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Managing volatility through smart inventory planning

Introduction

The consumer products (CP) sector, like many areas of the economy, is facing volatility on a scale and level of complexity almost never seen before. Old models of managing the CP supply chain – including IT tools – are not up to the challenge of dealing with hyper unpredictability. This is particularly true in the area of inventory planning and management. Decisions on what, how much, where, and when to stock product across the extended global CP supply chain directly impact corporate profitability, positively...or negatively.

Fortunately, a new breed of inventory optimization software solutions is helping CP enterprises resolve these issues. This paper will consider the latest developments in inventory optimization technology, including a look at how leading CP companies are using this generation of inventory management tools to help minimize working capital, improve inventory positioning and management, redesign network stocking nodes, and improve customer service and overall profitability. More specifically, this paper will explore the following areas:

- **Trends shaping the CP sector.** What are the key trends impacting the consumer products sector today? These include the growth of the global middle class, the financial and economic picture, growing marketplace complexity, changing consumer behavior, supply chain risks, and performance demands, cost pressures, efficiency requirements, and changing sales strategies.
- **Impact of current trends on CP sector supply chains.** This section discusses how CP companies design and manage their supply chains. In particular, it looks at three key areas of adaptation: Strategies for serving multiple and developing markets segments; relationships with retailers and suppliers; and strategies for serving evolving sales channel.
- **How smart inventory planning and management solutions can help.** This section describes the emerging trends in inventory optimization technology. It explains the capabilities of multi-echelon inventory optimization solutions and how they can be employed to analyze and manage inventory by type of channel, stock-keeping unit



(SKU) characteristics, demand patterns, production cycles, service-level commitments, cost, network allocation strategies, and other parameters.

- **Inventory optimization at work – Case studies.** This section profiles how three CP manufacturing firms are utilizing inventory optimization solutions to successfully address the challenges of managing inventory in a volatile global business environment.
- **Anticipated benefits of smart inventory optimization and planning.** In its conclusion, the paper analyzes the anticipated benefits of smart, multi-echelon inventory optimization. A brief discussion of challenges to implementation and some recommendations for companies that want to adopt inventory optimization tools round out the closing section.
- **Challenges to implementation.** This section touches on several key challenges companies face in implementing smart inventory optimization tools.

Trends shaping the consumer products sector

Although consumer products companies can and do forecast demand on both a product and market segment level, they need to work within constraints imposed by a complicating and unavoidable factor: human nature. Ultimately, individual consumers' tastes, attitudes, beliefs, and expectations determine what CP companies sell and where and how they sell it. And because many CP companies today sell globally, they need to respond to culturally determined tastes and expectations along with differing approaches to distributing and selling consumer products.

Consumer preferences, important as they are, represent only one aspect of the constellation of trends shaping the way consumer products companies manage inventory. Seven trends, in particular, stand out as having both short-term and long-term implications for CP companies.

1. Global population growth and changing demographics

In 2011, the world's population reached 7 billion. By 2045, according to demographers at the United Nations Population Division, there will be somewhere between 8 billion and 10.5 billion people on the planet. That population growth will largely occur in developing countries, as birthrates in Europe, North America, and parts of Asia head toward parity with death rates.

Growth in the middle class in developing nations is surging. The World Bank has predicted that by 2030, more than 1 billion people in the developing world will belong to the middle class, more than twice the number fitting that description in 2005. This growing consumer market is on the move, migrating from country to city at a remarkable pace. In 1975, according to world population data, only three cities in the world had more than 10 million inhabitants; today there are 21 cities of that size, most of them in developing countries.

These demographic trends are changing what products CP companies offer and where they position them.

2. Economic volatility and financial pressures

The global financial crisis has affected virtually every company, independent of industry, product, or market segment. Consumers who are unsure about their economic future cut their spending by switching to lower-cost products or reducing total purchasing. According to research from Ernst & Young, consumers who began "trading down" in 2009 were positively surprised by the quality of private label products compared with national brands. This makes it more difficult for leading brands to justify price premiums, withdraw promotional support or widen price gaps.¹

Internally for CP companies, financial pressures and constraints continue to ramp up the need to reduce costs and increase efficiency across the supply chain. Inventory policies play a significant role in carrying out that mandate. After all, cash tied up in inventory is unavailable to finance growth or provide liquidity when needed.

3. Increasing complexity in market channels

Consumers dictate to CP companies and their retailer customers how they wish to conduct business. Armed with instant access to information, consumers today are more service-, price- and availability-savvy and demanding.

If CP companies are to meet those expectations, then they need to deliver their products across multiple channels, including traditional brick-and-mortar retail stores and direct-to-consumer models. At the same time, they need to communicate with consumers in a multitude of ways: virtually everything from in-store displays and kiosks to mail-order and online catalogues to smart phones and other personal electronic devices.

