SAP Thought Leadership Paper Supply Chain Management

Inventory Optimization

A New Approach to Operational Inventory Planning



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Executive Summary

In today's ultracompetitive business environment, companies can ill afford supply chain inefficiencies. But if planners are using outdated inventory management models, it can be challenging to run a tight ship.

To boost efficiency, run leaner, and drive down supply costs, many organizations are exploring inventory optimization. This technique improves inventory targets to address the realities of today's complex, ever-evolving global supply chains. This paper examines how the stochastic multistage, multi-inventory model supports inventory optimization. It also looks at how the SAP® Enterprise Inventory Optimization application by SmartOps uses the model to help supply planners execute more effectively. The software enables a collaborative approach that extends beyond organizational boundaries while helping planners predict demand patterns more accurately. And an option that provides analytics for the application delivers executive-level insights and reporting using a focused dashboard.

No planner knows everything, and the models that planners work with should reflect this reality.



Inventory Management Has Changed

Traditional approaches to inventory planning are based largely on rules of thumb. Planners develop a set of heuristics for determining safety stock levels, and these rules get handed down. Some organizations also use rudimentary analysis, in which items are weighted on an A-B-C scale with the priority of keeping A-level items in stock. The assumptions made for this sort of analysis, however, are typically revisited rarely. In fast-changing environments, this approach can lead to out-of-stock situations and supply chain inefficiencies.

The complexities and uncertainties in today's constantly evolving global supply chains demand a dynamic new approach. The inventory optimization approach augments existing enterprise resource planning (ERP) and advanced planning and scheduling systems, helping planners improve operational inventory targets with item-location-period granularity for finished goods, intermediate items, or raw materials and components. The result is better visibility into demand, enabling planners to modify inventory and reduce carrying costs without impacting customer service levels or sacrificing product availability. This approach empowers organizations to improve performance and more effectively meet the terms of service-level agreements.

THE SCIENCE

The science behind inventory optimization involves stochastic (probabilistic) multistage, multi-inventory modeling in which a sophisticated algorithm is used to assess vast amounts of historic and real-time information while accounting for multiple variabilities and interdependencies. By enabling the analysis of a staggering number of variables, constraints, and what-if scenarios, this model empowers planners to manage the complexity of today's supply chains. This approach differs from traditional inventory management models that depend on deterministic, discrete-time inventory theory in the following ways.

Molecular, Not Atomic

Traditional inventory management views the supply chain according to a singlestage, single-item model. This model sees each stock item and each stage or stock location as isolated entities with few, if any, meaningful dependencies.

The multistage model, in contrast, views the supply chain in terms of molecules made up of atoms. This reflects the reality of today's multistage supply chains that include suppliers, numerous manufacturing stages, subcontractors, vendor-managed inventory, central warehouses, and multiple distribution centers.

Dynamic, Not Static

To accommodate constantly changing demand, inventory planners often cobble together sets of unconnected static models to ensure proper levels of safety stock. In contrast, the multistage model is dynamic and can accommodate shifting demand so that peaks and troughs are balanced out over time. The dynamic character of the model also allows organizations to model seasonality, promotions, and end-of-quarter spikes. It accommodates the fact that uncertainty is greater when a company looks farther ahead in time – something traditional approaches cannot do.

Data Driven, Not Assumption Based

The multistage model recognizes that organizations work only with finite historical data. Traditional models, on the other hand, start with an idealized assumption that planners possess complete knowledge of demand distribution. No planner knows everything, and the models that planners use should reflect this reality.

Variable, Not Unvarying

Traditional models lack the mechanisms to dynamically capture changing values or correct for errors over time. The multistage model, by contrast, is flexible enough to continuously incorporate the results of ongoing data analysis. This analysis helps identify forecast errors and biases so that planners can correct values and modify assumptions.

THE BUSINESS REQUIREMENTS

The purpose of the multistage model is to help planners in real-world supply planning scenarios. Any application that seeks to leverage the multistage model must meet the following requirements.

