Omni-Channel and Beyond: Top 9 Strategies for Retail Supply Chain Design

What if treating all products the same in your supply chain ultimately costs you money and diminishes your service level?

What if buying products at the lowest cost actually hurts your profitability?

As a retailer, your primary objective is to achieve the desired (highest) customer service level at the lowest cost. You must know the tipping point between purchase price, quantity ordered and downstream supply chain costs that delivers the desired service level and maximizes profitability.

Retailers must know the tipping point between purchase price, quantity ordered and downstream supply chain costs that delivers the desired service level and maximizes profitability.

Many of the world’s leading retailers have dramatically increased their profitability by designing the optimal supply chain. They use modeling technology to examine how their supply chain will perform under a wide range of market conditions and assumptions, and analyze the trade-offs between cost, service and risk. Retailers that maintain these living digital models of their end-to-end supply chain have the ability to redesign and re-optimize their supply chains under changing market conditions, and can test the sensitivity of their key assumptions. A supply chain design initiative can identify as much as 10-20 percent cost savings in the corporate supply chain while maintaining, or even significantly improving, customer service levels. For most retailers, this equates to millions of dollars in supply chain cost reduction.

What You’ll Learn In this White Paper

We will explore supply chain design strategies used by the world’s leading retailers to achieve maximum profitability. These strategies include:

1. Omni-Channel Fulfillment
2. Supply Chain Segmentation
3. Right-Sizing Inventory
4. Product Flow-Path Optimization
5. Optimizing Bracket-Pricing Options
6. Inbound Consolidation
7. Static Multi-Stop Route Design
8. Store-to-DC Assignment
9. Cost-to-Serve Optimization

Some of these strategies can produce quick wins by leveraging existing assets; others may require a more extensive level of change (facility relocation or capacity expansion), but are often the key to unlocking major supply chain improvements.

Creating an expertise in supply chain design is an investment that can position an organization for sustained competitive advantage.
Strategy 1: Omni-Channel Fulfillment

**Business Challenge:**
E-commerce giants like Amazon have raised the bar for on-line fulfillment, leading customers to expect rapid delivery, free shipping and free returns when they place an online order. Omni-channel fulfillment strategies can provide a new level of service and convenience for retail customers. The retailer’s objective is to utilize a variety of fulfillment locations in order to provide a smoother customer shopping experience, improved service time and inventory levels and lowered overall cost.

**Supply Chain Design Solution:**
Supply chain design solutions such as network optimization and greenfield analysis can help identify strategies for improving store sourcing and inbound transportation costs based on required service constraints. It is also useful to understand how to optimally leverage e-commerce, brick and mortar and third-party channels to minimize overall costs while meeting unique demands in each channel. Multi-echelon inventory optimization can provide a full inventory plan that right-sizes inventory levels across echelons to meet service requirements at lowest overall cost.

**Case Example:**
A large department store chain wanted to design an effective one-day and second-day delivery fulfillment network for its growing e-commerce channel. This included determining the optimal number, location and size for fulfillment centers as well as best way to flow merchandise through the network to customers. Utilizing network optimization and greenfield analysis, the company built an eight-year plan to expand capacity by establishing new facilities and incrementally increasing existing capacity as needed.

The analysis considered costs and service times of UPS and FedEx standard service, next day service and second day service as well as zone skipping strategies. The resulting plan leveraged retail stores to meet peak season demand and as a method of satisfying local market demands where fulfillment center delivery time and/or total network costs may exceed local fulfillment costs. The project also analyzed potential regional store fulfillment options which would enhance store fulfillment efficiencies and potentially direct demand to the local store as the first path for fulfillment.
Strategy 2: Supply Chain Segmentation

Many retailers offer as broad a variety of stock keeping units (SKUs) as possible to ensure that their customers’ demands are met. However, customers’ buying patterns vary greatly based on product size or color, geographic region, price, season and availability. Many retail organizations ignore these unique buying patterns and operate with a single product flow through a single, fixed supply chain network structure. Some organizations exacerbate the problem by instituting a single stocking strategy for all products. This can lead to stock-outs on key high-demand or high-margin items while simultaneously carrying too much stock on under-performing items.

