How to Improve Your Bottom Line by Optimizing Inventory Levels

A study on improving inventory processes, and reducing amount of inventory on hand using Distribution One for SAP® Business One.

Executive Summary

This white paper presents a method of how distributors and manufacturers can implement SAP Business One with the extended functionalities of Navigator's Distribution One Inventory Optimization and Forecasting tools. The company represented is a composite of several customers we have worked with, representing methods acquired through our experience in the field. For this paper, our customer will be referred to as ADC, an apparel company who needs to optimize their inventory. It demonstrates how they can improve their inventory processes, which in turn lessens the amount of inventory being carried. The adoption of these processes will substantially increase their bottom line. This discussion not only demonstrates significant results, but also provides the layman with a proven procedure to obtain similar result, as well as an understanding of the differences in the forecasting methods that are trusted and readily explained.

In his groundbreaking book *Crossing the Chasm*, Geoffrey Moore states that moving from the early adopter to the mainstream means radically shifting from vision to concrete practicality. Moore's assertion is that a technology forever remains a fad until the pragmatic executive grasps the understanding of *why* the solution delivers acceptable results. Over the past few years, the pragmatic executive has seen why inventory management and optimization is delivering acceptable results, and this is why inventory management and optimization is quickly becoming a mainstream practice in operating successful businesses.

However, it is no longer considered a fad of the business trendsetter or supply chain visionary. Now more than ever, the most successful companies improve their bottom line by implementing inventory optimization processes. Having learned from forward-thinking companies who have tested these toolsets, many have firsthand experience in realizing significant improvements to inventory costs, service levels and customer satisfaction. With the right tools, achieving savings of 30 to 50 percent in inventory costs, while maintaining or increasing service levels is attainable.

This competitive advantage not only generates an efficient supply chain, but it enables companies to become exceptionally adroit in accessing ready capital previously unavailable because of stocking excess inventory. Perhaps this is why the 2007 Aberdeen Group research study cited inventory optimization as one of the top areas of interest for companies. In truth, 85 percent of companies surveyed were looking into inventory optimization as an upcoming, near-future project.

Overcoming the Obstacle

Even with a wider acceptance of Inventory Optimization tools, the main obstacle to overcome is a lack of knowledge of what is entailed in making the optimization tools successful. According to Grant Fraser of Navigator Business Solutions, “We’ve found with the companies we’ve worked with, that at first they really don’t have a genuine understanding about how optimization decisions should be made to determine inventory levels, customer service levels, and safety stock levels. Unfortunately,” he said, “this is even true across many complex organizations.”

This white paper is intended to bridge that gap for potential users to show which processes are needed to realize significant inventory expenditure reductions. It also addresses what roles are needed and how to stress accountability. Even though benefits of Inventory Optimization may look sound from a dollar and ROI perspective, understanding the real issues and how the process changes by implementing the new tools are the keys to a successful transformation.

Inventory Turnover

ADC is a distributor in the apparel industry. Their goal was to improve their inventory turn rate from ten to twenty turns a year. Inventory turnover is an important heuristic to measure the success of any organization. A higher turnover rate means that the company is operating more efficiently. If an organization implements inventory optimization rules, the turnover rate invariably increases. A ratio showing how many times a company's inventory is sold and replaced over a period is generally calculated as follows:

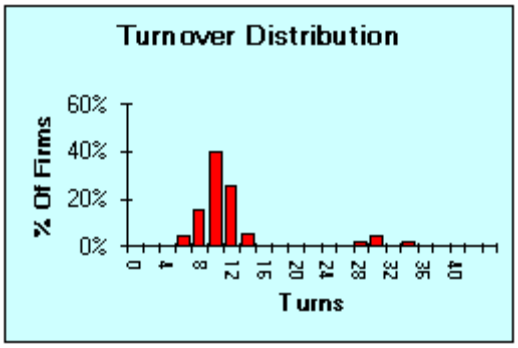
$$= \frac{Sales}{Inventory} \quad \text{Or} \quad = \frac{Cost\ of\ Goods\ Sold}{Average\ Inventory}$$

