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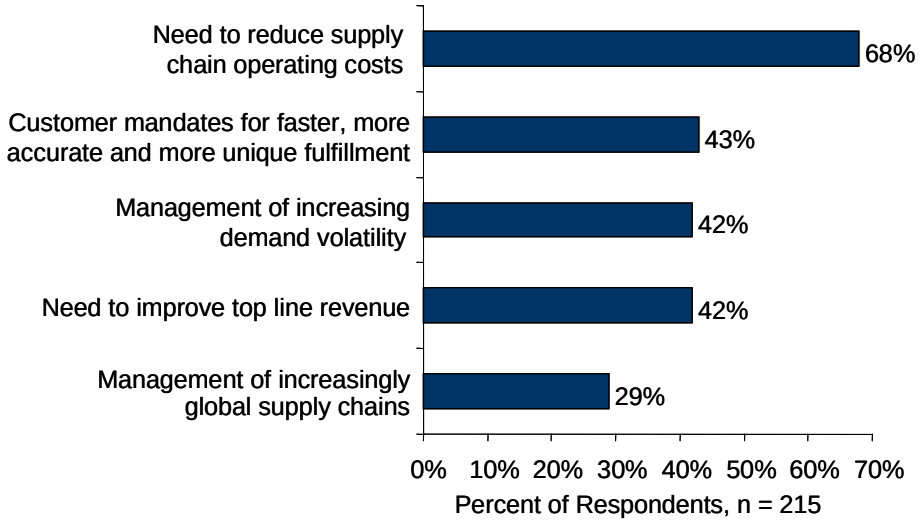
Inventory Optimization Technology Strategies for the Chief Supply Chain Officer

Aberdeen's recent report *Strategic Supply Chain Planning: 3 Key Priorities of the Chief Supply Chain Officer* identified that 86% of respondents indicate that their management team has asked them to find opportunities to improve their company's supply chain planning processes, and 71% of respondents have indicated the same for supply chain technology improvement. The focus of this Analyst Insight is to identify the inventory optimization strategies that chief supply chain officers need to prioritize in today's economy.

Business Context

As Figure 1illustrates, the need to reduce operating costs is still top-of-mind for responding companies. During the early part of 2010, there was considerable optimism regarding the economy and companies seemed to be gearing up for sales revenue growth.

Figure 1: Top Pressures Forcing Companies to Focus on Strategic Supply Chain Planning



Source: Aberdeen Group, December 2010

Now with fears of a double dip recession and overall global reduction in growth, the focus is squarely on cost reduction. The exceptions for the reduction in growth are countries like China and India which are seeing near double digit growth. However, it should be kept in mind that these countries had a lower baseline in terms of actual GDP compared to their

Analyst Insight

Aberdeen's Insights provide the analyst perspective of the research as drawn from an aggregated view of the research surveys, interviews, and data analysis

"Our top pressure, due to the economy, as been mostly reducing costs within the organization in order to stay competitive within our industry. We have researched alternate suppliers and left some open employment positions empty in an attempt to lower our overall costs. While this was difficult at first, we have managed to survive and now have multiple employees cross-trained in various departments."

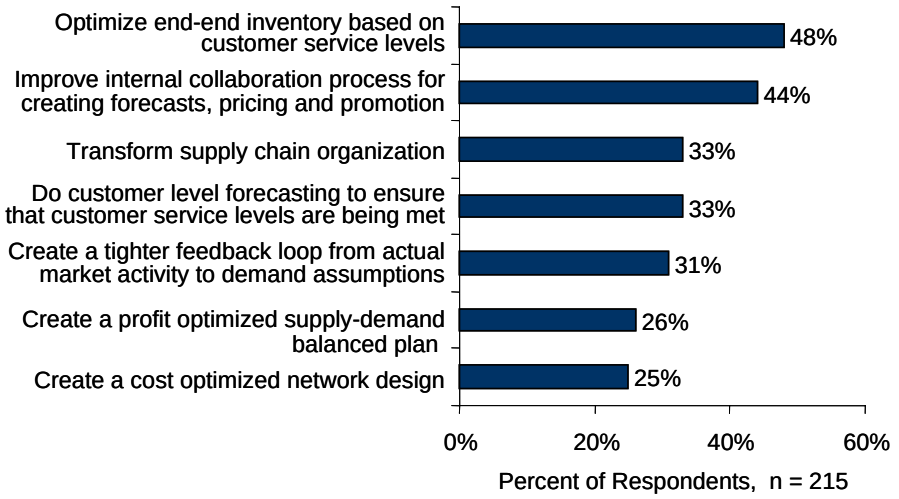
~ Supply Chain Planner at Mid-size Health Care Manufacturer

population and specifically in India; there is considerable inflation to contend with. Hence the need to use supply chain planning to reduce operating costs is universal across all regions.