A supply chain segmentation, or categorization study, is an excellent method to determine where your supply chain should be differentiated to better suit individual product stocking and delivery needs. By examining key product characteristics, such as margin, velocity and variability, you can spot trends and “clusters” of like-products, e.g., slow versus fast movers or low margin/high demand products. Each cluster may require different buying and supply chain strategies, e.g., setting unique service and inventory targets or delivery methods. You can model, test and implement unique strategies for each supply chain product segment to achieve the optimal stocking and delivery performance at the lowest total operating cost.

A big-box retailer carries over 20,000 SKUs and flows all products through a two-tier distribution network. A small number of national distribution centers (NDC) consolidate inbound supplier shipments. These NDCs consolidate products and ship them to regional distribution centers (RDC), each of which supplies an assigned set of stores. A three-dimensional plotting of product velocity, margin, and demand variability led the retailer to identify 10 unique supply chain segments.

Unique supply chain strategies were designed for each unique segment, for example:

- **On-shelf availability for high-volume and high-margin items was optimized, resulting in increasing revenue while reducing lost sales.**
- **Inventory for low-volume and low-margin items was centralized in a few RDCs and fewer of these items were stocked on store shelves, resulting in a reduction in cost.**
- **Creating a new store-to-store transportation (transfer) capability for high-margin items with high-demand variability resulted in out-of-stock items in one being available within one hour, lead to a reduction in lost sales and a simultaneous reduction in inventory cost.**

[IMAGE 2: Depiction of product groups by margin and velocity. The cluster of products in the upper-right hand quadrant (blue) are high-margin/high-velocity products. Products in the lower-left hand quadrant (green) are low-margin/low-velocity products.]
Strategy 3: Right-Sizing Inventory

**Business Challenge:**
Different products’ margins and velocity through the supply chain vary greatly. Some products are much more important to your profitability than others. Defining your supply chain segments can lead you to make more effective decisions on service requirements or desired fill-levels for each unique product category. However, the inherent variability of both customer demand and inbound supply make it difficult to determine exactly how much inventory is enough. This problem is complicated when the supply chain has multiple tiers and you must decide how much inventory of each item to keep at each level.

**Supply Chain Design Solution:**
Multi-echelon inventory optimization determines how much inventory should be kept at each level and location in the supply chain to deliver the desired service level at the lowest cost—either by SKU or by category. This analysis accounts for the inherent variability in both the demand and supply side to identify the lowest total cost inventory stocking solution that meets the service requirements. In this approach, you define service requirements for each product and site, e.g., “I want 99 percent availability for SKU #333 at my Chicago store.” The inventory optimization technology then determines the minimum level of product to be stocked at each echelon and location to meet these targets while minimizing the total inventory holding costs.

**Case Example**
A grocery store chain has seven regional distribution centers that stock product for, and deliver to, over 500 stores throughout the country. The top 1,500 SKUs are stocked at all DCs. These represent more than 70 percent of the overall sales volume. The company established seven service-level categories between 85 percent and 99 percent, based on product characteristics.

A multi-echelon inventory optimization analyzed the demand and lead-time variability for each product/site combination and recommended a $5M reduction in overall inventory, even though numerous locations required a higher level of inventory. In specific cases, inventory for a product was increased in three or four sites and decreased in others. The result was the “right-size” inventory for the organization. Savings are achieved by actualizing the lowest total landed-costs and not incurring excessive supply chain costs due to buying improper quantities.