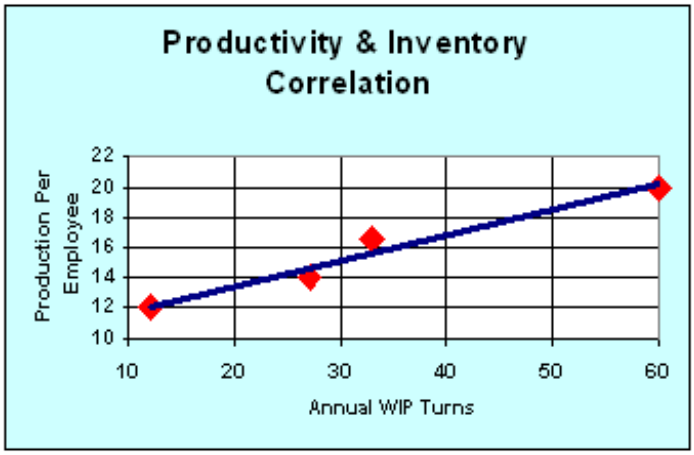
Industry	Turns
Apparel	9.2
Chemicals	9.1
Electronics	8.0
Fabricated Metal	13.6
Furniture/Fixtures	12.6
Industrial Machinery	11.3
Instruments	9.5

Industry	Turns
Lumber & Wood	12.7
Paper & Products	13.0
Printing/Publishing	31.9
Transportation Eqpt.	8.1
Wholesale-	
Durables	8.1
Groceries, General	14.9

These comparisons act as a valuable benchmark. They help rate a company's performance against others in the same or similar industries. Average inventory turnover rates can often be found through trade associations.

However, averages do not reveal the whole story. In most industries, the majority of companies cluster around the average. In fact, forty-three percent (43%) of all companies have an inventory turnover rate of around 10 turns per year. But a few firms are far above or far below. Lean manufacturers and distributors show turns of 200%-1000% of their industry average.





By utilizing the correct tool set, lean firms can achieve over thirty inventory turns a year. Thus, the goal is to improve processes so that inventory turns increase (there is a strong correlation between high employee productivity and those with more inventory turns). By improving processes through inventory optimization and employee accountability, only optimal quantities will be replenished to keep up with demand.

Applying the Ockham's Razor Principle

While evaluating ADC's needs, the consultants discovered they should follow the advice of the fourteenth century logician William of Ockham (the person who defined the Ockham's razor principle), who stated, "When you have two competing theories that make the same predictions, the simpler one is the better." Simplification certainly applies to implementing an inventory optimization process. First off, if it were too difficult to implement, it wouldn't be adopted by ADC's employees and thus, the benefits would never be realized. Secondly, if there were too many inputs and variables to analyze, then the data would never be collected and again the promised cost savings would not go into effect.

Navigator Business Solutions has been able to narrow down and focus on the most important factors in determining optimal inventory levels. They are:

- Having a solid foundation of basic stock requirements on each inventory item and applying that to a sound forecast.
- Determining the average "Lead Time" on each inventory item
- Determining order intervals (how often you order a product)

Once the above were determined it was simple for the tool to ascertain the following:

- Safety Stock levels (Mins)
- Reorder Points (The best time to make an order to maximize efficiency)
- Order Up-to Levels (Maxes)

With this information, Business One is able to determine which P.O.s need to be created and whether or not an inventory transfer might be the best option (especially for companies with multiple warehouses).

Determination of the Forecasting Methods

Since having a solid foundation of basic stock requirements is mandatory in developing a plausible forecast, this was ADC's first responsibility. They had been on Business One for two years so they had some history already built into the system. Yet they still needed history from their legacy system as well. Thus, they were able to import three additional years into the system to get a better view of what was happening with the items they carried and sold.

Another obstacle to overcome was the fact that many fashion styles go in and out every season. Since many styles were replaced by newer styles to accommodate the new season, they were worried about carrying the history from an older SKU and updating the newer SKU with the same history. However, with Distribution One, they were able to simply do this using the tools built into the software.

The next challenge was to determine which forecasting method to use for which items. To do this they needed to run a velocity report to determine which items moved the fastest. In doing this, they

discovered that some SKUs were seasonal, some were consistently moving at relatively the same pace, and other SKUs had a spotty record in terms of movement. With a couple of different locations it was also discovered that movement from each location differed.

To account for these differences, various forecasting methods were utilized. For those SKUs that were seasonal, they used the "Seasonal Forecast." This forecast takes the demand over specific months (November through February, or June through August, etc.) for up to the past ten years. For example, for their line of jackets, they tracked sales for each SKU from October through March over the past five years to determine the average demand of jackets they'll need for each month within the upcoming season. This method also calculates a standard deviation over each month and then averages the quantity sold over that time to determine the new forecast for the upcoming season.

