White Paper

Inventory Optimization
Self-Check for Life Sciences

Four questions every life sciences supply chain team should ask itself

Executive Summary

Supply chains in all branches of the life sciences industry involve high-value, high-margin items that tend to trap large amounts of working capital in excess inventory.

Life sciences companies face uncertainty, market complexity and regulatory restrictions, while at the same time they must ensure the availability of their products. Medical device makers have challenges around assembly, procurement and kitting, as well as deployment into healthcare offices or the third parties who serve them. Pharmaceutical producers use active ingredients in large batches [forming co- and by-products as well], or organic materials to grow compounds from single cells to production quantities. For this side of the industry, there is a packaging phase and a final pack stage. New product introductions for drugs, diagnostic material and medical equipment are priority-driven. Trade-offs between transport modes and costs, replenishment frequency and inventory costs are complex. Expediting is difficult to avoid.

An inventory optimization [IO] initiative can transform global supply chain performance for life sciences by strategically buffering inventory and setting time-phased inventory targets that handle shifting demand trends. Inventory optimization allows companies to achieve lower inventory levels while executing new product introductions more cost-efficiently and better exploiting market opportunities.

Inventory optimization works alongside an ERP transaction system. The IO platform uses ERP data as input and feeds optimized inventory plans, policies and specific inventory targets back in.

This paper outlines a handful of simple "self-check" questions to determine whether inventory optimization can create a better trade-off between cost and service level performance for a life sciences company.

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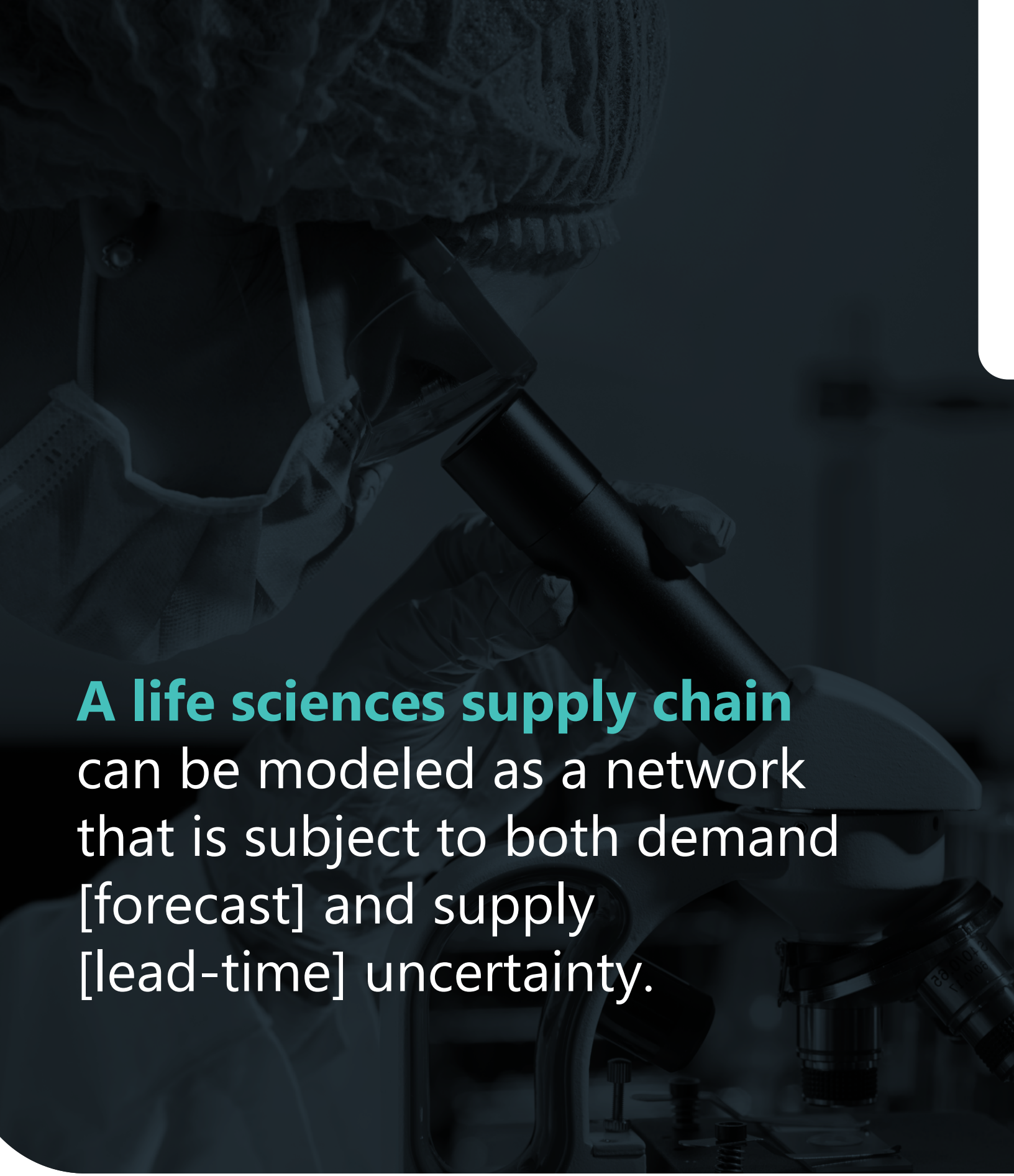

