



## Are Your Inventory Management Practices Outdated?

### Key Facts

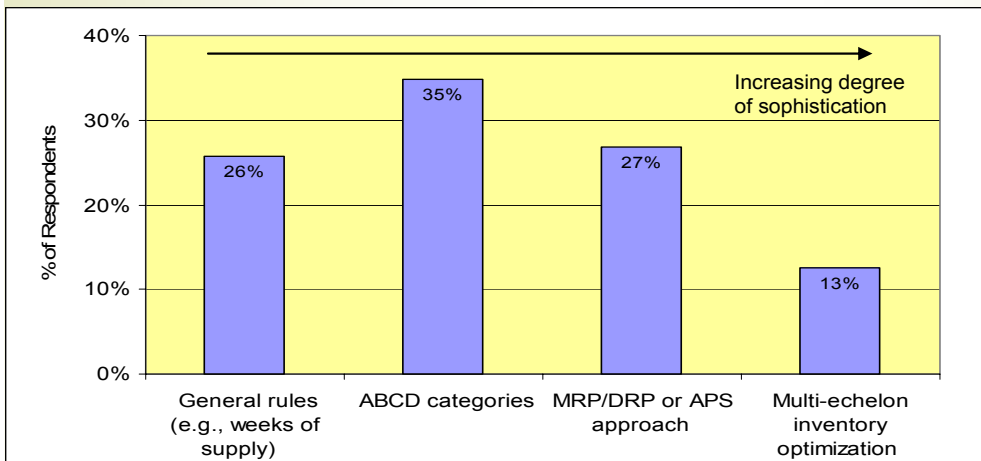
Traditional inventory management practices are being made obsolete by increasing global sourcing and contract manufacturing, more dynamic product life cycles, and multi-channel distribution. These trends are driving the need for companies to adopt new inventory management technology that better accounts for supply chain complexity and can reduce inventories by 20-30%, while simultaneously increasing customer service levels.

### Decision Framework

#### Benchmarking Your Inventory Practices

Have your inventory practices kept up with today's supply chain demands? Aberdeen survey results show that most companies continue to use locally set, overly simplistic inventory policies like simple rules like weeks of supply or ABCD analysis (Figure 1).

**Figure 1: How Companies Set Inventory Policies**



Source: AberdeenGroup, December 2004

Most enterprises will not gain much more from traditional weeks of supply rules, ABCD analysis, or MRP/DRP and advanced planning system (APS) approaches that serially plan inventory. They will continue to struggle with too much inventory that is not in the right place.

This is particularly the case for companies whose supply chain complexity and length have been amplified by increased global sourcing, contract manufacturing, or multi-channel distribution. If your company has seen its supply chain elongated, you now have more echelons (also called stages, levels, or tiers) in the supply chain to manage, with more erratic lead times and greater variability in demand and available capacity. These attributes make traditional inventory management practices insufficient, and often result in a company holding 20-30% too much inventory across its supply chain. Companies with short lifecycle and configurable products are also severely underserved by traditional inventory planning methods, as they must get every SKU or feature/option right to achieve their profit potential.

Benchmark results show that large companies aren't much better than their smaller competitors when it comes to inventory management. Of firms over \$1 billion in revenue, 29% said they use general weeks of supply rules, 19% ABCD categories, and 38% a traditional, deterministic MRP/DRP or APS approach that serially plans inventory and does not factor in the effects of variability across the supply chain.

To make matters worse, two-thirds of companies update their inventory policies once a year or less. Large companies are least likely to maintain up-to-date policies: 78% of large companies surveyed by Aberdeen update their inventory policy strategy every one to five years. This frequency of analysis is not sufficient given: 1) the rate at which most companies are changing the structure of their supplier networks and distribution channels, and 2) the extent to which market volatility and short product life cycles are causing the demand for a typical SKU to change several times a year.

## Adopting a Supply Chain Wide View of Inventory Management

To manage today's more complex supply chains, industry leaders are adopting new inventory practices that manage the flow and positioning of inventory holistically across multiple echelons in the supply chain, including suppliers and downstream partners. These practices result in higher-velocity product movement, enabling shorter lead times and more flexible response to customer demand. They also drive working capital improvements and operating cost reductions that companies can reinvest in new product introductions or other strategic programs.

In [\*The Supply Chain Inventory Strategies Benchmark Report\*](#), we highlighted key strategies for managing inventory across the supply chain, including postponement, risk pooling, supplier-managed inventory, and in-transit inventory management. Here, we focus on a new generation of inventory optimization technology, which is helping companies reduce inventory levels and better manage variability across their supply chains. These new solutions are being offered by some of the traditional planning vendors and a new group of specialist vendors. We look at who should consider this technology and how to select an appropriate vendor.

## New Inventory Optimization Technology

A new generation of inventory management technology is at last enabling companies to properly account for variability and multi-level activity in the supply chain. These solutions are known as multi-echelon inventory optimization solutions. This technology globally optimizes inventory policies across supply chain tiers, accounting for both demand and supply variability using a stochastic (probabilistic) approach versus a rules-based or deterministic approach that does not fully account for variability.