For SKUs that seemed to have a demand each month they used the Year over Year method. This method also applied a standard deviation to the usage history for each month in the comparison. It averaged the usage for each month independently for the past five years to derive the forecast based on that. Had they had ten years of history, they could have gone back that far, as well.

For the SKUs that had great fluctuations in historical demand, the "Gain/Loss %" forecast was utilized. This averaged the demand for those SKUs and automatically determined whether the quantities were increasing or decreasing to derive the percentage change. This method capped the percentage change (gain or loss) to no more than a hundred percent fluctuation. This prevented skewing the current forecast for years of substantial increases or decreases in the percentage change between periods.

MRP/DRP Wizard

Once the forecasts were in place, the MRP/DRP Wizard automatically determined the safety stock levels, the reorder point and the order up-to levels. Service levels were also determined according to the velocity of each SKU. A Service level of 100% was used for the core product lines being carried. For items that were sold as a courtesy, they could have service levels of 50 to 85% depending on their past performance. The following gives the definitions and the calculations used:

- **Safety Stock:** Also known as the **minimum quantity** needed to be on hand in order to make sure that there is always enough stock to keep up with demand no matter what. Safety stock gives a cushion in case there is an unexpected event (i.e. trucker strike or an act of God such as an earthquake or hurricane) that could stop the shipment of inventory into a company's receiving dock.

  Calculation to determine Safety Stock:

  Sq rt((CDbl(LeadTime) * stdDevBasicStock) + (CDbl(BasicStock ^ 2) * stdDevLeadTime))

- **Service Level:** Relates to having enough stock on hand to fulfill demand. At a 100% service level, there should be enough inventory on hand to fulfill demand 100% of the time. Thus, this is tied to the order fill rate. To be at a 100% service level, then the quantity shipped would equal the amount of the quantity ordered.

$$\text{Order Fill Rate} = \frac{\sum \text{Quantity Shipped}}{\sum \text{Quantity Ordered}} \times 100\%$$

  At a 90% service level, the quantity of safety stock goes down as well as the ROP and OUL. This means that 10% of the time there may not be enough stock to fulfill orders. On each forecast, different service levels could be applied to each item thereon. This is a management call about which items should always be stocked to meet demand and which don't need to be in stock every time to meet demand.

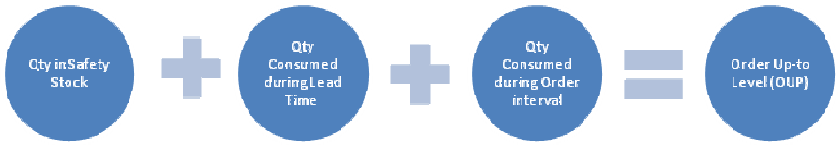
- **Reorder Point (ROP):** The level at which inventory should be ordered to ensure there is enough inventory to keep up with demand. If levels fall below this, then it is likely that there would be shortages and lost sales by not having it on hand.

  Calculation to determine the ROP:

  Standard Deviation (spread of the distribution of numbers) Calculation:
  - Determine the mean (average) of a set of numbers taken from the forecast.
  - Determine the difference of each number and the mean
  - Square each difference
  - Calculate the average of the squares
  - Calculate the square root of the average

- **Order-Up-To Level (OUL):** The maximum level of inventory needed to be stocked. If inventory levels go above it, then wasted capital is likely being expended, and it violates the rules of lean distribution and manufacturing.

  Calculation to determine the OUL:



Conclusions

ADC was able to apply the principles and tools for optimizing inventory levels to reduce carrying costs by 10% and to decrease the amount of inventory being stocked by 30%. They can attribute these savings directly to implementing Distribution One – the extended functionality of Business One for distributors.

Before implementing the system they carried $1.2M in inventory in their two warehouses. They were running out of space and were considering leasing another 10,000 square feet to keep up with their demand. They estimated that their carrying costs were about 10% of the inventory. However, with a reduction of items being stocked of 32%, that shaved $120,000 in carrying costs.

Furthermore, with a reduction on the amount of inventory that they were stocking by 32%, they were able to free up working capital to an additional $32,000 per month. This greatly increased their cash flow.