

Strategic inventory management through analytics

BY SEEMA PHULL, ED LAWTON AND REGINALDO A. MONTAGUE

EXECUTIVE SUMMARY

Many organizations hold plenty of inventory, which in theory means they should be able to deliver the goods to their customers on time. But piles of inventory often translate into poor service delivery. Using analytics to manage your enterprise's inventory strategically can find the optimal level of safety stock and logistics practices to keep service levels high.



An effective inventory strategy is a critical prerequisite for success in every business, regardless of size and market sector. Such a strategy focuses on aligning customer requirements, market dynamics and enterprise resources.

The key is to balance the investments in inventory with the requirements of each part and customer. Too often, companies make large inventory investments without adequate precision, so the results are suboptimal. Inventory tends to be the largest component of working capital for most manufacturers, so it requires sustainable management practices.

An effective inventory strategy consists of solid analytics, robust process and a culture of accountability.

Inventory management is not a random set of inventory control techniques. It is part of a well-thought out holistic strategy to bring together all aspects of a supply chain. Companies that operate in a highly coordinated manner with visibility across the supply chain excel in inventory and delivery performance.

The holistic strategy focuses on all stages of inventory, including finished goods, works in process and raw materials.

Best in class companies outperform others by understanding and collaborating on an inventory plan both internally and externally with their key trading partners. Effective planning processes and tools are imperative to manage inventory successfully. However, planning alone cannot and will not deliver results for inventory performance. A closed loop execution management operating system is also required.

Taming a beast with many heads

The first step is developing an inventory strategy, which must be based on the voice of the customer, economic conditions, market intelligence and supply chain complexity.

Most companies face a similar challenge. They think inventory levels are high based on internal measures,

although in some cases benchmarking has proven that the enterprises are holding too much inventory. However, these same companies face the problem that customer service levels are low based on the voice of the customer.

The old paradigm that better forecasting naturally will lead to inventory reduction has not and will not deliver desired results. Forecasting can contribute to inventory performance, but it is only one ingredient of the overall recipe for success. Inventory management is a multiheaded beast that requires a multiprong approach. It requires institutionalization of best practices, use of unbiased analytics and a review process that ensures accountability.

As enterprises embark on improving their inventory management strategies, they should consider how to achieve a holistic strategy that is supported by an effective process, governance, analytics and performance management culture. The benefits include improved customer satisfaction, lower inventory levels and, ultimately, greater profitability.

It all begins with a holistic strategy.

Most organizations are challenged by the availability of clean data, but that issue is not insurmountable. Before setting goals for inventory targets, organizations must understand the inputs of the equation they plan to use. Inputs include a view from within and outside of the organization. The organization must look at requirements based on how their products and parts behave, what types of inventories are required by their business model, the maturity of their execution processes and their partners within the supply chain.

First, your enterprise's management team must understand part behavior. A crucial part of all inventory planning is using a clearly defined thought process that considers the demand characteristics of the various parts. Parts that have predictable demand patterns versus those with patterns that are difficult to forecast require different methods of planning.

Most organizations tend to look at

a constrained view of the world based on what they shipped, and that view skews results. Instead, the organization must be challenged to dig up true and unconstrained demand history. All parts are not created equally, and their relative contribution must be understood before an inventory strategy is set.

Second, because all inventory does not have equal importance to the business, it is critical to a company's success to understand the various types of inventory and identify those parts that have a significant impact on overall inventory cost.

The design of the company's sales channels and delivery system affects the types of inventory required to ensure customer satisfaction. Therefore, organizations must understand by part and location what form of inventory is required at each node.

Most organizations start with segmenting the inventory into cycle vs. safety stock, and that is a good starting point. However, some industries will require further segmentation. The next steps require understanding the relative importance of the various parts. That can be achieved with a simple ABC Pareto analysis and culminates in the application of best practice tools, including inventory analytics.

Third, and perhaps the most critical aspect of an inventory strategy, is to ensure that specific processes link the inventory plan to its execution and control points. While inventory planning and modeling based on specific targets is important, only through a focused execution and tightly controlled processes can organizations successfully balance a high customer service level with reduced inventory carrying costs.

Traditionally, organizations think control mechanisms are systems such as material requirements planning/enterprise resource planning (MRP/ERP), system settings in the material master (a list of all material that a company procures, produces or sells), as well as safety stock targets based on fixed quantities or periods of cover

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(a reorder method where the reorder quantity should cover demand over a specified time period). It is true that those are aspects of control points; however, superior performance requires a management operating system that is broader, one that improves the culture of the entire organization.

Establish a management operating system

Upon setting the strategy for inventory, organizations must implement processes and tools for governing the progress and ensuring rapid root cause analysis.