**Image 3:** Seven service-level categories with historical inventory stocking level (depicted by the orange bar), the newly-calculated and optimized stocking level (depicted by the green bar), and the difference—either positive or negative (depicted by the blue bar). Blue bars extending below the line imply a reduction in inventory and those extending above the line imply an increase in inventory level is optimum. The length of the bars depicts the inventory level in millions of dollars.
Strategy 4: Product Flow-Path Optimization

**Business Challenge:**
There are many variables that determine a product’s flow-path from sourcing to the customer. These variables include the supplier, the quantity purchased, the frequency of purchases (with current bracket pricing as a given), the mode of transportation, the port-of-entry, the distribution center, the transportation carrier, the transportation route and the order/ship time. All of these variables imply that there are numerous “paths” along which a product can move from its point of origin or manufacture to its ultimate retail point of sale.

**Supply Chain Design Solution:**
Your objective is to maximize margin and profit by determining the best flow-path for each product that will yield the lowest total landed cost and still meet the desired service levels. This type of analysis provides a more accurate picture of how each product should be supplied and distributed by accounting for its unique characteristics. You can model product flows at the SKU or the category level.

Savings are achieved by determining the proper network configuration to achieve the lowest total landed costs. Both right-sizing inventory and product flow-path optimization impact total landed costs. Right-sizing inventory determines how much and where; product flow-path optimization determines how to flow product through the network.

**Case Example**
A global consumer goods company wanted to evaluate how product flowed from each of their 10 European plants to their customers in Spain. Over 90 percent of all goods were flowing through a single distribution center in Northeast Spain and were shipped by private over-the-road freight. While performing the product flow-path optimization, the team added dozens of flow options, including new intermodal hubs, additional distribution centers, inter-waterway and short-sea ports, and different transportation modes (rail, short sea, inter waterways, and 3PLs). They also added service-level constraints to ensure that any solution would still meet their strict customer service-level agreements.

The variables created thousands of potential product flow-path options, and the optimized answer defined the lowest total-landed-cost for each product and production location. This solution showed that opening a second facility in Central Spain, shifting over 50 percent of the volume to the new DC, and utilizing significantly more rail transportation created the optimal network. The additional facility operation costs, inventory holding costs and handling costs associated with this new solution were offset by a significant reduction in the overall transportation costs, giving the company a supply chain cost reduction of over €1.5M.
Strategy 5: Optimizing Bracket Pricing Options

Many retail merchandising organizations set up supplier “bracket-pricing” agreements—tiered pricing agreements where purchasing in larger quantities results in a better per-piece price. Many purchasing organizations are motivated and measured by their ability to achieve lower supply prices. This incentive system often leads to an actual increase in a product’s total landed cost, due to excess storage, handling and transportation costs. It is possible to have unnecessary and avoidable supply chain costs actually exceed the savings achieved through bulk purchasing. To optimize the bracket-pricing option for each product, you must first model the end-to-end supply chain costs to calculate the true landed-cost.

In order to provide meaningful total landed cost data to the procurement team, you must first create a model of your end-to-end supply chain, incorporating all the costs incurred from the supplier(s) to the store shelf. The supply chain model will likely then be locked in place as a fixed network, potentially including alternative policies for replenishment frequency, transportation mode/container, handling costs (for different breakdown or stocking options), etc. At that point, the procurement analyst can enter the supplier bracket pricing options and run the network optimizer to determine the correct purchase amount and frequency that would deliver the lowest total landed cost.

A North American grocer’s sourcing group established bracket-price contracts with their suppliers, enabling them to get lower per-piece prices when purchasing in larger quantities. (For example, they could buy an item for $1.47/piece in a quantity of 1,000 units; the same item cost $1.25/piece when purchased in a quantity of 10,000 units.) Since the buyers were incented to reduce purchase costs, they would delay purchases or buy ahead in larger quantities to reduce the total spend.