Enterprise Readiness

Many inventory optimization applications fail to address the fact that supply planning is a collaborative activity that extends beyond enterprise boundaries. They are neither scalable nor capable of automating planning processes. What's needed is an application that leverages the multistage model at an enterprise level. Requirements include visibility across multiple ERP applications and planning systems, along with support for global inventory planning. This allows planners to understand inventory liabilities, maintain service levels, and operate according to supplier- and vendormanaged inventory business models.

Flexibility

An inventory optimization application needs to be flexible enough to accommodate industries as varied as consumer products, chemicals, manufacturing, and high tech. It requires reporting tools that can help validate, analyze, and improve industry-specific supply chain information regarding demand, supply, and production elements.

Data Input Connectivity

Better outputs require better inputs. Thus, an inventory optimization application should include data connectivity modules that can work with a wide range of data sources to transform and load raw data easily and automatically. These modules should also accommodate the supply chain network structure itself, which is often the most challenging aspect of data connectivity.

Built-in Intelligence

The ability to access data is important. But planners also need to work with that data. An inventory optimization application, then, must support robust analysis to help planners understand issues involving forecast bias and accuracy, supplier uncertainty, schedule adherence, and more.

Approval Workflow

Planners need to review updated inputs (such as forecasts), perform due diligence, and approve any modified targets in order to avoid problems downstream. An inventory optimization application should accommodate this requirement with automated workflow and alerts that allow planners to manage by exception.

Continuous Improvement

Supply chains are in constant flux. This is why inventory optimization applications need to support continuous improvement processes. Planners should have the ability to play out what-if scenarios and study the ramifications of proposed actions. Tools that support the visualization of alternative strategies and the comparison of planned and actual scenarios help businesses predict possible outcomes. In this way, they can identify effective actions to improve supply chain efficiency.

Executive Visibility

Information is of no value if it is not readily accessible to the people who need it. At-a-glance update mechanisms such as executive dashboards are vital for helping planners and senior managers to focus on and evaluate supply chain performance in regard to established targets.

THE APPLICATION

The SAP Enterprise Inventory Optimization application addresses these requirements, helping organizations strike the right balance between service levels and inventory investment. The application can be used on a stand-alone basis, if desired, or as an integrated part of the SAP ERP application or the SAP Advanced Planning & Optimization component. In either case, it enables planners to dynamically determine optimal demanddriven, time-phased inventory targets for every item at every location throughout the supply chain. SAP also provides an option for analytics that helps planners monitor demand, inventory, and supply data against prescribed targets. The option uses SAP BusinessObjects[™] business intelligence solutions with preconfigured data analysis functionality to populate executive dashboards and performance reports.

The Right Inventory

Specifically, planners can:

- Coordinate capacity, inventory, demand, lead time, and product availability variables to gauge how much inventory should be carried by item, location, and time period
- Leverage a multistage modeling approach to calculate the relationships among inventories, service levels, capacity, and costs across all stocking locations and stages – and across different types of supply chains within organizations and beyond enterprise boundaries to support supplier- and vendor-managed inventory
- Set and manage targets such as safety stocks more frequently at a more granular level, supporting lean processes

- Accurately track and streamline inventory positions throughout the orderto-cash value chain, using advanced algorithms that eliminate waste and help the organization run leanly
- Access real-time, at-a-glance updates on supply chain performance, identifying trends and deviations from predefined targets and refining inventory strategy accordingly
- Use flexible data filtering to pinpoint issues at a granular level, allowing remedial measures to be implemented to meet key performance targets
- Visualize "what-if" scenarios, compare historical trends, and analyze the impact of alternative supply chain strategies

In the end, these functionalities enable your planners to optimize inventory levels throughout the organization, helping you improve customer service levels while minimizing working capital requirements. This makes you more efficient and far more competitive.

LEARN MORE

To learn more about how SAP Enterprise Inventory Optimization can help your organization compete more effectively, contact your SAP representative today or visit us online at

www.sap.com/lines-of-business/scm /inventory-optimization.

www.sap.com/contactsap

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