Large Automotive Parts Retailer Case Study: Inventory Efficiencies Through Supply Chain Network Optimization

In today's retail world, a retailer's ultimate formula for success is offering the items their customers want, where and when they want them. Today's logistics and technology capabilities make this goal more attainable than ever before. The question is, at what cost and rate of return?

The Challenge

enVista recently helped address this question for a large automotive parts and tire retailer. With over 750 service centers in the U.S., the retailer had been working on strategies to regain market share in a declining industry by improving service to their stores. Their current distribution and transportation network consisted of four tire distribution centers (TDC) and one centralized parts DC, utilizing weekly static routes to replenish their stores. The retailer carried over 15,000 items in four major categories. However, tire SKUs made up the majority of their volume and revenue.

In general the tire industry is challenged by the following factors:

- Reduced demand during periods of economic recession
- The demands associated with a "needs" vs. wants based product - Tires are a commodity
- Managing an assortment based upon fit (size)
- Competition by manufacturing dealerships
- Multi-channel price optimization
- Unstable cost of raw materials
- Intermittent demand and supplier variability

The following white paper focuses on how best to synchronize supply with demand, based upon the automotive retailer's demand patterns. Each of the points above creates an inventory management challenge. Above all, the challenge is deciding where to place inventory based upon the demand and supply variability that exists with the tire industry. Tire generalist and specialist retailers are in the needs business. Demand is shaped much differently than a wants business (i.e. high tech electronics or fashion apparel). Replacing tires on a vehicle is not something you do because you want to; consumers either change tires because the tires are at the end of their life cycle or because the tires need to be replaced due to unforeseen circumstances. Unfortunately, a needs business creates a different customer tolerance time or expectation for an item. Consumers expect a tire retailer to have the right tire for the car they are driving, and for the right price. Tire replacements are usually time-sensitive and parts and tires are specific to each car make and model, making it difficult to negotiate for alternatives.

In order to meet the forecasted demand of the customer, the retailer over-stocked (extra safety stock) inventory at all stores. Note that the extra inventory does not always equal better service. In many cases it can impact in-stock percentages negatively by over-allocating inventory to the wrong store. With 800 tire SKUs and 750 locations, equating to 600,000 SKU and location combinations, the ability to forecast accurately at the store level became very difficult. This was compounded by the fact that the retailer replenished their stores only once per week, regardless of store volume. The existing inventory management approach created less than desirable store inventory turns and increased working capital to manage the retailer's intermittent demand patterns.

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Intermittent demands patterns occur with slow-moving or infrequently purchased items that are difficult to forecast with traditional forecasting techniques. Common forecasting techniques look for predictable demand patterns with trends or seasonality. Intermittent demand, however, is characterized by the number of zero-demand periods that are not easy to predict. It is very important when evaluating intermittent demand patterns that retailers look at demand patterns by store and not the aggregate demand patterns for all stores. Not all store and SKU combinations should be treated equally. Therefore, when looking at forecasting solutions, retailers must have the ability to forecast at both the store level and distribution level (single and multi-echelon).

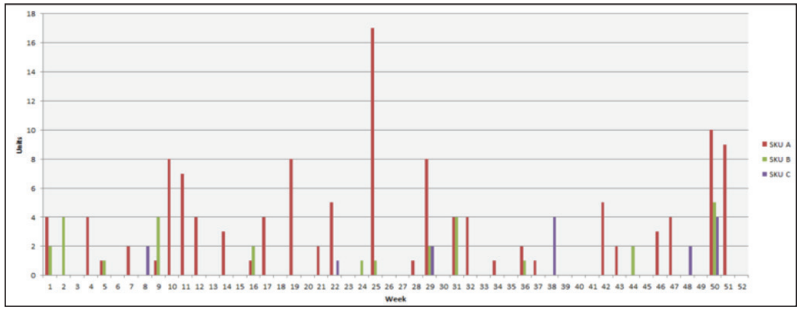

Illustration 1.0 – Intermittent Demand

Excess inventory was an issue not only at the stores, but at the DCs as well. The retailer was stocking excess inventory at the stores to cover demand variability and stocking at the DCs to compensate for supply variability. Compounding the excess inventory in the supply chain was the fact that the retailer was making forward buying decisions to protect themselves from pricing volatility by the manufacturers. Based on these issues, the retailer took the path of bulk purchases and advance deals to protect their margins. At the time of the study, the retailer owned over $200 million worth of inventory. Eighty percent of this inventory was stocked at the stores, with tires comprising 75 percent of in-store inventory.