The other pressures - customer mandates to improve order fulfillment and the need to manage demand volatility - are related to each other. Demand volatility exists due to the wide-spread impact of the "Great Recession" as well as global competition. Participants in the demand network (retailers, wholesalers, etc.) have seen this demand volatility first hand, and are pressuring manufacturers to improve their order fulfillment capabilities.

Figure 2 illustrates the types of actions that companies are taking in response to these pressures. The top action is optimizing end to end inventory based on customer service levels. Inventory optimization is the primary approach to manage their supply chain related challenges.

Figure 2: Key Strategic Actions Taken for Improving Strategic Supply Chain Planning



Source: Aberdeen Group, December 2010

Why is Inventory Optimization Technology Critical?

We see from Figure 3 that Best-in-Class companies are highly differentiated from Industry Average and Laggard companies when it comes to process level maturity:

- Seventy-five percent (75%) of Best-in-Class companies have the ability to create demand forecasts that reflect true customer demand versus 26% of Laggards. Accurate demand variability data is critical to obtain accurate results from the inventory optimization process.
- Twenty-four percent (24%) of Laggards have the ability to understand tradeoffs between service level and inventory investment versus 50% of Best Class companies. When asked about

Best-in-Class Defined

Best-in-Class Companies represent the top 20% of survey respondents. Their results are as follows:

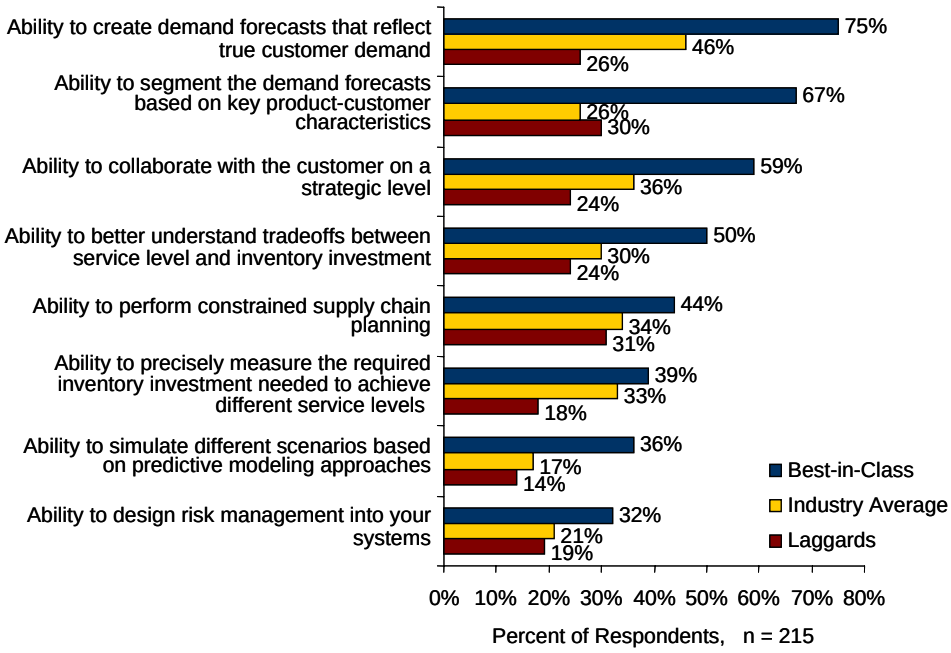
√ Experienced 82.3% forecast accuracy level for three months out into the future

√ 96.9% of orders delivered to customers complete and on time

√ Experienced cash-to-cash cycle time of 25.6 days

the cost of increasing service levels, 49% of Laggards indicated that they don't compute it. And 25% of the Laggard respondents indicated that they use a rule of thumb approach to estimate the cost of increasing service levels. Whereas among the Best-in-Class 40% of respondents adopt more sophisticated approaches such as analyzing the standard deviation of the historical data or analyzing the forecast error.

Figure 3: Process Capabilities of the Best-in-Class Compared to Average and Laggards



Source: Aberdeen Group, December 2010

From a technology utilization perspective, Best-in-Class companies are two-times to three-times more likely to adopt a multi-echelon inventory optimization approach and five-times more likely to use a best of breed solution (*Strategic Supply Chain Planning: Priorities of the Chief Supply Chain Officer*, November 2010)

Multi-echelon inventory optimization considers the entire network – including finished goods inventory in distribution-centric environments, and Work-in-Process (WIP) and Raw Materials (RM) inventory in manufacturing-centric environments – and right-sizes the inventory buffers. Tangible financial benefits can be obtained over a very short term.