Creating transparency to current state and desired future state is the first step, followed by an ongoing drumbeat for rigorous review of status and root cause analysis for areas where targets are not being met by the organization.

A governance process can be housed within a larger sales and operations planning (S&OP) process framework. This construct works effectively for most organizations, as it strengthens the entire value chain through its natural integration to demand and supply planning, financial reconciliation and executive decision-making.

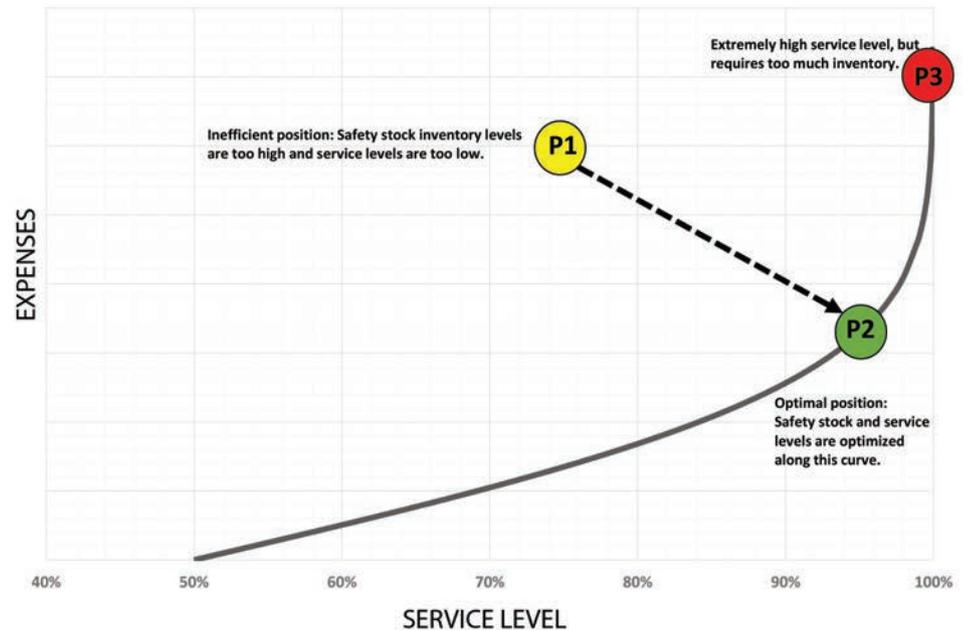
Once the process is established, clear roles and ownership points are required. Just as there are different types of inventories, there should be clear points of ownership cross-functionally for each type of inventory.

Simply having operations own inventory is not sufficient. Operations owns certain types of inventory as processes directly impact them. However, other organizations within an enterprise also have direct impact on inventory, so they also must own the performance metrics. Through a mature S&OP process, executive leadership is able to drive inventory goals for each of the cross-functional areas.

Inventory strategy execution requires transparency and quick responses to disruptions. Therefore, most organizations are investing in platforms that enable analytics and visibility to issues. Optimal inventory targets and safety

SAFETY STOCK EXPENSES VS. SERVICE LEVEL

Figure 1. Using analytics to drive your inventory management strategy can help alleviate the dual problems of holding too much stock while delivering poor service.



stocks are based on variability, lead-time, target service levels and other factors.

All of this data must be processed and refreshed periodically. Inventory data tends to be significant in size and continually changes. Therefore, the most effective way to manage inventory strategy is to apply statistical inventory optimization techniques in an inventory model.

Using these techniques, organizations can determine their cycle stock, prebuild stock, in-transit stock and safety stock for every part-location combination in the inventory model.

We often find that organizations have too much inventory but are still delivering suboptimal service levels. This is not only inefficient, but it is the typical starting point for most organizations at the beginning of their inventory optimization journey.

This position would be characterized by large inventory levels in internal reports, excessive use of working capital due to inventory and, occasionally, warehouses so full that additional space must be rented to handle the overflow of goods. One would think that such high levels of inventory guarantee high

customer service levels, but in many cases customers have valid complaints about the service they receive.