CP companies are grappling with how to manage inventory in this demanding multi-channel environment. Some firms choose to maintain separate inventories for each channel, which can add significant inventory and operational costs; others try to serve multiple channels from a single inventory pool.

4. Retailer power and SKU rationalization

As the conduit to multi-channel shoppers, retailers – particularly the mass merchants – have gained tremendous marketplace power in the CP sector. As retailers become more global, their ability to force change in the CP sector grows exponentially. Shelf space and positioning (both physical and virtual) have become the equivalent of gold, and retailers understand this.

Global retailers, as a result, are demanding that CP companies rationalize their SKU portfolio as a means of reducing complexity, simplifying the shopping experience and freeing up shelf space for their own private label brands. Wal-Mart Stores, for example, is cutting the product ranges it carries by 30 percent in some market segments, while Carrefour is paring its number of SKUs by 15 percent.²

CP companies are responding – based on retailer pressure but also on a need to better manage SKU profitability. Between 2001 and 2006, for example, under Unilever’s “Path to Growth” program, the number of brands in the company’s portfolio was cut from 1,600 to 400, and in a second phase concluding in 2009, 2,500 SKUs were slashed by 40 percent.³

5. Industry consolidation and globalization

The CP sector is undergoing consolidation, with companies acquiring or merging with direct competitors and/or manufacturers of complementary product lines. The impetus behind these mergers is growth, geographic expansion and the need to boost profits and returns for shareholders.

At the same time, the practice of sourcing and manufacturing in lower-cost regions is meshing with the growth of the middle class in these locales. Big box retailers are expanding their store footprint to serve these growing market segments, becoming truly global enterprises. This expansion, in turn, impacts CP companies’ operating strategies.

6. Sustainability and competition for resources

Consumers’ interest in how the products they buy impact the environment continues to grow. Demand for sustainability is extending to the supply chain, as consumers become more aware of the significant carbon footprint CP supply chains represent.

Efforts to reduce carbon footprint inevitably will have a spillover effect on inventory management decisions. CP manufacturers are re-assessing where raw materials are sourced; where finished goods are manufactured; and how far goods are transported across the supply chain to the end consumer.

Sustainability is on CP companies’ agendas for another reason: availability of some of the resources they require is no longer assured; or prices for those resources are so volatile that the companies’ own costs have become difficult to forecast.

Oil price volatility, of course, carries the greatest impact on CP cost structures, translating into higher costs of raw materials, manufacturing, transportation – and, ultimately, higher shelf prices for consumers.

Ethanol policies similarly generate cost and commodity availability issues for CP manufacturers. The global volume of ethanol used as transportation fuel has more than tripled since 2000, driven largely by U.S. energy policy. This demand increase has driven corn prices up, which necessarily affects costs for CP manufacturers either directly or indirectly.

7. Sales strategies and demand variability

Sales, coupons, and other special promotions are a given in the consumer product sector, particularly for products that are sold through retailers. But while promotions may achieve their objectives – temporarily boosting sell-through, enticing consumers to purchase products they otherwise might not buy, or introducing a new product to a target audience – they also increase demand variability.

“Research shows that demand variability in retail networks has been increasing,” says IBM’s Remzi Ural. An IBM Institute for Business Value study of 664 organizations ranked demand variability as their number one concern (Figure 1).

“The consumer is educated about taking advantage of promotions,” Ural explains. For some CP manufacturers and brands, the volume sold through promotional periods might represent 40 percent or more of the annual volume. “That sort of variability distorts the demand side of the equation and creates more challenges for the supply side,” he says. Forecasting and planning inventory deployment in the face of such demand variability is increasingly difficult.

Impact of current trends on CP sector supply chains

These trends are profoundly affecting how CP companies design and manage their supply chains. In particular, they are adapting in three key areas:

- Strategies for serving multiple and developing markets
- Relationships with retailers and suppliers
- Strategies for serving evolving sales channel

Strategies for serving multiple and developing markets

Consumer products companies that manufacture and sell in multiple market segments around the world are engaging in a strategy that IBM’s experts refer to as “glocalization” – balancing marketplace demands for localization of offerings with the need for global operating efficiency. In other words, they are seeking to package, distribute, and sell products in ways that meet local tastes and expectations while managing production and inventory with standardized processes and systems. The challenge is to do so without compromising responsiveness in the name of efficiency.⁴

Toward that end, some CP companies are centralizing high-level, strategic supply chain decisions while keeping tactical decisions at the local or regional level. A few have launched so-called “control towers”. These are central