Today, there are multiple processes within which inventory optimization is an important component of including supply chain risk management, new product introduction, outsourcing, S&OP, lean, supplier management and working capital management.

Why Should Companies Implement Multi-Echelon Inventory Optimization?

The following table differentiates between traditional approaches and the multi-echelon approach.

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

	Traditional Approaches	Multi-echelon Approaches
Target Setting	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)
Variability	Use a normal distribution of demand to describe variability	Allow for different measures of forecast/demand variability such as forecast error, also takes into account supply variability and replenishment frequency impact on overall variability, often modeling actual distribution probabilities
Inventory Interdependencies	Assign inventory levels without regard to upstream or downstream inventory	When setting inventory targets, take into account postponement opportunities and upstream/downstream inventory risk pooling
Mix Optimization	Single echelon inventory calculations assign each individual sku-location a target based on the factors in the calculation versus rules of thumb (e.g. 21 Days of Supply) being applied across whole product groups	Multi-echelon inventory mix optimization sets individual sku-location targets versus broad rules of thumb, accounting for more factors in the calculation. It does this simultaneously for the different forms of inventory across time.
Goal-Based Optimization	Set inventory policies to meet service target defined for individual level. Typically only for Finished Goods and unit based.	Set inventory polices to meet global service level objective with minimum total supply chain inventory investment
Calculations	Calculations take into account expected demand, forecast error, and lead times for one point in the supply chain	Optimization takes into account expected demand, forecast error, finished good service level, service times, inventory policies, cycle stock impacts, time-phased yield factors, production or distribution capacity constraints; production and handling lead times and lead time variability by location; transportation lead times and deviations by lane; handling/ manufacturing/transportation cost factors; etc.
Time Sensitivity	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; timing of inventory levels are coordinated across time between RAW, WIP through Finished Goods
Demand Propagation	Traditional approaches have no formal mechanism for coordinating the demand upstream for proper target setting	Demand and demand/forecast uncertainty are propagated upstream so that inventory can be positioned properly throughout the supply chain
Multi-level Cost Accumulation	Traditional approaches often do not include cost as a part of their calculation and cannot optimize based on multi-level costs	By accounting for value add at each step along the supply chain, the multi-echelon optimization can position inventory before expensive costs are added into an item while still satisfying service level goals
Service Time coordination	No coordination of service times across the supply chain	Coordination of service times in multi-level BOMs and Distribution Routing so that excess inventory is not waiting for other long lead time components unnecessarily

Source: Aberdeen Group, December 2010

The multi-echelon optimization solutions do not require ripping out existing systems. These solutions can be integrated into a company's current inventory management and transaction systems, within 60 to 120 days, 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 monthly or quarterly update basis.

Case in Point: Stanley Black & Decker Achieves Inventory Planning and Inventory Execution Accuracy through the Adoption of Multi-Echelon Inventory Optimization

Stanley Black & Decker (NYSE: SWK) was formed by the merger of Stanley Works and Black & Decker on March 2010, It is a manufacturer of tools, hardware and provider of security products and locks, which is headquartered in New Britain, Connecticut. The characteristic of the company's supply chain is that of a typical consumer products company as well as a B2B company given the wide range of customers – end consumers, professional contractors, commercial real estate etc. The Construction and Do It Yourself division have the various tool related brands like Black & Decker, DEWALT, Stanley Hand Tools, etc.

From a sourcing perspective, Stanley Black & Decker has several globally distributed plants. The approach that Stanley Black & Decker adopts is that they tend to make products close to the markets they serve. However Stanley Black & Decker also tries to manufacture products where there is low cost labor for example: they have factories in Mexico, factories in Asia, factories in Eastern Europe, but also have factories in Western Europe, USA etc. Hence Stanley Black & Decker has a diversified footprint of manufacturing and the supply base is also diversified to support plants all over the world.

In terms of products, they vary from a simple hand tool with few sub-components to cordless drills which have a longer BOM including engineered parts like motors, batteries, and electronic components.

The following are pressures faced by Stanley Black & Decker with respect to Inventory Optimization:

- They have a global supply chain and supply base with extended lead-times, increased complexity and opportunity for failure
- They had a need to increase turns to reduce excess inventory
- There was a need to increase fill rates for their customers
- Some consumer products within their footprint have short product life cycles with major design changes every year, while other products have major changes every two to three years

Given the challenges faced by Stanley Black & Decker with respect to inventory optimization, they started looking at adopting solutions starting in 2003-2004 timeframe.