The DCs, which were operated by a dedicated 3PL, were not as overcrowded as one would expect, given the kinds of practices described above. The underutilized DC space was the result of an industry that has witnessed double-digit declines in sales over the last twelve years. Unfortunately, the retailer was paying for the entire space, even unused square footage. This, in turn, increased total logistics costs and cost per tire.

Transportation costs, on the other hand, were reasonably low. Most inbound transportation was freight collect and loads were optimized using a transportation management system (TMS). Outbound store deliveries were transported via full truckloads while 85 percent of the transportation cost was allocated to tires.

enVista's Solution

In order to design a proper network that would increase speed-to-market, reduce inventory and still account for intermittent demand and supplier variability, enVista utilized LlamaSoft's network optimization tool, in combination with enVista's proprietary inventory and forecasting modeling solution. The enVista team focused on how to best synchronize supply with demand, while improving service to the stores and simultaneously lowering the inventory in the total supply chain. After comparing the quantitative and qualitative results for the various options, enVista recommended a two-DC cross-dock and 31-spoke model with increased shipment frequency to the stores and weekly shipments to the spokes from the DC cross-dock locations (reference Illustration 2.0). In the proposed new network model (reference Illustration 3.0), the two TDCs/cross docks would deliver weekly shipments to spokes, and spokes would deliver to stores multiple times a week (two, three or five times, depending on stores sales volume). The new network required an investment in forward-facing warehouses and a $5 million investment in a dedicated fleet to deliver from the spoke to the stores. enVista evaluated the coefficient of variance (CV) for each SKU and store location combination and determined a new inventory on hand policy (reference Illustration 4.0). Given the reduced lead time for the spoke (days vs. weeks) to the stores, safety stock inventory levels could be reduced significantly. The CV analysis defined which SKUs/locations required inventory forward in the supply chain (store or spoke) and which SKUs could be moved back in the supply chain (spoke and DC). In order to prove the theory, the retailer conducted a test run for six months in a large demographic market. By positioning inventory closer to the demand point, while increasing store shipment frequency, the retailer witnessed a 4.15 - 9.72 percent increase in comparative sales compared to the non-test stores in the same geography.