A life sciences supply chain can be modeled as a network that is subject to both demand [forecast] and supply [lead-time] uncertainty.

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Self-Check #1: Can We Safely Reduce Inventory?

Pharmaceutical, biotech and medical device companies are innovation machines operating in a difficult landscape characterized by organizational silos, extensive regulatory compliance requirements, and complex global manufacturing environments. Factors such as the demands of clinical trials and uniquely high product availability requirements contribute to a demanding supply chain landscape.

The question. Whether we are involved in discrete or process manufacturing, is it possible to right-size inventory to optimize new product introductions and time-to-market plans, as well as manage onsite stock if necessary?

The way. Multi-echelon Inventory Optimization [MEIO] determines the optimal buffer locations for raw materials, work-in-process components and finished goods across all interdependent tiers and quantities for each item at each buffer to optimize customer service while minimizing costs. MEIO bridges dangerous inventory gaps created by using less advanced inventory management processes to reduce costs, speed time-to-market and minimize stock-outs.

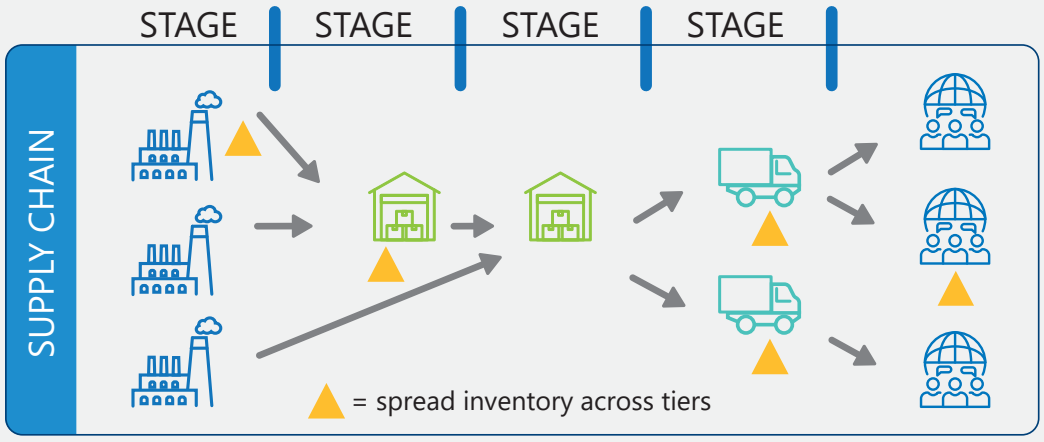
Components of Life Sciences Supply Chains

- Multiple production, packaging and distribution facilities
- Global sourcing
- Expensive components with long lead-times
- Strict government regulatory requirements
- Onsite stocking at healthcare provider facilities
- Customers with different service level requirements
- High-risk penalty for stock-out events
- Perishable inventory accountability for execution

The win. MEIO integrates inventory policies across the extended enterprise. It shrinks inventory buffers, reducing cost by 15%-30% while providing 99%+ confidence in meeting product availability and service level requirements. MEIO provides end-to-end supply chain visibility. It positions key raw materials for cost-effective manufacturing and optimizes sourcing and manufacturing operations to minimize lead times and simplify material tracking.

[3]Industry Comparison for Best-in-Class S&OP/IBP Capabilities, Aberdeen Group, August 2016

Multi-echelon inventory optimization



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Self-Check #2: How Much Excess Inventory Do We Have and Where Is It?

Every supply chain is made up of stages that represent major processing functions. From raw materials to transporting finished products to the manufacturing sites and distribution centers, inventory buffer can accrue at every step.