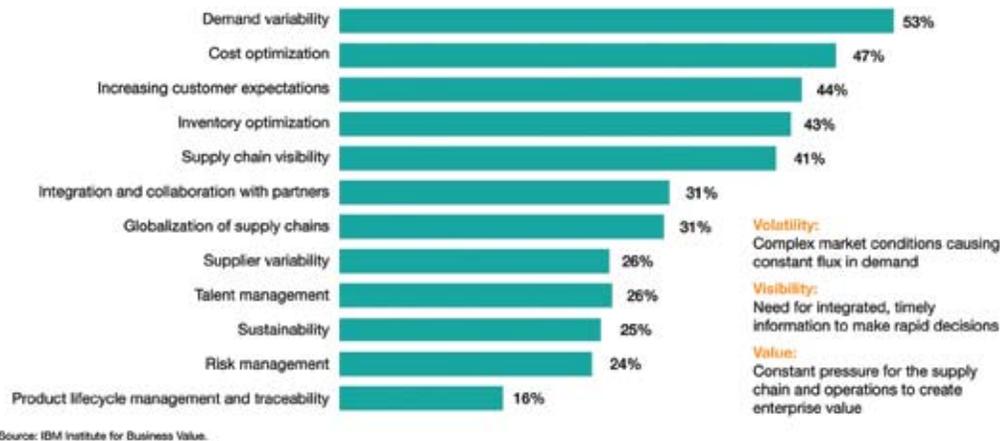


Figure 1: Top supply chain challenges

Source: “New Rules for a New Decade: A vision for smarter supply chain management”, IBM Institute for Business Value, 2010.

locations that provide visibility into inbound and outbound distribution flows and are managed by logistics and supply chain experts who are in close communication with each other and the regional organizations they oversee.

Emerging markets present yet another challenge for CP companies' supply chains: how to keep consumer prices lower in order to serve consumers who have little disposable income. The solution is to keep supply chain costs as low as possible while maintaining the necessary levels of inventory and service.

Relationships with retailers and suppliers

To reduce their financial risk, retailers are slashing the amount of inventory they are willing to hold. Wal-Mart, for example, has been trying to reduce inventory by up to 9 percent annually, and Carrefour is working on reducing its average inventory holding period from 37 days to 30.⁵

Inventory streamlining at the retail level impacts the entire CP manufacturing supply chain, re-shaping decisions about inventory and product assortment. CP firms respond by producing smaller quantities to avoid costly excess inventory, and by achieving faster throughput to meet retailers' smaller, more frequent orders. That, in turn, puts pressure on CP companies' suppliers to handle more rapid changes in demand while maintaining less inventory of raw materials and components.

Additionally, consumer price pressure has provoked an explosion of private label products, which produce higher margins for retailers. To make space for their own labels, retailers are cutting back on the number of CP manufacturers they buy from, or by replacing certain SKUs with their own, comparable versions. Some retailers are planning to possibly double current private label business sales up to 40 percent over the next 7-8 years.

CP manufacturers counter this price competition by offering promotions on branded products and introducing new products that provide the basis of differentiation. An important process in the industry continues to be trade

promotion management (TPM). Per recent industry articles, indications are that a large majority of CP companies are expected to continue robust spending on trade promotions for the near term. Promotions, not surprisingly, inject tremendous volatility into CP supply chains.

Due to global and local operations balancing and volatility, the supply side complexity is also increasing in CP industry through the use of multiple suppliers, co-packers and co-manufacturers. To accommodate these various operational and pricing pressures, CP companies are working more closely with their suppliers to help ensure continuity of supply by sharing information about such inventory-related factors as safety stock and order forecasts.

Evolving sales channel strategies

CP supply chains were developed to serve the traditional brick-and-mortar retail channel and typically are not configured to serve other channels effectively. As a result, many multi-channel CP companies operate multiple supply chains – one to serve retail stores, one for distributors, and another to serve Internet sales. Depending on the circumstances, this approach can add significant costs – with multiple distribution center networks and multiple inventory pools.

As their dot-com businesses mature, more companies are considering how to serve virtually all of their customers from a single pool of inventory. That's a complex undertaking, requiring companies to dynamically aggregate forecasts and apply allocation policies for multiple channels to one inventory pool.⁶

How smart inventory planning and management solutions can help

Fortunately for CP companies, new optimization tools can help tackle these myriad challenges. Smart inventory optimization software, in particular, can look across multiple levels, or echelons, of a supply chain to detect changing conditions early on and suggest responses to them, thereby enabling faster decisions that anticipate rather than simply react.

