



BALANCING ACT

Cost, inventory and service in a volatile economy

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Many industries have experienced a rapid drop in customer demand over the last several months. In this environment, each sale is especially valuable, which makes it important to maintain or improve service levels without over-investing in inventory. With limited capital available, a business cannot afford to waste it on unsold inventory or inefficient transportation. At the same time, astute business managers need to be well-positioned to increase inventory when customer demand picks up again. How can supply chain executives address these conflicting objectives?

The answer to this will vary by compa-

ny. For a very strong, financially sound company that regularly uses topnotch technology, the approach won't necessarily differ from that used under normal circumstances. However, for many companies – particularly those carrying significant debt – the risk of making a mistake today is much greater than in times of high growth. For these companies, this may be a good time to revisit their supply chain techniques.

BALANCING SERVICE AND INVENTORY

It typically requires inventory to achieve high service levels, and the higher the service level, the more inventory is required. Today, even experienced executives will ask themselves whether all that capital tied up in inventory is properly employed and will use these uncertain times to review service levels and ensure they are properly set. No one wants to

provide less service or take chances with customer satisfaction, so service levels at first glance seem to be the Holy Grail of the supply chain. However on closer inspection, it is clear there is a lot of variability in service levels.

Certainly service levels vary by industry. A direct-to-consumer firm selling over the Web aims for a service level approaching 100 percent, but a manufacturer resupplying its distribution centers may allow service levels in the mid-90s. Service levels vary by product, as well. A pharmaceutical manufacturer producing a unique life-saving drug will aim for the highest service level for that product but might tolerate lower levels for products for which there are alternatives on the market.

Although service level is one factor that contributes to inventory levels, most companies calculate inventory levels via

forecasts considering the standard deviation of demand. This is a good time to ask: Are our existing planning and replenishment tools configured properly? When was the last time that the forward coverage or safety stock rules were recalculated? Often, these inventory rules are set and forgotten. Yet, in this economy, it's critical to ask key questions and then make the necessary adjustments. For example:

- Have any of our previously slow-moving products become inactive?
- Have any of our fast-moving products lost popularity or market share?
- Does today's volume warrant the capital for the current inventory levels?

LESSEN TRANSPORTATION COSTS

In addition to having the optimal safety stock and addressing the desired service level, producing and distributing the inventory from the right places is crucial. This is the key to reducing transportation network costs.

Balancing the tradeoffs between the various routes to market, such as warehouses or cross docks, and the many modes of transportation available can yield significant reductions in transportation network costs.

For example, a building products manufacturer based in the United States implemented an infrastructure analysis and supply chain network design project. The challenge the company faced was to determine how best to service demand during peak season, while minimizing costs too. The company used a network optimization tool to model the supply chain and define clear service territories for shipping sites, eliminating overlaps and reducing total miles traveled in the network. This was followed by a carrier selection optimization to reduce overall shipping cost. As a result, the company achieved \$2 million to \$3 million in annual savings and a 17 percent reduction in carbon footprint of the transportation network. Because the shipper paid the freight, this amounted to significant bottom-line improvement.

WHERE TO START

So, how can optimization tools address these tasks? Here are some key applications to consider:

1. Network design. One of the most important strategic decisions a company can make to balance inventory, costs and service level is to review its network design on a regular basis. In many industries, as much as 75 to 80 percent of supply chain cost is determined by the network – where manufacturing plants and distribution centers are located, what products are produced and distributed from each and which suppliers ship to each. Of course, the network determines the transportation costs. Using optimization tools, a supply chain manager can preview the various options or future scenarios to evaluate costs for alternate network nodes and products. Using this analysis, it is possible to accurately determine how to minimize costs related to the overall network. Savings of 10 percent of supply chain costs are typical of successful network analysis efforts.

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“What if” analyses are particularly relevant in a volatile economy. They can be used to identify how costs can be maximally reduced now, while helping to identify options that can lessen risk in the future. Perhaps the greatest immediate savings would dictate closing a plant, but significant savings might also be achieved by shifting production among plants. Armed with concrete analysis of the tradeoffs

between these alternatives, an executive might choose the second option because it provides more agility to respond to an upswing in demand. While it may be essential to bring costs down now so the burden of overhead doesn't sink a company, it's equally important to be prepared for the rebound.

2. Transportation planning. Optimization methods may also be applied to transportation planning directly. For instance, if a shipper uses fixed transportation routes and regular stops, it is

important to review assignments and routes on a regular basis to ensure deliveries – or pickups – are performed in the most efficient way. While this problem can be attacked with spreadsheets, it can be accomplished much more quickly and accurately by analyzing the options with a mathematical model. Such algorithms also are employed in dynamic routing, building daily loads and routes, which can provide additional savings by limiting the number of delivery trucks.

Companies also can minimize transportation costs by selecting regular carriers for lanes via competitive bid analysis. This evaluation considers least cost and service level, as well as capacity and other constraints. Optimization tools provide a time-saving method of selecting the best carrier(s) for given lanes. For example, a large manufacturer saved \$1 million per bidding cycle on its network of 3,000 lanes and eight carriers. While the spot market for transportation can sometimes yield some low-cost gems, negotiating long-term contracts can reliably yield substantial savings that can be counted on to deliver bottom-line benefit.

3. Customer segmentation. Another way to reduce inventory costs is to vary service level based on customer segment. Many companies are carefully evaluating their customers to determine who the most and least profitable are. This analysis considers all the costs of servicing the customer, including customer support costs, transportation costs, order size, sales costs and backorder costs, as well as the strategic importance of the customer. The ranking of customers and allocating inventory first to the most profitable may allow a company to reduce inventory without sacrificing significant profit. An inventory allocation program, augmented by some optimization, can ensure inventory is assigned so that profit and customer service are balanced. *USBR*

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