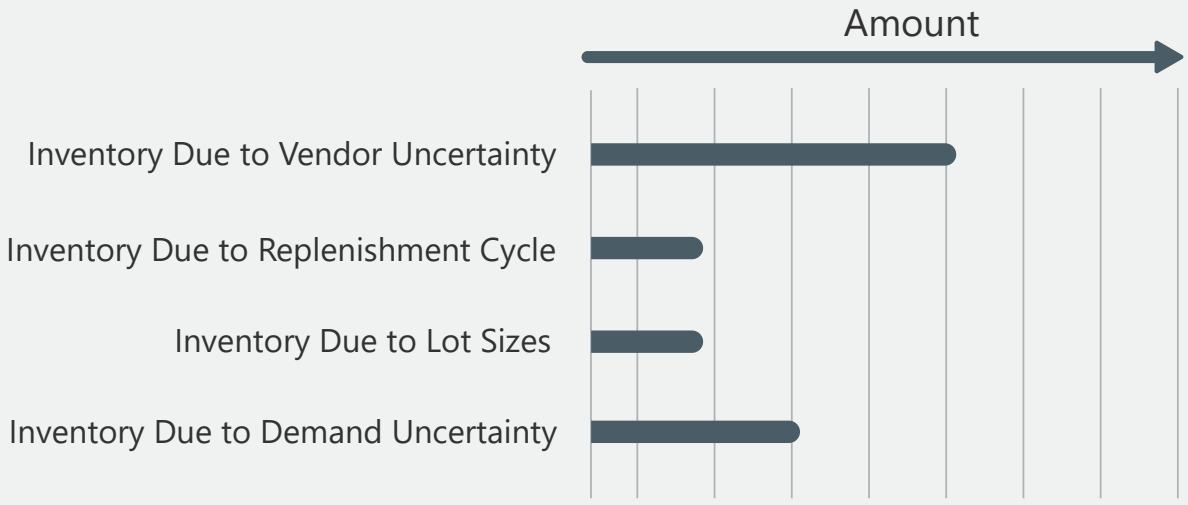
The question. Can uncovering the causes of our excess inventory help us make better strategic and tactical business decisions?

Inventory optimization discovers the causes, amounts and locations of existing inventory.

The way. Each holding point for inventory is connected to upstream and down-stream stages. Each stage has a periodic, review-based stock replenishment policy that perceives demand signals from another stage [or perhaps an external customer], and places orders with its suppliers in response to that demand. The direct cost added to work-in-progress at each stage [for material, labor, transportation, etc.] drives the value of inventory.

The win. After analyzing the amounts, locations and causes of inventory being held across the supply chain, along with the interdependencies that drive buffering, MEIO calculates how to reposition and right-size stock to lower costs and improve customer service. These recommendations usually run counter to traditional tactics of holding inventory at every stage, or conversely, concentrating inventory at the finished goods stage, in its costliest, most differentiated, and least flexible state.

Discovering the causes of inventory



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Self-Check #3: Can We Cut Inventory By Handling Demand Uncertainty Better?

A life sciences supply chain can be modeled as a network that is subject to both demand [forecast] and supply [lead time] uncertainty. Demand uncertainty causes supply chain teams to tolerate overly large inventory buffers to ensure they can respond to the market.

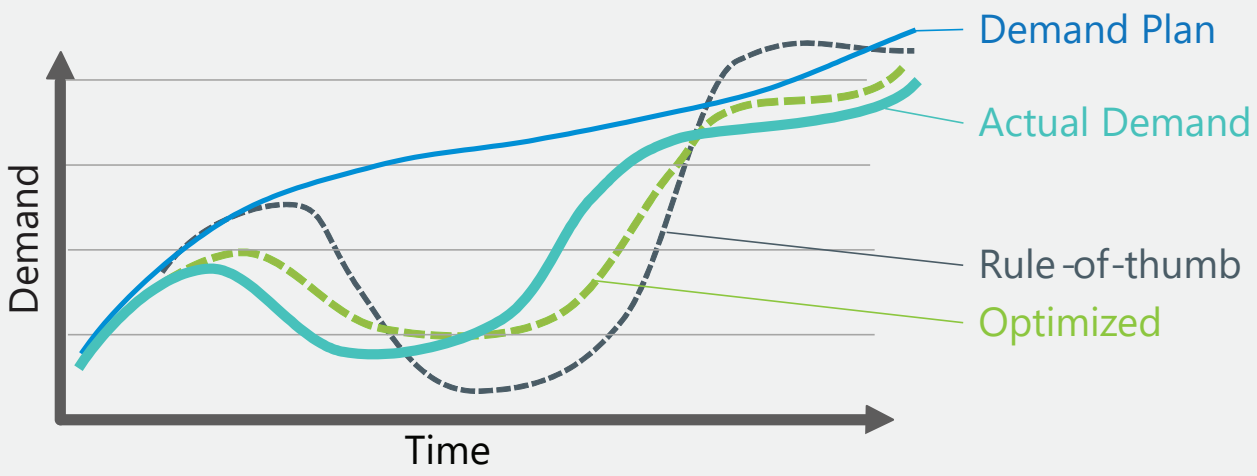
The question. Can we defeat the tendency to overreact to demand uncertainty, and thereby exceed the performance achievable by following standard rules of thumb?