Multi-echelon inventory optimization solutions are designed to help assure the right amount of inventory for virtually all SKU and raw material, at almost every location, at virtually all times, across the extended supply chain. “Inventory can be anywhere. It can sit in the retailer’s distribution center, if the CP company is responsible for inventory – as is typical in a vendor-managed inventory (VMI) situation,” Ural explains. “It can sit in regional local DCs, it can be in mixing centers, or it can be plant-level inventory, which can include raw material and finished goods.”

Smart optimization tools can set inventory and safety-stock levels down to the individual SKU, location level and time period. They take into account such factors as demand levels and variability, demand forecast, lead time, transit time, order and shipment frequency, order size, order and production cycles, and service-level requirements. These systems also understand the actual and potential variability in all of those factors.

This technology can identify the lowest-cost inventory strategy for each SKU, channel, and geographic region and model the trade-offs between inventory and such factors as desired service level, forecast error, holding costs, transportation costs, and picking costs.

The tools interact with demand planning systems to understand changes in demand and other factors like lead time to adjust the allocations. It can help CP companies determine the optimal location to keep components and semi-finished products.

Multi-echelon inventory optimization represents a dramatic advance over traditional inventory decision making. Inventory planning typically was not centralized, and service-level commitments were managed and measured at the warehouse and DC level based on individual or location-based metrics. As a result, inventory was optimized with no view into total supply chain stock levels, resulting in lower inventory turns, inconsistent service levels, expediting of products, and a lack of understanding of supply chain-wide inventory drivers. *Figure 2* depicts a typical inventory management strategy.

Inventory target setting often was a once- or twice-yearly undertaking, notes Ronan O’Donovan, Product Manager, IBM Supply Chain Applications. “A company might have had the bandwidth to manually collect data once or twice yearly, and then it would take days and weeks possibly months to gather and analyze.” Targeting individual SKUs was rarely done because of the difficulty in collecting and analyzing the data and performing the necessary calculations. As a result, CP companies could not readily adjust inventory to respond to change.

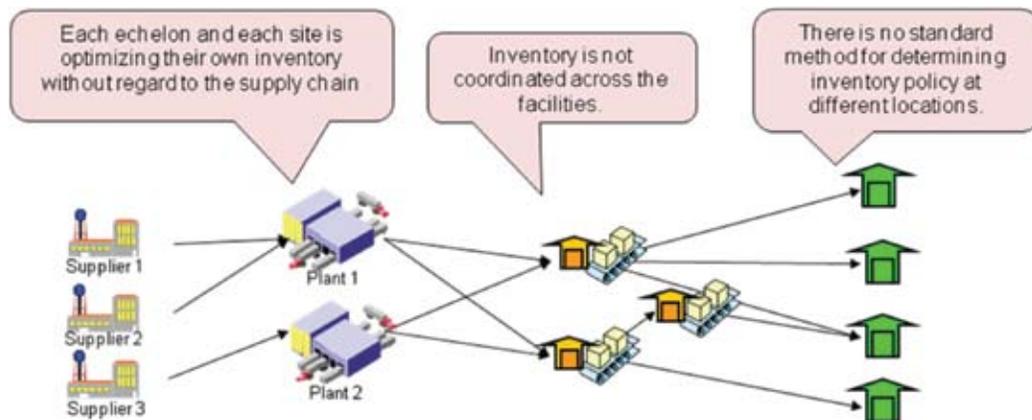


Figure 2: Typical inventory strategy – Local optimization: In a typical inventory strategy, each location optimizes its own inventory without regard to total supply chain inventory, resulting lower or unpredictable inventory turns, erratic service levels, and excess cost.