They had the need to reduce the inventory they needed to hold – improve working capital or reduce expense for inventory. At the same time they wanted to improve fill rate. They wanted to do both things at once intelligently namely lean out the inventory without sacrificing fill rates. As they looked into these challenges, they realized that an inventory optimization solution is the way to go. They adopted a multi-echelon best of breed solution from Optiant (which has since been acquired by Logility) to enable this.

There were several benefits gained through the solution:

- For those business segments where there was no existing robust statistical target setting process, they found dramatic inventory reduction – for e.g. 30% gross inventory target reduction without sacrificing fill rates. For some of the products, right sizing the inventory meant an increased investment in inventory to improve fill rates.
- In those business segments where there was already a statistical calculation used, they had much smaller decreases in inventory targets (3% to 10% reduction). Rightsizing of inventory drove investment for some items in these areas as well.
- Another benefit that was gained was process standardization and consistency. If the solution is implemented in one area and benefits are gained then it is a lot easier to take the solution into another business segment. Support from upper management is also there if they are able to standardize and streamline processes
- They started looking at the supply chain with this level of data, and it helped Stanley Black & Decker recognize and change behaviors that drove them to have more inventory than was necessary to cover demand, and change systems parameters to allow them to more closely track inventory to targets.
- It began a cycle of 'peeling the onion' to uncover more about their supply chain-driving projects, addressing root causes, new metrics, new reporting, etc. to increase and expedite performance improvement

Single Stage versus Multi-Stage Inventory Optimization

The inventory optimization solution was implemented in the finished goods inventory (single stage inventory optimization) first to gain the above benefits. Last year (in 2009) Stanley Black & Decker adopted the multi-echelon solution for some of the largest North American plants as well as Asian plants. After the adoption of the multi-echelon capabilities there was 3% additional reduction in inventory. So the question may arise as to what the value of the multi-echelon solution is. Surprisingly Stanley Black &

Decker found that they were able to execute to the fill rate targets much better than before. In other words there was a rebalancing of the inventory mix across the multiple stages of the supply chain with an accurate consideration of lead-times and demand variability. The plan generated by the multi-echelon solution reflects the real-life variability much better.

With the implementation of the solution, work in process inventory within the manufacturing plants was also reduced.

Michael Martin, Manager of Global Strategy at Stanley Black & Decker says, "We have seen major successes through this solution across our global footprint. For instance after rolling out the multi-echelon solution in a large North American plant, the solution was taken to a large plant in Asia. Instead of positioning the rollout as a mandate, it was positioned as a business benefit and resources were provided to the Asian plant from the North American team. This resulted in a situation where the Asian plant was able to adopt the solution at a much faster pace than might have been the case. This was a huge success story from the point of view of gaining trust and by-in from the local experts into a process to deliver results company-wide."

Key Takeaways

1. **Segment finished goods inventory based on financial performance**. Forty-seven percent (47%) of Best-in-Class companies have indicated strong process capabilities in optimizing inventory, compared to only 29% of Laggards. The key attributes typically used for inventory segmentation are volumes, picking volumes, complexity of customization, and lead-times and profit margins. Given the current economic challenges, companies need to segment the finished goods inventory based on profit margins.

- **Move away from "rule of thumb" inventory target settings**. Only 35% of Laggards have indicated strong process capabilities in analyzing demand patterns and creating accurate SKU-level forecasts, versus 63% of Best-in-Class companies. One of the reasons why Best-in-Class companies have been able to achieve this is that they are 1.5-times as likely as Laggards to employ statistical forecasting approaches.

- **Extend inventory optimization beyond finished goods inventory management.** Thirty percent (30%) of Industry Average companies have indicated strong process capabilities in the ability to perform inventory optimization, versus 47% of Best-in-Class companies.

  The working capital and cash-to-cash cycle metrics depend on the end-to-end inventory within the supply chain, including raw materials, work in progress, and finished goods inventory. While optimization of finished goods inventory is critical in order to maintain customer service levels, it is important to look into non-

finished goods inventory when focusing on working capital management.

The goal of this Analyst Insight is to provide a strong business case for why inventory optimization is a high priority initiative for the chief supply chain officer. The inventory initiatives, however, should not be done independent of the broader requirements of the strategic supply chain planning such as S&OP and demand management.

For more information on this or other research topics, please visit www.aberdeen.com.

Related Research	
Sales and Operations Planning: Strategies for Managing Complexity within Global Supply Chains; July 2010 *Inventory Management: 3 Keys to Freeing Working Capital*; May 2009	*Strategic Supply Chain Planning: Priorities of the Chief Supply Chain Officer,* September 2010

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