

White Paper

Winning the Inventory Battle in Consumer Electronics



Executive Summary

In the electronics industry, product shelf lives are short and, according to Gartner, the greatest margin occurs during a successful product launch. So it's not surprising that consumer electronics SKUs are proliferating, as are the channels, customers and locations through which these products must be distributed. But 50% of new product introductions fail to achieve success and almost half of those failures are due to initial misreads of market expectations. Why? From a supply chain standpoint the battle for profitability turns largely on two key disciplines: accurate demand planning and effective inventory optimization.

The threats to success are significant in an industry where the profitable period of a product's lifespan may be as short as three months. Forecasts must often be generated with insufficient precedents. Global sourcing and contract manufacturing push lead times longer and supply variability higher. Launching products into conditions of uncertain demand can result in too much safety stock and over-reactive inventory adjustments that sap profitability. Service parts for big-ticket electronics items further complicate the plan. These and other factors make it difficult to optimize inventory levels for every SKU location in the network. There is seldom a chance to "make it up later" because short product life spans leave less time for error correction, and soon it's too late to recoup lost revenue or avoid obsolescence costs. That's why planners feel they have to hit it right from the start. But, according to Gartner, only 65% of forecasts are accurate and 75% of new products fall short of forecast expectations.

Consumer electronics manufacturers can improve their odds during the short-lived "product moment of truth" with better demand planning and Multi-Echelon Inventory Optimization [MEIO]. Mastering these disciplines yields big benefits. According to Gartner, companies that do a better job forecasting demand carry 15% less inventory, have 17% stronger order fulfillment, and 35% shorter cash-to-cash cycle times. It is estimated that a 5% improvement in forecast accuracy yields a 10% improvement in perfect orders [and every 3% improvement in perfect orders increases profit margin by 1%].

The motivation is clear. Leading consumer electronics companies must continually drive their demand planning and inventory optimization expertise to new levels of effectiveness.



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Leading electronics companies use collaborative forecasting with key suppliers to build both consensus and trust regarding safety stock requirements to achieve contracted service levels.

Better Forecasting Sets the Stage for Success

Forecasting over the lifetime of long-lived products can be optimized by using multiple forecasting methods to tune performance at different phases the product life cycle. The goal is to pick effective models and shift between them as the product life cycle progresses to keep forecast accuracy at its peak. A powerful statistical forecasting strategy requires flexible features such as trend, seasonal-with-trend, moving average and low-level pattern fitting, as well as trend models for products with sporadic, low-volume demand. Limiting and damping, as well as seasonal smoothing, demand filtering, reasonability tests, and tracking signals are important.

By contrast, in the consumer electronics industry missing the market by even one quarter may mean missing it permanently. It often takes longer to design, develop and manufacture a new product than the item's entire life cycle. Outsourcing critical electronic components to contract manufacturers creates long lead times, and creates another risk factor: supplier-held inventory is hard to control. Sales predictions may span thousands of SKUs with wide-ranging shelf lives and differing specifications for capacity, capability, performance and feature sets.

Normally, the aggregated demand history for a product family, brand category, country and/or selling region serves as a good predictor of future performance when forecasting SKUs. When there are more than four-to-six periods of sales history, SKUs can be effectively forecast using moving average and basic trend methods. SKUs with at least one year of sales history offer sufficient information to incorporate a seasonal profile into the projected trend.

But new products with long lead times and short shelf lives pose a special challenge. Planners are navigating without a map and have very little time for mid-course corrections between product launch and end-of-life. Quantitative forecasts based on insufficient historical data fall short, and experience-driven qualitative models are only as good as the subjective inputs of personnel such as salespeople and account managers.

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Action Item: Use hybrid forecasting methods that draw insights from historical demand information for related products, as well as predictive models based on product attribute profiles.

Derived Modeling

Generating new product forecasts using demand variations or extensions from existing products, families or brands, is derived modeling. This approach can provide a realistic forecast, if it is combined with good judgment and insightful overrides to accommodate introductory promotions and other factors. Derived modeling assigns new products a percentage of the parent, family and/or brand. The new product proportionately inherits a forecast that contains the base, trend and seasonal elements of the associated category. As the forecast for the associated category is adjusted to reflect changing conditions over time, the new product's derived forecast changes, too.