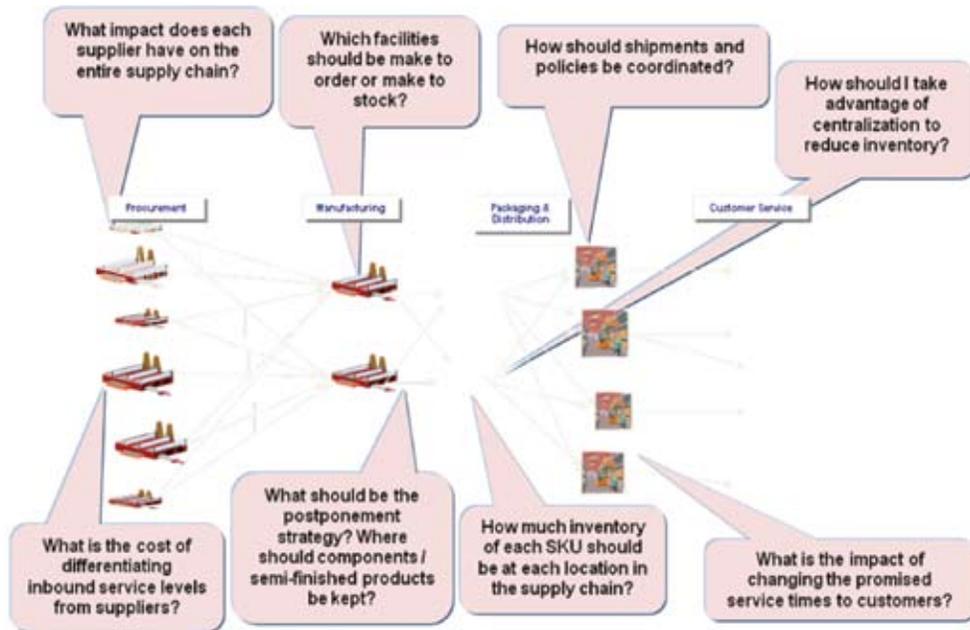


Figure 3: Multi-echelon inventory optimization: Multi-echelon inventory optimization provides visibility into inventory across the supply chain, enabling planners to optimize inventory as a whole, while maintaining or improving service

Multi-echelon inventory optimization technology can help eliminate those shortcomings. Planners gain visibility into inventory levels and demand across almost every level of a supply chain by individual SKUs. The entire supply chain-wide picture reveals systemic issues as well as localized situations that are likely to create problems (stock-outs, for instance) elsewhere in the supply chain. It also determines the optimal fill rate for each product considering its margin, revenue, demand variability, and supply lead time and variability. Constant updates make it possible to dynamically adjust inventory targets in a remarkably short time, without manual intervention.

Multi-echelon inventory optimization tools also enable dynamic what-if scenario modeling. By generating what-if scenarios and analyzing the results, this technology can address key questions relating to inventory at almost every level of the supply chain – the supply base, manufacturing, packaging and distribution and customers. Figure 3 details some of the questions it can answer

Inventory optimization at work

This section of the white paper profiles three major U.S. CP manufacturers and their experiences with implementing the IBM ILOG® Inventory and Product Flow Analyst solution.

Household products manufacturer

With sales in more than 70 countries and overseas expansion opportunities continuing to multiply, a U.S.-based household products manufacturer faced the daunting task of trying to optimize inventory across an extended, multi-nodal supply chain network. Its goal: avoid stock-outs while preventing excessive inventory build-up.

The company sells its products through food-drug retailers and mass merchandisers. These retailers want to hold as little inventory as possible, but at the same time demand increasingly high service from their suppliers.

Adding to complexity, retailers frequently require the household products company to provide account-specific customization of stock-keeping units (SKUs). One club store may require entirely different packaging than a neighboring

competitor, for example. Identical product, but packaged in a different format or size. For the manufacturer, this means more and different SKUs, each with a smaller sales volume than the non-specific version.

To address these challenges, the manufacturer re-engineered how it manages supply chain inventory. From a strategic perspective, it adopted inventory “risk pooling”, whereby it holds as much inventory as possible in a central location and maintains smaller stock levels in decentralized locations to cover orders with short lead times. This postponement practice allows the company to wait until it is more certain of demand before committing inventory to one region or another.

The company also realized it needed inventory visibility across the multiple echelons of its supply chain – from second-tier suppliers all the way to customers. “If we can see that we have some safety stock in tiers one and two, in manufacturing and at our accounts, then we can easily see there is excess inventory ripe for the picking,” notes the VP of supply chain.

The manufacturer’s existing inventory management system was not up to the challenge of delivering this kind of visibility. To resolve this issue, the company implemented a multi-echelon inventory optimization solution with scenario planning capabilities. “The IBM solution can look at the same product coming from two different locations and determine how to balance it so we can pull from one or the other as needed,” the VP explains.

Inventory optimization technology also helps the company manage SKU proliferation resulting from retailers’ demand for customized packaging. “The software automates the SKU analysis and numbers crunching, freeing our people up for decision making,” he notes.

The optimization solution can draw information such as lead times, customer service history, forecast error history, future forecast, and supply variability from the manufacturer’s

enterprise resource planning (ERP) system, and use it to compute inventory requirements. “This allows us to calculate inventory requirements with fewer input errors and get a quicker turnaround on ‘what-if’ scenario planning,” the senior executive says.

The optimization tool has become something of a “myth buster” at the company. Conventional wisdom held that effective inventory management meant improving turns and reducing stock levels. In some instances, however, the optimization solution recommends that planners increase stock levels for certain SKUs to meet customer service requirements.

Additionally, the optimization solution has helped planners build a more robust inventory budget. In the past, management would mandate a certain aggregate or percentage budgeted sales increase for an entire product line. “It was impossible to slice that down to the SKU level,” the VP recalls. “The optimization tool allows us not only to do an SKU-by-SKU analysis, but actually makes a recommendation of what the numbers should be based on facts and hard data rather than conjecture.”