The way. Normally, during a demand windfall, managers resort to expediting, premium freight or overtime. In a plunge-and-recover scenario, if vital inventory is not on hand at multiple stages of the supply chain, sales will be lost at the precise time they are most crucial. MEIO efficiently manages inventory levels without causing a ripple effect in buffers across stages of the supply chain.

MEIO's proven mathematical algorithms outperform human judgment in managing demand uncertainty over time.

The win. MEIO's proven mathematical algorithms outperform human judgment in managing demand uncertainty over time. Using existing demand data, MEIO efficiently manages inventory levels across stages of the supply chain without causing inventory ripples [a.k.a. "the Bullwhip effect"] between buffers. Even as demand changes over time, the degree of uncertainty is predictable. MEIO creates an "uncertainty envelope" around the demand signal that can be widened or narrowed by planners to fine-tune inventory to meet their service level goals.

Optimized response to uncertain demand



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Self-Check #4: Is Our Team Ready to Embrace Best Practices?

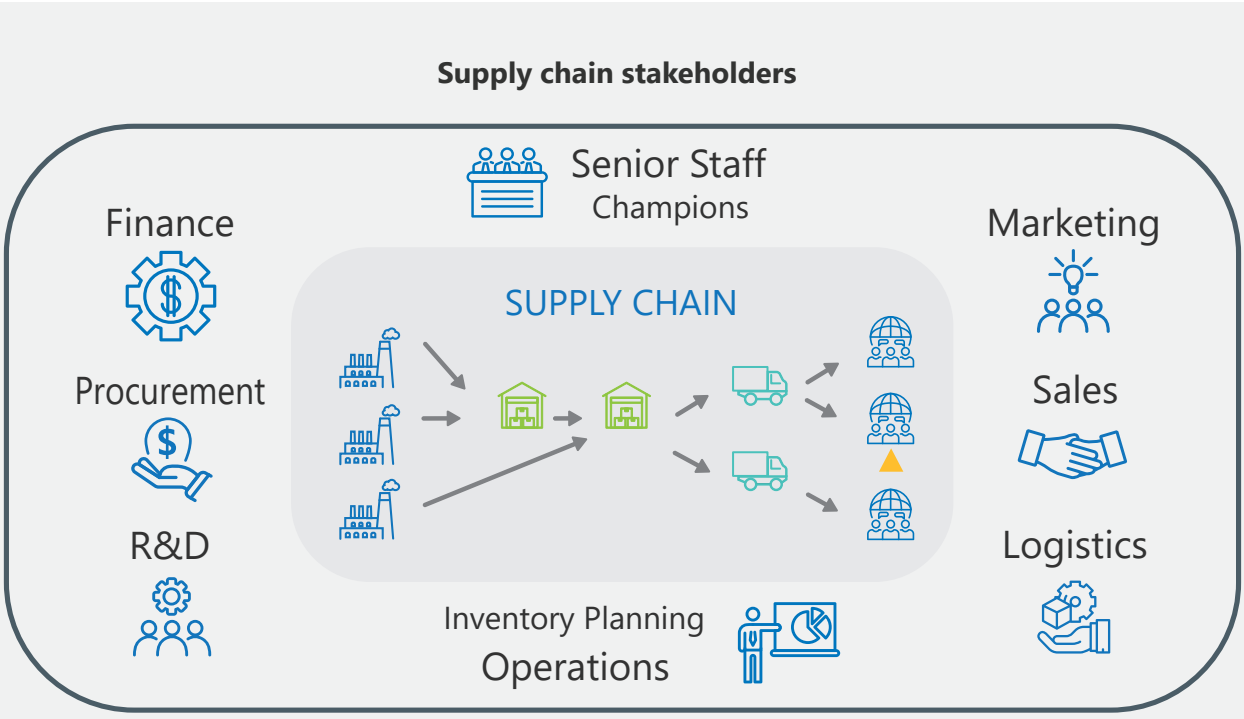
With a heavy R&D focus, strict regulatory environment and long time-to-market, life sciences companies may take an even more deliberate course in implementing inventory optimization initiatives than companies in other industries. Inventory planners won't use an inventory optimization system unless they believe in it. It's not possible to put a "black box" into a life sciences supply chain organization and expect everyone to follow its lead.

