Reduce Days of Supply and Improve Customer Service… Can You Accomplish Both?

by Ned Bauhof

Considering the historical difficulties associated with inventory planning, many companies believe that inventory optimization can only occur at the expense of customer service. This mindset is understandable considering the ongoing stock-keeping unit (SKU) proliferation, limited forecast accuracy, and massive seasonality trends that most organizations experience.

That said, the pursuit of more advanced planning tools should not stop. For those who wish to optimize their supply chain, it is important to note that the majority of a supply chain's lifecycle costs are locked in at the start. No kidding. According to AMR Research, 80% of a company's supply chain costs, including inventory planning and deployment, are captive in the strategic planning phase of supply chain optimization. This does not mean, however, that inventory optimization stops at the strategic level. True inventory optimization must be accomplished at the tactical level as well.

The development of tactical inventory tools, combining optimization, simulation, and/or heuristic models has taken years. Only recently have such software solutions, focused specifically on inventory policy optimization and with a proven track record of success, become available. True inventory optimization tools simultaneously consider demand and supply variability and the trade offs between cost, lead time, and desired service performance across the end-to-end supply chain.

These tools are capable of rapidly calculating optimal inventory and resultant service levels. Replenishment parameters, such as review periods, lead times, delays, re-supply intervals, re-supply lots, and capacity must be considered during this process. It is possible to quantify inventory reduction opportunities by comparing historic logistic performance (stock and service level) with the attainable logistic performance defined by a software model.

Such inventory optimization tools can be used for both high-level strategic analyses and decision support where one-time data inputs are sufficient and for the weekly generation of inventory targets that drive planning and scheduling activities. Companies have also used inventory optimization and planning tools to:

- create a demand forecasting system that controls the method of producing forecasts and the management of marketing events such as promotions and pricing policy
- create distribution requirements planning (DRP) for manufacturers and distributors using vendor-managed inventory (VMI) logic
- evaluate the interdependency between the number of stocking points, inventory levels, and customer service levels within a distribution network

- calculate the trade off between investing in manufacturing capacity versus pre-building inventory
- assess inventory positioning opportunities such as the consolidation of low-volume SKUs

Inventory Planning Methods

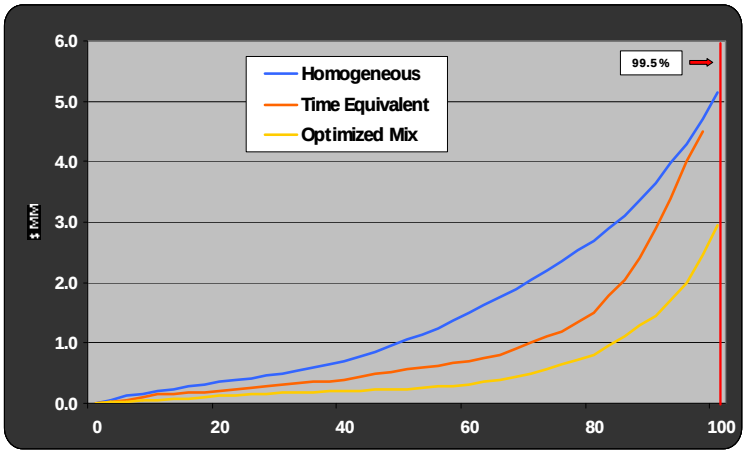
Days of supply (DOS) is—and continues to be—the predominant method of measuring inventory in many industries. Although DOS is the measure, several operational factors contribute to overall DOS inventory levels. Factors such as network configuration (plants versus warehouses), purchasing lead times, production cycles, batch size, production reliability, daily throughput variability, safety stock, and desired service levels all impact DOS. By the way, all of these factors vary by SKU, so an overall DOS can often be a misleading calculation.

There are three alternative methods of inventory planning that merit consideration during supply chain and inventory optimization planning:

1. Time Equivalent
2. Homogeneous
3. Optimized Mix

Time-equivalent inventory planning refers to the traditional process of evaluating inventory based on an overall DOS. Homogeneous inventory planning is the process of setting a fixed customer service level (e.g., 99.5%) for every SKU in a company's portfolio once a service level target, in terms of "first pass line fill rate," has been identified. Optimized mix inventory planning focuses on an aggregate service level goal (e.g., 99.5%) but allows for a minimum service level (e.g., 70%) for any individual SKU.

The chart below shows the resultant impact on inventory and customer service by planning the same SKU base by all three methods.