For example, the company can use the tool to prioritize changes based on projected outcome. “For products that are showing a high forecast error rate, we can analyze how much inventory we could save by improving the forecast, and see whether it’s worth spending the time and resources to realize that improvement,” the executive explains. “That’s a very strategic benefit.”

The company has even used the optimization technology to look beyond finished-goods inventory, to quantify how much capacity would be needed in internal or external production lines to fulfill various levels of demand. If planners identify potential insufficient capacity in a given production line for a particular scenario, they can develop a contingency plan to address it.

The anticipated benefits of optimization extend beyond the company's own internal operations. "We use the solution to help our suppliers' optimize their inventory as well," the VP reports. "We go to them and say, our analysis suggests you hold this much in safety stock – and we can show you what the impact is and share in the savings. This is a real plus."

Multi-echelon inventory optimization provides critical support to the household products manufacturer's global supply chain – and to its bottom line. With more facts and more accurate projections in hand, planners can develop more effective budgets and plans, thereby improving the performance of the extended supply chain.

Consumer health and pharma products company

Until recently, a North American consumer nutritional products company, like many firms, managed inventory on a node-by-node basis across its global supply chain. The company, well known as a pharmaceuticals manufacturer, used an in-house modeling tool to determine optimal inventory at each discrete location.

Management realized, however, that it could significantly improve cash flow by optimizing inventory globally, across the entire supply chain – without compromising customer service levels.

The company understood it needed a robust inventory optimization tool to accomplish these dual goals of service and cost control. "Our top 15 products make up 50 percent to 60 percent of our total inventory," the VP of supply chain explains. "We knew if we could model those products effectively, we could reduce inventory throughout the entire supply chain."

The manufacturer also wanted a tool that could perform 'what if' scenario analyses. "For example, if we want to provide 99.5 percent customer service, what does that imply for our inventory levels?" the VP asks. "If we improve forecast accuracy by 1 percent, what does that mean for inventory levels by product? Is it worth our time? Or what are the implications of taking a node out of our supply chain?"

The manufacturer had laid the foundation for implementing an inventory optimization solution, by developing an in-house data repository which allowed it to do some analytics and performance metrics on inventory. The repository gave it an even better grasp of current inventory positions, but did not enable multi-echelon visibility or modeling. The data, however, would feed the optimization tool.

After reviewing four or five software solutions, the company selected IBM ILOG Inventory and Product Flow Analyst. "We wanted a company that would keep improving the solution over time and had the resources to do so," the executive explains. "IBM was committed to listening to our needs and revising the product to improve it over time."

In deploying IBM ILOG Inventory and Product Flow Analyst, the manufacturer adopted a phased approach to optimizing its inventory. "If the model advised cutting inventory by 30 percent at a particular node, we understood we couldn't do that overnight. The people at the site would never agree."

So the company devised a phased plan, agreed to by the site, to cut inventory by just 10 percent the first year. If that move succeeded, the site would take another 10 percent reduction the following year.

IBM ILOG Inventory and Product Flow Analyst gives the nutritional products firm the data it needs to develop an objective reference point as to what its supply chain inventory should be. "It takes some of the subjectivity out of the discussion because we can simulate the site," the executive says. "Without that, there's always an internal debate as to how we arrive at the optimal inventory plan for a node."

The solution also provides greater cross channel visibility. "We use it to see how long things are taking in each node, and in some cases, we were surprised," he continues. "One product, for example, was being manufactured in two very similar plants. One plant had a frozen period of 120 days, the other 60 days. The first plant obviously required significantly more raw material inventory than the second. Once we identified the discrepancy, we were able to take steps to reduce it."

“Using the inventory tool across our supply chain helps us streamline inventories while at the same time improving agility,” the VP concludes. “It helps us reduce the amount of working capital we have tied up in inventory globally, thereby improving our margins. Our analyses tell us that we can reduce inventory anywhere from 5 percent to 20 percent across the supply chain, depending on the product. That’s a huge savings.”

Major U.S. food manufacturer

Unpredictable U.S. consumer buying behavior is reshaping how one major U.S. food producer manages inventory in North America. “Consumers have become highly price sensitive at the expense of brand loyalty,” says the company’s strategic technology manager. “We’re seeing consumers bounce around from retail chain to retail chain depending on which has the best price. This makes it more challenging for us in deciding where and how much inventory to deploy to our customers.”

In the past, when consumers were predictable, the company produced product and pushed it downstream close to the customer. Fuel was \$20 a barrel, so it didn’t really matter if inventory was in the wrong location. The company just moved it.