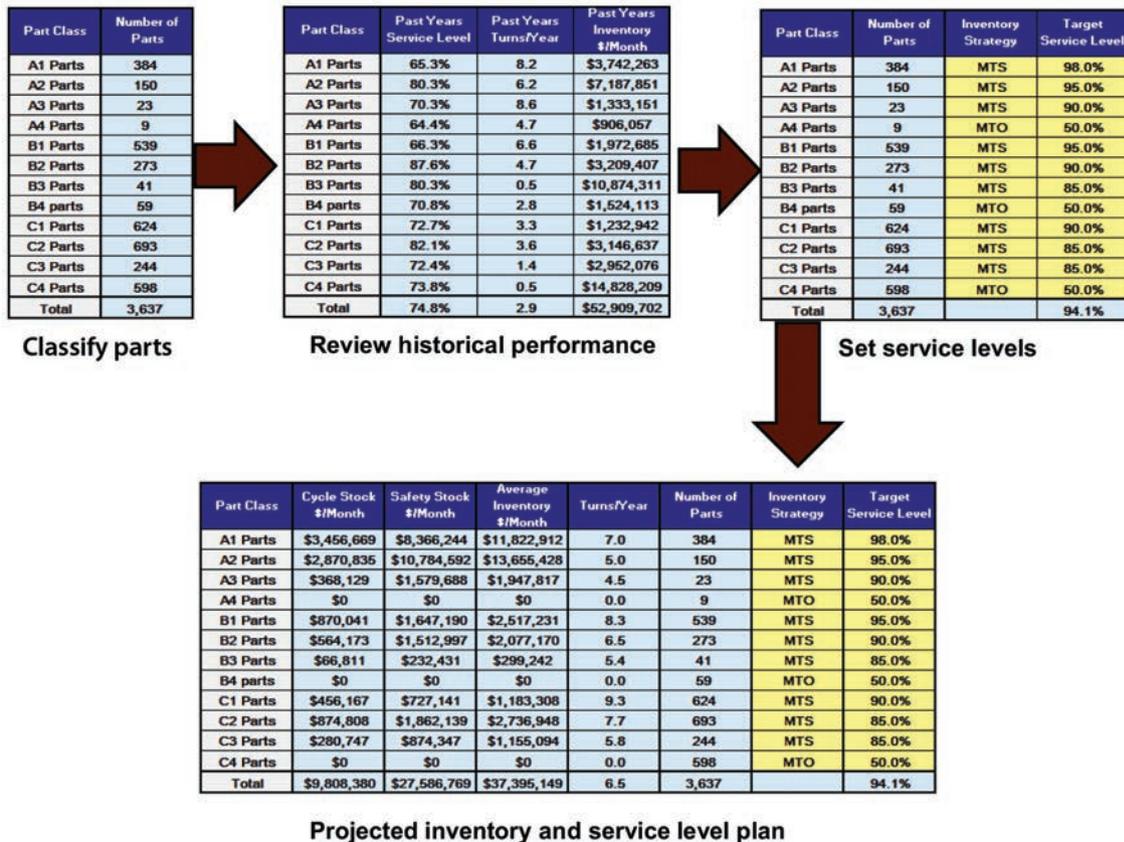
One case involves a North American consumer products company. It had too much inventory and unsatisfactory customer service levels, as it only delivered goods to customers at their requested date 75 percent of the time. Figure 1 depicts this scenario as position "P1." This organization developed and implemented a thorough inventory strategy powered by statistical analysis and a powerful operating system. The changes enabled improvements across various execution processes, including production planning, sourcing, logistics and distribution, and manufacturing. The consumer products company achieved unprecedented results for its operations.

To achieve this, the organization rolled out a comprehensive S&OP process that included demand management to apply advanced forecasting analytics to global demand; supply and production planning to ensure planned execution to meet the demand requirements; and financial reconciliation and executive decision-

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DATA DRIVES SUCCESS

Figure 2. This inventory calculator output from NorthFind Partners helped a North American consumer products company reach record service levels, even while reducing inventory.



making to ensure broad-based accountability for commitments. The financial reconciliation and executive decision-making included an ongoing review of inventory position to ensure operational and financial targets were being met and gaps were addressed.

This effort required significant change management, which included reorienting senior management to focus on inventory and ensuring the right talent was in place to manage the analytics long-term and ensure execution throughout the organization.

After just six months of implementing the new processes and tools, the organization gradually moved from position “P1” to position “P2” on Figure 1. At 94 percent, the customer service levels set a record, while inventory was decreased by 29 percent and inventory turns were improved from 2.9 to 6.5 turns per year.

Figure 2 depicts the inventory analytics that not only enabled optimized inventory levels but also

allowed the organization to conduct valuable “what if” analyses by shifting the service level-safety stock inventory along the curve to understand the impact on working capital, customer segment and profitability.

It was this transparency that enabled cross-functional collaboration. Prior to this operating system, executives with a limited understanding of inventory status and drivers were demanding near 100 percent customer service levels, which is typical in many organizations. The operating system allows the entire enterprise to see the cost of the various customer service levels and provides the processes and tools to have the open dialogue about what is the most balanced approach across all customers and products.