The question. How do we prevent a powerful inventory optimization initiative from stalling out?

The way. One difference-maker is establishing solid executive-level support across functions: supply-side procurement, production, distribution, sales and marketing, finance and even R&D. Planners should be given a chance to validate the recommendations during initial launch and on an ongoing basis afterward to become confident that the calculations are not "magic," but are based on proven operations research algorithms and analytics that have been validated by practitioners over years of successful worldwide use.

Simple, visible data brings people together in solving problems, reaching agreement and making decisions.

The win. When inventory planners take ownership of inventory targets derived using historical transaction data [which considers uncertainty in demand, volatile supply, costs and delivery timetables, forecast accuracy, replenishment cycles, lead times and review periods], they become champions of inventory optimization best practices, rather than reverting back to static or simplistic methods. An opaque technology solution takes longer to earn the trust of a planning organization.



How One Medical Device Manufacturer Optimized Inventory

Background. A medical device maker with more than 30,000 worldwide employees producing and delivering over 15,000 life-saving products was experiencing stock-outs and expedited freight charges due to poor forecasting accuracy. An inappropriate inventory mix caused frequent write-offs of excess or obsolete inventory. A suboptimal logistics network created long manufacturing and transportation lead times and disrupted service level performance.

Guiding principles for improvement:

- Use forecasts to drive capacity planning and raw materials purchases, but rely on actual sales data to drive the production schedule mix.
- Pool safety stocks globally, determined analytically based on demand signal volatility and supply chain performance.
- Compress order fulfillment lead times to improve responsiveness, including lean implementation at manufacturing plants and distribution centers.

Beyond ERP. The company implemented many process changes. Eventually, improvements from its ERP effort began to plateau. The team then implemented new statistical safety stock calculations, and ultimately moved to dynamic supply chain modeling and Multi-echelon Inventory Optimization [MEIO]. MEIO provided the power to go beyond the basic assumptions of the ERP system and take into account real-world supply and demand uncertainties.

Benefits. Inventory holding cost reductions resulting from the MEIO pilot program surpassed previous efforts by 15%. This right-sizing project validated the MEIO approach and demonstrated the value of strategic supply chain analysis, as well as the tactical advantage of setting safety stock targets by SKU by location. The company deployed MEIO across its three-tiered finished goods distribution network.

Real World Benefits

- **Integrating inventory optimization with ERP raised service level performance to 98%-99%**
- **Inventory reduced 15%-26%**
- **Precise targets for every SKU location**
- **Next-day delivery on most orders**
- **Distribution across 40+ countries**
- **Shorter lead times**
- **Clear understanding within each business franchise of the drivers of efficient inventory policy**

Keys to success. The project succeeded due to empowered project governance, supporting resources and a corporate-wide executive sponsor with global responsibilities. A project leader was identified to drive knowledge and implementation across the company. Powerful, collaborative business intelligence was essential to back up every supply chain decision. Stakeholders gained visibility to the entire supply chain in order to understand the ramifications of their choices. Greater visibility and risk pooling provided a more responsive supply chain and optimized new product introductions.

Conclusion

Multi-echelon Inventory Optimization is a proven method for life sciences companies, with their complex supply chains, SKU proliferation and demanding service levels, to gain competitive advantage by reducing inventory and improving service levels.

An inventory "self-check" can help determine how prepared your life sciences supply chain team is to exploit the benefits of MEIO. Key questions include:

Do we believe we can safely right-size our inventory? Multi-stage life sciences supply chains trap enormous amounts of working capital in excess inventory. It takes advanced inventory optimization technology to reliably adjust end-to-end buffers across functions and facilities worldwide.

What are the causes of our excess inventory? Discover the amounts, and locations of excess inventory, then use modeling and "what-if" scenario analyses to improve the position of inventory buffers.

How do we defeat demand uncertainty? Inventory optimization solutions employ proven mathematical algorithms for managing varying degrees of uncertainty in the demand signal. Results outperform those that can be achieved using human judgment alone.

How do we embrace inventory best practices? Build executive support and create a shared understanding of the supply chain. Let inventory planners validate MEIO recommendations on an ongoing basis.

About Logility

Accelerating the sustainable digital supply chain, Logility helps companies seize new opportunities, sense and respond to changing market dynamics and more profitably manage their complex global businesses. The Logility® Digital Supply Chain Platform leverages an innovative blend of artificial intelligence [AI] and advanced analytics to automate planning, accelerate cycle times, increase precision, improve operating performance, break down business silos and deliver greater visibility. Logility is a wholly owned subsidiary of American Software, Inc. [NASDAQ: AMSWA].

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