In this example, a service level of 99.5% is identified as the target on the "X" axis. The associated inventory level is $5.1 million for homogeneous inventory planning and $2.9

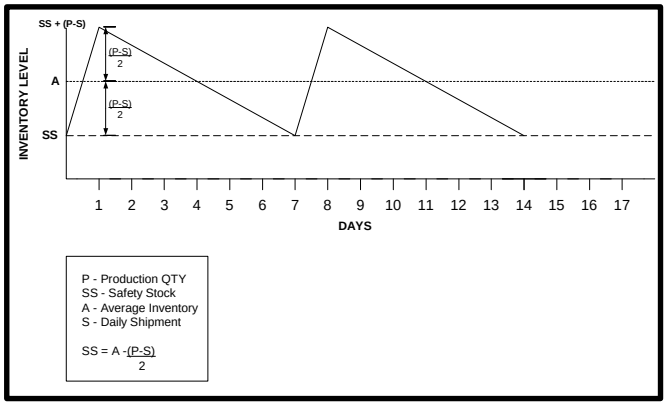
million for optimized mix inventory planning. The time equivalent inventory plan did not achieve 99.5% in this example.

Areas of Opportunity

As stated above, inventory itself has a number of components; therefore, during the optimization process, it is important to understand the areas within the overall inventory that can be impacted. There are typically three primary areas of optimization opportunity: 1) safety stock, 2) inventory build, and, 3) supply chain noise.

Safety stock refers to the minimum inventory requirement for a given SKU. Safety stock is often referred to as “just-in-case” inventory. Safety stock is most often a fixed number that frequently results in a significant amount of excess inventory. With improved replenishment planning, it stands to reason that a reliable reduction in safety stock offers significant opportunity for overall inventory optimization.

One simplistic example of calculating the static safety stock for a single SKU is as follows. First, subtract the average daily shipping volume from a day’s production and divide this number by two, then subtract the resultant number from the average inventory. The chart below depicts this calculation.



Inventory building, which is driven by production capacity constraints, can result in cramped warehouses that negatively impact productivity, the need for overflow warehousing, and, inevitably, excess inventory. Will the process of inventory building cease anytime soon? Probably not. Can you optimize inventory building based on more sophisticated replenishment planning? Absolutely.

Today’s planning efforts often depend heavily on manual processes, which are susceptible to a phenomenon known as supply chain noise. Supply chain noise is the result of a deviation to actual supply and demand that has no rational basis or historical foundation, and is primarily the result of human intervention. Any industry that experiences business volatility should expect some degree of supply chain noise, but by no means to the extent currently being experienced. To manage supply chain noise, replenishment planning must occur at the SKU level.

Case Study

Font Vella S.A., part of Danone Group, is a bottler and distributor of several brands of bottled water (Font Vella, Evian, Fonter, Lanjarón, and Fontemilla).

The bottled water business has intrinsic features such as high seasonality of sales and environmental influences (heat, humidity, etc.) that impose restrictions on manufacturing and logistics planning, which cannot be controlled. Also, Font Vella had considerable operating costs, however, they did not use a tool for obtaining an accurate measurement for these costs. Considering these factors, they wanted a replenishment-planning model that could achieve sales forecasts, service planning, distribution requirements planning, rough-cut capacity planning, and transportation planning.

Font Vella chose to pursue a software package designed to achieve the following objectives:

- develop a coherent and effective manufacturing and replenishment planning structure
- account for the actual capacity constraints within the manufacturing centers
- accommodate pronounced seasonality of Font Vella products (summer months)
- optimize and manage the relationship between stock and service levels
- reduce operating costs

The chosen software, Toolsgroup's DPM, had the capability to interface with Font Vella's current ERP. The database was updated on a weekly basis with stock data and the replenishment-planning model carried out detailed weekly calculations for manufacturing and replenishment planning. The plan took into consideration the capacity and minimum requirements of the manufacturing and replenishment process, as well as daily calculations of the transportation requirements between the various warehouses.

It took four months to complete the project and Font Vella achieved its objectives. Furthermore, the company reduced the time dedicated to manufacturing and replenishment planning to a mere six hours per week for which a single logistics planner is now responsible.

Conclusion

Inventory optimization, previously considered unattainable by many, is becoming a reality. Years of emphasis on sales, marketing, and production efficiency have left replenishment planning and inventory optimization as two of final frontiers in supply chain optimization. The net result of inventory optimization is improved profitability, decreased inventory investment and risk, increased return on assets, improved customer service levels, and speed-to-market.

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