Once the new product has accumulated sufficient demand history of its own, the link to the derived model's source model can be severed and switched to the forecasting technique that best fits market conditions. The short product life may call for the forecast to accommodate demand shaping initiatives such as promotions, discounting, and channel rebalancing to precipitate desired buyer behavior.

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Action Item: Expect every derived product's point-of-sales [POS] or demand levels to deviate from the forecast. Analysts need an exception-based demand planning solution in which user-defined tolerances are set. The system generates alerts when it's necessary to take corrective action. Exception-based workflow saves hundreds of hours of planner time and frees up resources to focus on high-value planning activities.

Attribute-based Forecast Models

When relevant historical demand data is scarce or nonexistent, planners can employ attribute-based modeling, which works from historical sell-in and sell-through data reflecting a variety of demand and seasonal profiles. The forecast is patterned after the profile that best characterizes the product and is assigned to individual planning records. As actual demand information is captured, the profile is validated or alternate profiles identified to dynamically adjust the product's plan.

Attribute-based modeling consists of four unique processes.

Attribute-based modeling uses demand profiles in place of direct historical sales data.

1 Creation of Demand Profiles

Creation of demand profiles is based on mathematical concepts known as Chi-squared analysis. The demand planner selects products to be included based on attributes such as color, type, region, etc. Multiple attributes can be applied simultaneously.

2 Assigning Demand Profiles

New products can now be assigned to Demand Profiles. It's vital that planners be able to set criteria for how a new product's attributes must match the attributes of a demand profile.

3 Automatic Revision of the Forecast Based on Demand Signals

Forecast accuracy must be monitored continually through vehicles like Point-of-Sale [POS] data [the demand signal that most accurately reflects customer buying patterns] and syndicated data to check the accuracy of the forecast. Correctness-of-fit modeling adjusts the forecast to reflect what is happening in the marketplace.

4 Assess Accuracy of Demand Profile Based on Demand Signals

In a perfect world, demand profiles, once set, would never need adjusting—new products would sell just like other products with similar attributes. In the real world, POS and other demand signal feedback should be used to assess how well the current demand profile fits versus other demand profiles that have similar attributes. Relative-Error-Index [REI] calculations let planners see which demand profile now has the most accurate fit based on current demand trends. The current demand profile is swapped out for the profile that has the lowest REI attributes can be applied simultaneously.

Collaborative Forecasting with Suppliers

Consumer electronics leads all industries in outsourcing critical high-cost components to contract manufacturers around the world. Operations teams are often faced with the challenge of managing supply chains they do not own. Miscommunications or mistakes involving suppliers often cannot be “made up” in time to recover lost sales and repair lost customer loyalty.

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From a product launch standpoint, the team strategically models different launch scenarios [generating a high-moderate-low forecast], then runs through the model to see where constraint points are, what volumes are, and to determine the investment needed, which determines the capital investment required. A monthly demand forecast drives inventory targets, and planners create weekly manufacturing plans to drive fabrication, assembly-test, and finish work.

Consumer Electronics product introduction advice:

- **Use attribute-based forecasting to calibrate product launches**
- **Put inventory optimization to work across your entire supply chain, from suppliers to DCs**
- **Get serious about demand shaping and promotion planning**
- **Redefine collaboration by reaching out to suppliers and retail partners**
- **Strive for greater inventory visibility everywhere it hides**
- **Plan your business to service key customers**



Action Item: Adopt a forecasting and inventory optimization solution that can accurately model multiple supply chain stages across multiple manufacturing and distribution organizations. The system should support and encourage visibility and collaboration with customers, suppliers and logistics partners, presenting a “non-silo’d” view of the supply chain so that everyone understands how much stock suppliers have to hold in order to meet their commitments. This takes emotion out of the process.