Now, with freight costs so high and consumer behavior so unpredictable, the company has begun to hold product upstream as long as possible. “We need to be able to postpone deployment downstream as long as possible so we don’t end up with inventory at the wrong place,” the manager stresses. “This is not an inventory reduction strategy. We actually may increase safety stock, but we spend far less repositioning product. So it’s a net advantage.”

The food company uses IBM ILOG Inventory and Product Flow Analyst to help make these decisions regarding its network and inventory positioning.

The company began using the software as a standalone tool about seven years ago to analyze inventory at the strategic business unit level. But because the tool was not integrated into the manufacturer’s ERP system, analysts had to collect business unit data and manually enter it into the optimization tool – a highly time- and labor-intensive undertaking.

On a more operational level, the company used an internally developed spreadsheet to develop product-specific safety stock and inventory recommendations. “Using the spreadsheet to perform this analysis all the way down to product location was extremely labor intensive, so we only did this on an annual basis,” the technology manager recalls. “So if key drivers like forecast error or network change occurred after we completed that annual review, we couldn’t address them until the following year.”

Realizing it needed a better solution, three years ago, the manufacturer deployed operationally, and integrated it with its ERP system.

Today, the food-maker runs inventory optimizations monthly. In doing so, it can identify cycle changes in manufacturing, sourcing changes, or forecasting error rate reductions and react more quickly. “We can update our inventory and safety stock in a timely fashion – as opposed to waiting 18 months,” the manager says.

The company uses the solution’s “what if” simulation capability to model the impact of production and distribution change. “In the old world, if we talked about changing manufacturing cycles, for example, all we knew was that we’d incur plant changeover costs, so we’d drop it,” he explains. “We couldn’t articulate the impact on inventory to see if it offset the increased manufacturing costs. Now we can.”

The food company also uses the optimization tool to perform “backward engineering” on its supply chain. For instance, it can quantify the risk-reward trade-offs of changing service levels from 99 percent to 98 percent, and make more informed decisions.

“In a lot of companies,” the technology manager observes, “management just decrees a 10 percent reduction in inventory without any science behind the order. The impact on service isn’t always positive. Now we have the ability to assess exactly how an inventory reduction will impact service, and decide whether it’s something we really want to do.”

The company’s goal with the complete solution implementation was to reduce inventory levels by one day across the overall organization. “When we went fully

operational with the tool,” recalls the manager, “we got a two-day improvement. From a working capital perspective, that’s a \$5 million savings.”

By having the right stuff in the right place at the right time, the company has reduced unplanned manufacturing changeovers, which typically mean two days of lost production.

From a strategic perspective, the manufacturer views the optimization tool as a sound investment. “The ROI is well under the radar of most hurdle rates,” reports the manager. “We exceeded payback and continue to do so. There’s never been a doubt in our mind that the system is a good investment.”

The key was recognizing that inventory, even though it is an asset on the books, ties up cash that could be invested in the organization, to build new capabilities or expand the brand. “We wanted to free up working capital but not impact our service,” he concludes. “This tool allows us to do that.”

Anticipated benefits of smart inventory optimization and planning

As the companies profiled here and many others have found, smart, multi-echelon inventory optimization and planning can provide major bottom line benefits.

Reduced out-of-stocks across the supply chain

Because these solutions have visibility into almost every level of the supply chain and can analyze the impact of relevant factors on supply, manufacturing, and demand, they can anticipate problems like stock-outs and recommend action to prevent them and improve on-shelf availability.

Reduced working capital requirements

Multi-echelon inventory optimization technology can achieve leaner inventories and reduce total supply chain buffers. It can free up cash and reduce working capital requirements. Reductions of 10 percent to 25 percent are not uncommon.⁷

Permanently lean inventory across channels

Dynamic optimization constantly assesses buffer stocks and locations correlated to demand to permanently streamline supply chain inventory levels. One consumer goods manufacturer achieved a 30 percent reduction of finished goods inventory simply by using this technology to determine the optimal location of its buffers. At the same time, the technology’s ability to optimize by SKU helps enable companies to meet service, cost, and operational requirements with the least amount of inventory.

Improved demand forecasting

One of the critical inputs to inventory optimization is demand plans, forecasts and forecast errors. The interesting dynamic is that multi-echelon inventory optimization will allow the inventory to move with changing demand patterns. This kind of reassurance will lead to reduction of stock-outs in the supply chain, reduce alternate sourcing and expediting costs and in turn provide a clearer demand picture.

Improved decision making through cross-channel visibility

As more consumer products companies begin to sell their products through multiple channels – retail, catalog, and online, through intermediaries or direct-to-consumer – they need to be able to monitor, balance, and correctly allocate inventories when and where needed.