To evaluate their true landed-cost, the company modeled their end-to-end supply chain, including source pricing, inbound and outbound transportation, warehousing costs, inventory holding costs and transfer costs. Buyers were given an easy-to-use model to input their bracket purchase amount and price options. The model provides the buyer with the optimal solution that minimized the total landed-cost for each product purchase. This resulted in a total supply chain cost savings of over $2M annually.
Strategy 6: Inbound Consolidation

**Business Challenge:**
If each DC in your network replenishes individually, product costs can be higher because individual DCs order smaller quantities more frequently. Significant savings can be garnered by establishing one DC (perhaps the one closest to the supplier) as an inbound consolidation center. All shipments from the supplier are delivered to that one DC and then appropriate quantities are transferred to the other DCs as necessary.

Although this adds a second handling and transportation layer to the distribution network and a redistribution cost, significant economies can be realized due to utilizing transportation assets more efficiently and taking advantage of vendor volume discounts. Pre-buy inventory quantities will also be minimized since multi-DC volumes achieve the best product price without buying ahead of demand.

**Supply Chain Design Solution:**
Your objective is to significantly reduce overall supply chain costs by adding a distribution layer into the network to reduce overall landed costs of product.

By building a model that compares direct shipment costs in smaller quantities with economic transportation (full-load) to a consolidation center and beyond, you can identify the optimal transportation plan based on the end-to-end costs, your defined service constraints and any increased handling and storage costs encountered in the cross-dock or redistribution center. The model optimizes the buying plan to take advantage of volume discounts while minimizing pre-buy inventory across the DCs by identifying and balancing all of the costs, then determining the optimum total landed-cost strategy.

**Case Example**
A major retail organization was buying significant quantities of product from the Chicago market and distributing those products to the south and middle-Atlantic states. When shipped direct, the product moved primarily in less-than-truckload quantities.

To evaluate their best economic options for inbound resupply, the company modeled their “as-is” supply chain with the potential for employing one of their existing DCs as a cross-dock/redistribution center. Upon completion of the optimization, the company discovered that using their DC in Maryland as a redistribution point and moving both inbound and outbound product in economic quantities resulted in an annual savings of over $1M.

These savings were achieved by lowering:

- **Overall transportation costs** (through full-loads inbound and consolidated stop-offs outbound)
- **Purchased cost of product** by buying in economic quantities (the supplier also benefits by processing orders and shipping in economic quantities)
- **Inventory carrying costs** (and smoothing the inventory levels in the other DCs, downstream from the Consolidation Center, even though there is an added handling at that center)
Strategy 7: Static Multi-Stop Route Design

**Business Challenge:**
If you ship frequently and in small quantities (LTL versus full TL), you incur higher transportation costs. If you periodically examine your shipment history, you can detect consolidation opportunities that will lower your overall transportation costs. The more these opportunities repeat historically, the more you should consider establishing them as regular, static multi-stop routes in the future.

**Supply Chain Design Solution:**
Static multi-stop route design identifies repetitive patterns of shipments that are candidates to be consolidated – smaller shipments going to the same store and from the same distribution center, orders going from the same DC to the same geographic destination and orders moving in the same lane (direction of travel). Your objective is to achieve the lowest transportation costs through consolidation of LTL shipments into truckload quantities. You ship less frequently and in more economic quantities.

By modeling your entire supply chain network, incorporating alternate transportation options and key variables such as cost, time, capacity and delivery parameters, you can determine the best modal mix or the optimal number of transportation assets and the positioning of these assets. You can simulate routing strategies to predict actual costs and service levels.

**Case Example**
An office supplies retailer served its north-eastern territory from its Connecticut distribution center. Historically, they had shipped LTL direct to each of their stores individually. This was due, in part, to the difficulty in routing and scheduling full truckload shipments within the New England area. Optimizing the historical transportation patterns resulted in numerous direct shipment routes being converted to full truckload shipments with stop-offs. These truckload routes were constructed observing the truckload driving restrictions and were still effective. This consolidation and changed routing represented an annual freight bill savings of greater than $500,000.
Strategy 8: DC to Store Assignment

**Business Challenge:**
Distribution networks must evolve as volumes grow. Distribution centers have finite capacities and delivery routes have distance limitations. As your network grows, it is beneficial to evaluate if your network would be better-served by adding more distribution centers in strategic areas to reduce overall supply chain costs. Balancing DC workload and reducing transport distances can actually result in savings, even when additional facility costs are added.

