

## **What is Missing to Enable Optimization of Inventory Deployment and Supply Planning?**

*A Best Practices Solution that Bridges Top Academic Research and the Commercial Marketplace*

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**Abstract:** Although sizable investments have been made in supply chain applications, collaboration projects, planning process improvements, consulting, and personnel, companies still seek a solution that allows them to improve their inventory and supply replenishment planning. It seems the most basic questions are still the hardest to answer: "Given all the variables and complexities of my supply chain, what is the appropriate amount of inventory of this product that I should keep at this location to meet customer service levels over time? What should my reorder quantities be over time to accomplish a lowest total cost decision? How often should I recalculate my planning decisions and is there a rapid way to do that?" As a result, inventory turns and supply chain efficiencies have not significantly increased over the past decade, and most companies are spending about 10% of their sales revenue on supply chain costs (compared to 4% spent by top performers in each industry).

The inherent and growing complexity of today's supply chains requires a new optimization approach that combines appropriate intellectual property in operations research with integration-friendly software design to enable advanced planning decision support. However, an appropriate solution has eluded the marketplace because of several major challenges: different optimization techniques must be evaluated; supply chains are becoming more complex; supply and demand uncertainties continue to increase; uncoordinated "silo-based" decision making drives inefficiencies further; and there is a lack of consistency in planning approaches and no way to leverage existing investments to solve strategic and tactical planning problems. Additionally, sales incentives - such as vendor deals and other discounts, financing, announced price increases, and bundling deals - create cross-company inefficiencies.

Over the past decade, many professors have been called upon by several visionary Fortune 500 companies to see if academic approaches and optimization techniques could solve industrial-size supply chain problems. These solutions support inventory and supply planning at many levels (strategic, tactical, operational), and greatly enhance the performance and usefulness of existing ERP, APS, and home-grown execution systems to support operational activities. This talk will present two case studies to demonstrate an approach that can bring efficiency to supply chains.