are several key pieces of data that should be reviewed including:
 - Transportation Rates
 - Shipment Sizes
 - Inventory Levels
 - Ordering Patterns
 - Warehouse Handling and Storage Practices
3. Use sophisticated computer models to optimize your network. These tools allow the analyst to determine how changes in the network, such as moving or closing facilities, will impact costs, service and material flow. The company can compare hundreds of alternatives before deciding on which network best suits their business.
4. Before taking action, develop an implementation plan! This is the step where many companies fall short. After a new distribution network has been agreed upon, there are still many things to consider and plan. Do we own or lease our current buildings? How easy will it be to sell any company-owned facilities? When do leases expire, and what are the penalties for terminating a lease before the expiration date? Are there existing facilities available in the desired new locations? Do we have to build? How will we move the product from the existing facilities to the new locations? How will this impact customers during the changeover?



These are a few of the many questions that must be addressed before changing your distribution network. But why undergo such a daunting task? **Companies that have not reviewed their distribution networks in the last five years typically see a reduction in logistics costs between 10 and 20 percent, while improving the service to customers.** This generally translates to millions of dollars added to the bottom line, and much happier customers. We recommend that companies review their distribution networks on regular three- to four-year intervals.