**Supply Chain Design Solution:**
Your objective is to achieve the lowest supply chain cost by determining the proper DC service areas—which stores are served from which DCs. An optimization model balances DC capacity and handling and transportation costs. It also considers the impact of adding key new DCs in strategic areas to shorten supply lines and balance DC capacities. As with inbound consolidation, the DC-to-Store Assignment optimization model identifies the tipping point by evaluating and balancing all of the costs, then determining the optimum strategy.

**Case Example:**
A national retailer served its network of stores from three primary distribution centers in Boston, Houston and Denver, with outsourced distribution capacity in Chicago, Los Angeles, San Francisco, and Seattle. They realized that some of their supply lines were unreasonably long. By optimizing their network, they discovered that adding a new DC in Atlanta and in-sourcing and growing the Chicago DC operation allowed them to save significantly on transportation costs by shortening and rationalizing supply lines and by balancing DC capacities. Determining the proper network configuration to serve the stores and to achieve the lowest total landed costs resulted in net savings of $6.2M annually.
Strategy 9: Cost-to-Serve Optimization

**Business Challenge:**
Different customers, products, service levels and distribution channels contribute different margins; by identifying the unprofitable and low-margin product/customer combinations and high-cost processes, you can develop action plans for each in order to improve your business’ profitability.

Cost-to-serve optimization (CTSO) is the analysis and quantification of all the activities and costs incurred to fulfill customer demand for a product through the end-to-end supply chain. Cost-to-serve has a scope across all functional areas in the supply chain and is intended to accurately assess the total profitability of an individual product or item being sold to a customer.

**Supply Chain Design Solution:**
Your objective is to achieve the lowest cost to serve each customer with each product. A small investment in cost-to-serve analysis pays off immediately by identifying key issues that become the basis for your supply chain improvement action plan.

CTS models incorporate all activities necessary to complete the customer delivery and collect the product revenue. It models how each major supply chain activity affects the complete end-to-end cost-to-serve a customer. It is the determination of the total cost of servicing each individual customer at a SKU level and at the designated level of service. CTSO evaluates the thousands of activity-based costing options to identify the optimal network design, structure and flow to achieve the lowest total CTS based on all end-to-end trade-offs.

**Case Example**
A North American retailer with over 900 stores and thousands of SKUs was profitable as a company, but had never been able to accurately calculate the total cost to serve each product to each customer (store) location. They hypothesized they had numerous store/product combinations that were highly unprofitable and wanted to optimize their overall cost-to-serve to eliminate unprofitable combinations. They believed this would lead to higher profit margins.

The analysis incorporated all key cost components throughout the supply chain and mapped the flow of each product to determine the stacked cost for each product at each location. The model also incorporated sale price to calculate profit margin and margin-to-serve, then used optimization technology to evaluate all the different flow options to determine the cost-optimal enterprise.

Scenarios were created with different constraints, e.g., all products must be stocked at each location; non-profitable products must be eliminated altogether; any combination of product and store can be eliminated, if necessary. The result was an overall cost reduction of over $22M, with a two percent increase in profit margin.

**IMAGE 9:** A plot of product/store combinations graphically depicts their profitability from green (profitable) to gray (neutral) to red (unprofitable). The size of the dot represents the quantity of profit or loss.
Conclusion

Many retailers focus on the lowest product price at the expense of higher supply chain costs. Some have taken a balanced approach and driven decisions from a lowest total landed cost perspective, utilizing supply chain design technology. Leading retailers are continuously redesigning and improving their supply chains using modeling technology to examine how their supply chain will perform under a wide range of market conditions and assumptions, and analyzing the trade-offs between cost, service and risk. Companies that maintain these living digital models of their end-to-end supply chain have the ability to redesign and re-optimize the supply chain under changing market conditions, to significantly lower supply chain costs and increase profitability.