- For instance, a deterministic approach would say that 80% of orders from a Chinese supplier are delivered on time and use that information in calculating safety stock requirements. A stochastic approach, by comparison, would say that 6% of orders are 1-3 days late, 1% are 4-6 days late, 5% are 7-14 days late, and 8% are more than 14 days late, resulting in a much finer understanding of variability and the resulting inventory requirements.

An important difference between this new breed of multi-echelon technology and traditional DRP is that it takes into account all of the sources of variability across the supply chain, not just variability at one point as does traditional DRP.

The quality of result of multi-echelon solutions differs significantly from MRP/DRP or traditional deterministic APS technology. ***It is typical for companies adopting a multi-echelon solution to drive a 20-30% reduction in on-hand inventory while improving service level reliability.*** In addition, with these solutions, companies can alternatively choose to achieve shorter lead times to customers without having to increase their inventory investment – paving the way to grab market share from competitors. Because multi-echelon inventory optimization takes into account the full financial and operational picture of inventory, it can also be used to help evaluate “cost to serve” and maximize financial returns.

## The Multi-Echelon Difference

Table 1 outlines the key differences in the multi-echelon inventory optimization approach over traditional techniques, including APS and MRP/DRP approaches. Many companies have defaulted to blanket inventory policies for products and facilities because of the complexity of supporting sophisticated calculations in their current spreadsheet and application systems. The new multi-echelon solutions mask these complexities and enable companies to be much more precise in their inventory management.

**Table 1: Multi-echelon vs. Traditional Inventory Policy Setting**

	Traditional Approaches	Multi-echelon Approach
<b>Target Setting</b>	Independently or sequentially set inventory target for each item (set target at one location or level first, then the next, etc.)	Simultaneously optimize inventory targets across all SKUs, echelons, and locations to meet global service level objective (e.g., customer fill rate)
<b>Variability</b>	Use a normal distribution to describe variability (e.g., forecast error is +/- 15% for a given SKU)	Model actual distribution probabilities (e.g., 5% probability that demand will be 10% lower than expected) and nonlinear relationships
<b>Inventory Interdependencies</b>	Predefine the service level target for each echelon without regard to upstream or downstream inventory	When setting inventory targets, take into account postponement opportunities and upstream/downstream inventory risk pooling
<b>Mix Optimization</b>	Assign all SKUs in a class (or product family) the same service level target	Assign different service levels to different SKUs so that, in aggregate, they meet the overall customer-defined class target with less inventory expense
<b>Goal-Based Optimization</b>	Set inventory policies to meet service target defined for individual level	Set inventory policies to meet global service level objective while optimizing for a business objective (e.g., maximize margin)
<b>Calculations</b>	Calculations take into account expected demand, forecast error, replenishment frequency, and lead times for one point in the supply chain	Calculations take into account traditional factors across <i>all points</i> of the supply chain simultaneously, plus include: production or distribution capacity constraints and yields by location; production and handling lead times and variability by location; transportation lead times and deviations by lane; handling/manufacturing/transportation cost factors; etc.
<b>Time Sensitivity</b>	Static inventory targets are changed when there is a shift in a product's life cycle stage	Time-varying inventory targets account for seasonality and other time variations in demand, supply, or capacity

Source: [AberdeenGroup](#), February 2005

Refreshingly, these multi-echelon optimization solutions do not require ripping out existing systems. These solutions can integrate to and enhance a company's current inventory management and transaction systems, resulting in 60-120 day implementations that can be managed without disrupting existing operations. The multi-echelon solutions create optimized inventory targets for each product at each location, and these targets are then passed to the existing APS or ERP system for execution, frequently on a quarterly update basis. For instance, vendors have integrated their multi-echelon solutions into SAP's APO. As a result, these solutions do not require extensive integration, training, or IT maintenance. However, they do require a commitment by the corporation to use the new inventory targets and to measure performance based on compliance to those targets.

### Should You Consider This Technology?

Consider adopting a multi-echelon inventory solution if your company has any of the following characteristics:



- Multi-stage manufacturing network
- Multi-echelon distribution network
- Customer service level requirements of 95% or more
- Retail stockout challenges
- Globalized supply chain experiencing frequent lead time or supply variability
- High-velocity, short life cycle products (e.g., less than a year)
- Slower moving products with lumpy demand
- Highly varying performance from SKU to SKU or location to location

## *Benefits of Better Inventory Planning*

Companies adopting multi-echelon solutions typically find that their old approaches to inventory management were too localized and did not properly account for demand and supply capabilities and variations across their supply chain. They discover that their old solutions had them hold the wrong products in the wrong places and in the wrong quantities. Frequently, they find their distribution centers are overstocked because of arbitrarily set internal service levels. In lean manufacturing environments, multi-echelon solutions often reveal that too little upstream or in-process inventory is being held for some components, causing long lead times and delays that create higher overall inventory costs. Companies with hybrid supply chains where some components and products are replenished just in time while others are drawn from stock often find that their push-pull boundaries need redefining.