Without this type of transparency and “what if” capability, organizations tend to get fixated on position “P3” on Figure 1, a place that is very costly. In fact, in this case a 33 percent increase in inventory from the baseline only delivers

a 0.9 percent increase in service level. The inventory strategy and management operating system enables organizations to recognize the point of diminishing returns.

After the inventory plan is developed through the operating system, it is now time to implement the traditional notion of inventory controls by entering new and agreed upon inventory targets into the company’s ERP system to drive future component requirements to proceed with manufacturing.

Key metrics

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The above described management operating system is only as strong as the metrics that drive it. Organizations have a tendency to overcomplicate the metrics either by definition or implementation. It is imperative that the metrics used in the operating system are understood clearly, and they must be simple to implement.

Figure 3 is a chart of critical inventory metrics that link inventory plans to

execution and control points. Per the operating system above, a periodic review of inventory and operations performance metrics coupled with root cause analysis and corrective action will assure progress. These metrics are to be used to drive cross-functional accountability, which makes regular root cause analyses a critical aspect of the overall process.

Performance metrics have several roles and functions.

- They provide a quantified definition of what areas are of key importance and how the organization is performing in these areas.
- They ensure alignment between strategic, tactical and operational goals.
- They facilitate a cross-functional view of the relative importance of goals and objectives.
- They form a key part of the basis for continuous improvement within the organization.
- They provide a systematic method to link individual and organization performance to various reward systems that are based on key performance indicators (KPIs).

The metrics in Figure 3 are most commonly used as inventory performance metrics for finished goods. They facilitate understanding internal performance as well as performance compared to benchmarks. Some are direct measures of inventory, while others are affected by or impact inventory. Understanding inventory performance relative to other aspects such as transportation and expedite costs is critical for understanding overall cost performance.

As discussed earlier, performance management requires not only close observation of metrics but also the application of standard root cause corrective action measures when there are deviations from the normal performance. Performance misses tend to correlate with demand error, supply chain master data deficiencies, supplier delivery misses, unforeseen lead-time

SELECTED INVENTORY METRICS

Figure 3. Metrics should link inventory plans to execution and control points and be reviewed periodically to assure progress.

Metric	Definition
Inventory balance/current inventory on hand	Inventory as measured in dollars and units. It may be further segmented to cycle stock, safety stock, pre-build stock and pipeline stock.
Inventory turns	The comparison of dollars of inventory to the cost of goods sold for a specific period (cost of goods sold/average inventory). It measures how many times a company sold its average inventory amount during the time period (most commonly monthly).
Days of supply	The number of days it will take a company to sell its entire inventory (365 x (average inventory/cost of goods sold))
On-time delivery	Percentage of shipments delivered on time to customer order due date. This is sometimes segmented further to capability and reliability.
Inventory accuracy	A percentage showing the variance between inventory records and actual count
Order fill rates	Percentage of customer orders satisfied from stock at hand for make-to-stock parts
Expedited freight costs	Cost of freight in excess of method planned per customer order
Inventory stock-outs	The number of orders during the last business period in which no inventory was available to meet orders

expansion, and material, manufacturing process or supplier quality failures.

Using tools such as the fishbone diagram, five whys, Pareto analysis and other standard quality tools to determine the root cause of your problem will assure a focus on the correct drivers of failure.

Holistic process, proven results

Developing and managing the inventory strategy is an iterative, integrated and collaborative process. The operating system outlined in this article demonstrates that success has multiple prongs.

While analytics represents a substantial part of the recipe and the early part of the process, analytics alone is not sufficient. Significant managerial and strategic judgment is necessary to balance out the approach. Applying the above described operating system delivers powerful results. A number of companies that have implemented these solutions have seen customer service level increases ranging from 13 percent to 25 percent, reaching a total of 93 percent in most cases. Corresponding decreases in inventory range from 16 percent to 24 percent.

Inventory strategy and planning can have a direct impact on many drivers of business success, including customer

satisfaction, working capital and profit. As targets are set for business level metrics impacted by inventory, it is important to assure company, division and individual goals for inventory are aligned and synchronized.

As inventory goals are implemented, don't forget that other goals that are affected by inventory are of equal importance. Make sure your enterprise measures them too. For example, favorable results on finished goods inventory turns should not occur at the cost of unfavorable results in on-time deliveries to customers. And reducing inventory carrying costs should not reduce your overall profits because of an inability to ship products that have favorable gross profit margins.

Visibility and ownership of goals need to be implemented during the goal deployment process in a manner that assures the related moving variables are considered. Ultimately, the process needs to be holistic and drive cultural change. ❖

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