By considering locations in almost every echelon, smart inventory optimization tools have the numbers-crunching and analytics capabilities to handle this complexity. They minimize the chance of making decisions that benefit one channel to the detriment of another, or to the entire supply chain.

Operating cost savings

Multi-echelon inventory optimization helps enable organizations to gain “huge process-level efficiencies across the enterprise in a holistic manner,” says Ural. Companies frequently can reduce expedited transportation costs 20 to 50 percent, trim millions of dollars from global inventory pools, and realize other cost savings related to supply, production, distribution and service.⁸

Greater agility, adaptability, and responsiveness

Cross-channel, multi-echelon visibility – essentially, the ability to see supply chain activities across the entire supply chain – provides early warning of changing patterns of demand and supply. Companies can sense change sooner, and react more adeptly to manage it.

Improved margins and greater competitive advantage

Cash tied up in inventory cannot be used to finance growth or provide needed liquidity in tight markets. Inventory optimization can free up capital for investing in business growth.

Challenges to implementation

For supply chain executives, multi-echelon inventory optimization raises questions of a high-level, macro nature as well as nuts-and-bolts, technical matters. That was evident in the results of a 2011 survey of 225 supply chain executives on the subject of inventory optimization.⁹ When asked about barriers to more effective cross-network inventory management, respondents most frequently cited the following as “high” barriers:

- can’t optimize network holistically (55.9 percent)
- demand volatility (45.9 percent)
- functional silos (45.8 percent)
- technology integration (45.2 percent)
- misaligned metrics (44.6 percent)
- lack of visibility (41.8 percent)

Organizational challenges

Some of these barriers, including the inability to optimize holistically, lack of visibility, and demand volatility, could be mitigated by multi-echelon inventory optimization solutions. Indeed, these are the very problems the technology is designed to address.

But others are organizational in nature. Functional silos and misaligned metrics tied to individual node performance, as opposed to total supply chain performance are high on the list of issues that need to be addressed. When organizations (either within a company or within a single supply chain) establish key performance indicators and set associated rewards in isolation from one to another, they invariably face misaligned metrics that pit one function or supply chain node against another.

Cultural challenges

Implementing companies typically encounter some resistance, because inventory optimization brings with it major changes in inventory policies, processes, organization, governance, and the alignment of individuals and teams.

It’s not uncommon for inventory optimization solutions to reveal that long-held assumptions about inventory are wrong. For instance, managers at one Fortune 1000 manufacturer believed that reducing forecast error and migrating customers to longer service lead times would reduce inventory. But a multi-echelon inventory optimization analysis determined that these strategies would each reduce global inventory levels by less than 1 percent. The data-driven analysis identified other inventory drivers that would have a far more significant impact: revising positioning of inventory buffers (30 percent reduction), changing transit times (9 percent), changing shipment frequency (11 percent), and synchronizing manufacturing, distribution, and delivery (up to 19 percent, depending on the customer contract) (*Figure 4*).¹⁰

Driver	Impact	Driver suggested by
Reduced forecast error	<1 percent	Management assumption
Longer lead times to customer	<1 percent	Management assumption
Inventory positioning	30 percent	Global optimization
Synchronization	0 percent - 19 percent	Global optimization
Changing transit times	9 percent	Global optimization
Changing shipment frequency	11 percent	Global optimization

Figure 4: Inventory Optimization Discoveries – Fortune 1000 manufacturer

These challenges can be overcome through sound management practice, however. The forces of volatility and change compel consumer products companies to offer extensive product portfolios, faster time to market, reduced capital outlays and improved service levels. Combined with globalization and heightened supply chain complexity, these realities create significant inventory planning and management challenges for CP companies. By facilitating coordinated, smart inventory planning across the entire supply chain, inventory optimization can help reduce inventory and working capital costs and speed responsiveness to changing marketplace demands.

Conclusion

Consumer products manufacturers are being buffeted by volatility on an unprecedented scale. Changing consumer behavior, fragmenting marketplace channels, retailer service demands, supplier constraints, cost and margin pressures, production challenges, changing demographics, emerging markets are just some of the pressures conspiring to eat into profitability and performance.

Fortunately, smart inventory optimization tools offer a new, important weapon CP manufacturers can use to tackle these challenges. The tools are proven. They produce significant savings across the supply chain, as the examples and case studies in this white paper illustrate. At the same time, they help enable companies to meet changing customer service demands cost effectively and responsively.

Ultimately, inventory optimization tools help free up capital and resources for more productive uses – growing the company, improving the bottom line, cementing customer and consumer relationships and anticipating the future.



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