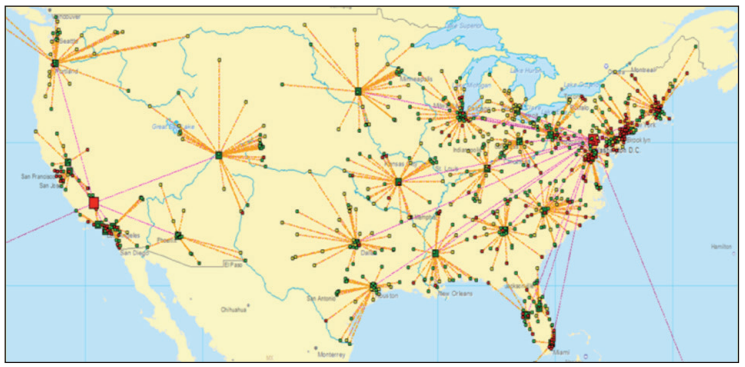

Illustration 2.0 – Llamasoft Output: 5 year Hub and Spoke Strategy

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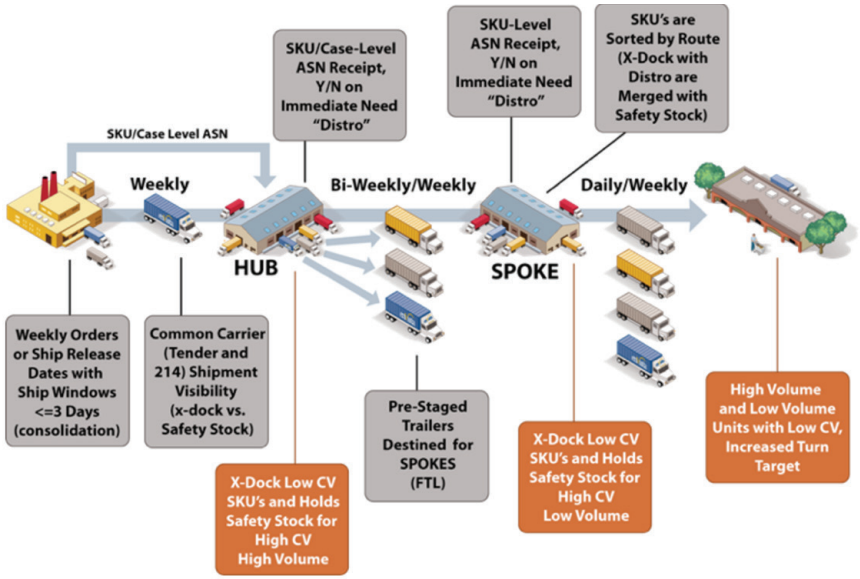

Illustration 3.0- Supply Chain Strategy

The next area of focus was to reduce inventory and increase inventory turns. This task was completed in two steps. First, the retailer's product assortment needed to be reduced. A SKU optimization analysis based on demand, revenue margin, and demand variability revealed that tire assortment carried in inventory could be reduced by 20 percent. This reduction would result in a one-time $28.2 million inventory value reduction and an annual carrying cost reduction of $3.3 million. This solution was supplemented by expanding the use of secondary procurement sources for items that were infrequently purchased.

The second step involved positioning the right amount of inventory at the right locations (DC, spoke or store). The retailer utilized an economic order quantity policy for each item at all of the stores. enVista utilized a proprietary Inventory Optimization solution to determine the right quantity of inventory for each SKU/location. With the inclusion of spokes in the network, inventory that was less frequently demanded would be held at the DC, shipped to the spokes, and then pulled from the spokes to the stores when a purchase was made, versus pushing and cross docking tires with a low CV. Also, the economic order quantities would be adjusted by product-location combination, since every item demand varied from store to store. This solution increased inventory turns at the stores by 60 percent and contributed to a one-time working capital reduction of $24.6 million, as well as reducing annual carrying cost by $35.9 million over a period of five years.

Additional recommendations to help reduce logistics costs and inventory levels included:

- Reducing warehousing costs by paying for utilized square footage and with 3PL's leasing the remainder of the space.
- Implementing a more successful vendor compliance program.
- Rolling out an effective S&OP process and collaborative forecasting model with suppliers.
- Right-sizing the private fleet for the last-mile delivery at each spoke location.

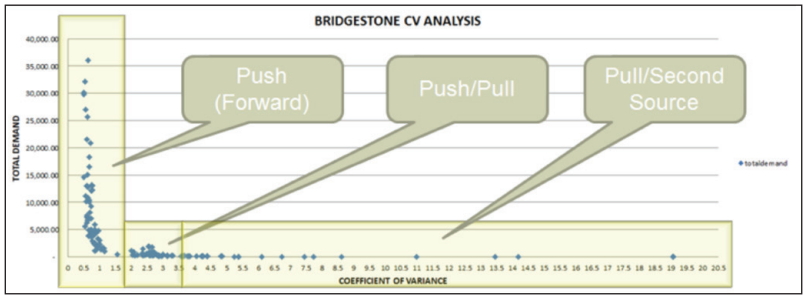

Illustration 4.0 – Sample Coefficient of Variance Analysis

The Results

In conclusion, enVista's retail client attained significant savings, inventory reductions and efficiencies by optimizing their supply chain network. enVista's retail supply chain consulting expertise, combined with LlamaSoft's network modeling tools, delivered important opportunities for the retailer to streamline their network, reduce inventory balanced with transportation and warehousing costs, and deliver an optimal consumer experience.

For more information on enVista's services, please call 877-684-7700 or contact inforequest@envistacorp.com

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