Optimizing inventory targets based on a holistic view of the supply chain can result in immediate benefits for companies:

- A contract electronics manufacturer identified an inventory cost reduction of 30% while cutting its committed service time to customers by half (from 30 days to 15 days). The multi-echelon inventory optimization solution, from LogicTools, not only reduced the manufacturer's overall cost and inventory liability but also helped improve its competitive position in a low margin, short product life industry.
- A high-tech OEM used a multi-echelon solution from Optiant to reduce on-hand inventory by 20-30%. Previously, the company had assigned all products at a location similar weeks of supply if the products had similar volume or were at a similar life cycle stage. The new system identified non-intuitive optimization points where inventory buffers needed to be increased to enable an overall lowering of supply chain inventory.
- A manufacturer with a large dealer network adopted a multi-echelon solution from SmartOps and reduced actual inventory by \$550 million and avoided another \$340 million in additional inventory that would have been held under the previous planning system. The company can now understand which drivers increase or decrease inventory and to what extent.
- A multibillion-dollar consumer products company used a multi-echelon solution from ToolsGroup to reduce its average finished goods inventory in one of its business segments by 25% and improve customer service levels (fill rates) to more than 99%. The improvement was across the entire supply chain, not concentrated in one set of products or at one location.

## *Selecting a Vendor*

Companies seeking to improve their inventory management have a variety of multi-echelon solution providers from which to choose. Each vendor brings its own special strengths for specific types of inventory problems. Table 2 lists key vendors and some of their defining characteristics.

**Table 2: Multi-Echelon Inventory Solution Providers**

	Multi-Echelon Focus	Solution Differentiators
<b>Adexa</b>	Inbound supply chain and multi-stage manufacturing; some finished goods distribution	Combine with constraint-based sales and operations planning process; integration into Adexa supply chain planning suite
<b>GAINSystems</b>	Inbound supply chain, multi-stage manufacturing, finished goods distribution, and repair/remanufacture	Dynamic optimization with profit contribution logic; modeling of both high volume and low volume/sporadic demand items
<b>i2 Technologies</b>	Inbound supply chain and multi-stage manufacturing	Integration with i2 supply chain planning suite
<b>LogicTools</b>	Inbound supply chain and multi-stage manufacturing; some finished goods distribution	Part of a full suite of supply chain design tools
<b>Optiant</b>	Inbound supply chain and multi-stage manufacturing; some finished goods distribution	Situation templates and ease of use for business users
<b>Oracle</b>	Inbound supply chain and multi-stage manufacturing	Integration with Oracle supply chain planning suite; experience with postponement operations
<b>SmartOps</b>	Inbound supply chain, multi-stage manufacturing, and finished goods distribution	Dynamic optimization; robust data loading and data checking capabilities
<b>ToolsGroup</b>	Finished goods distribution	Dynamic mix optimization of large SKU-location combinations; optimizes to achieve very high service levels

Source: [AberdeenGroup](#), February 2005

Because multi-echelon inventory optimization is based on making sense of supply chain complexity and uncertainty, the domain expertise of the vendor matters. Examine the credentials and expertise of the vendor's in-house algorithmic and modeling experts and its implementation staff. Also evaluate the vendor's commitment to continued R&D funding for its multi-echelon optimization solution.

In particular, look at how the vendors are building out visualization capabilities to support what-if analysis and situation templates to speed modeling. Visualization capabilities will enable better decisions on sourcing and capital investment, help define where to focus supply chain improvement initiatives, and make it easier to model the impact of supply disruptions. Compelling visualizations will also help overcome internal resistance to resetting inventory policies, which is often the biggest barrier to change.

## Vendor Selection Checklist

- ✓ Is the vendor focused on the part of the supply chain (e.g., inbound, multi-stage manufacturing, finished goods outbound, end-to-end) that you care most about improving?
- ✓ How many production solutions has the vendor delivered for supply chains with similar attributes to yours and with a similar scale of SKU-location combinations?
- ✓ Are you looking for a daily/weekly replenishment planning solution or a quarterly/annual inventory target setting solution? Where is the vendor's sweet spot?
- ✓ What are the system's inherent goal-based optimization capabilities (e.g., optimize for maximum profit, optimize for minimum inventory investment) and how does it handle costing and variability modeling, bills of material, etc.?
- ✓ Are there complementary solutions in the vendors' portfolio that you currently use or plan to use (e.g., network design, manufacturing capacity planning)?
- ✓ What is the process for uploading data into the system? How does the vendor deal with missing or poor quality data?
- ✓ What are the training process and expertise requirements for the system?

## Related Research

*Supply Chain Inventory Strategies  
Benchmark Report*; December 2004

*Supplier Performance Management: What  
Leaders Do Differently*; September 2004

*The China Trade Management Strategies  
Benchmark Report*; September 2004

*The Quiet Revolution in Supplier  
Management*; June 2004

Author: Beth Enslow, VP, Enterprise Research ([beth.enslow@aberdeen.com](mailto:beth.enslow@aberdeen.com))