Customer Segmentation and Channel-specific Demand Planning

Successful consumer electronics supply chains focus on a system and a process that serves high-priority channels and top customers well. Forecasting and inventory policies should be differentiated for ABC channels and customers to maximize service for the highest value, most profitable segments.

Demand Shaping for New Product Introductions

Within the shortened “sweet spot” of the typical consumer electronics product life cycle, planners must be quick and confident in making mid-course corrections to increase sales and minimize obsolescence. For products not getting traction in the marketplace, sell through data drives recommendations for relocating product from one channel to another, price cutting, bundling, advertising, and other marketing techniques that shape demand in response to real-world conditions.

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To evaluate the profitability and operational impact of multiple demand-shaping scenarios, leading consumer electronics teams use a neural network engine fine-tuned by marketing intelligence. The neural network simulates the effects of multiple marketing strategies and applies the calculated lift to the base forecast.

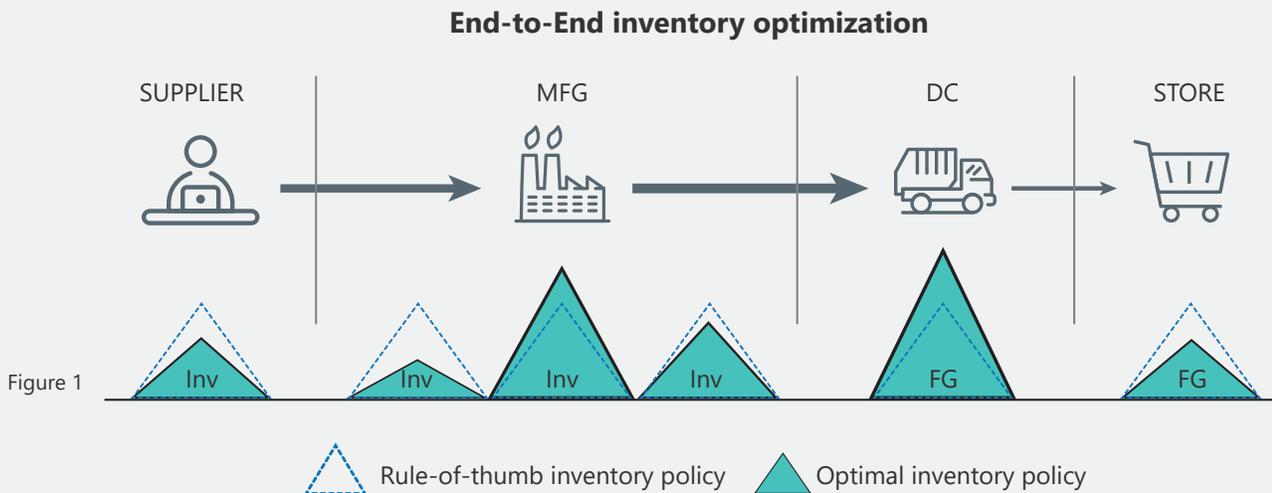


Action Item: Work with a forecasting solution that tracks actual sales vs. forecast and alerts planners when items move outside of pre-determined tolerance levels. The system must be able to perceive the effects of promotional lifts so that false alerts are not generated.

Multi-Echelon Inventory Optimization Sets Targets Better than People Do

Modeling inventory behavior across the end-to-end supply chain—from suppliers to distribution center—is a core benefit of Multi-Echelon Inventory Optimization [MEIO] [Figure 1]. MEIO looks at all safety stocks throughout the stages and locations of the supply chain and analyzes lead times, costs, and many other factors. The MEIO system recommends amounts and placements of inventory buffers to minimize inventory cost while achieving required service levels at launch and throughout the lifespan of the product. Postponement strategies allow more stock to be held at lower-cost stages of manufacturing, before major value-add steps are performed.

MEIO-driven inventory targets outperform rules of thumb, and also significantly surpass results achieved using single-stage inventory optimization. Figure 2 shows how a major US electronics manufacturer that had developed and successfully implemented a single-stage optimization program dramatically improved service level performance by turning to MEIO.



MEIO inventory targets outperform manually adjusted targets

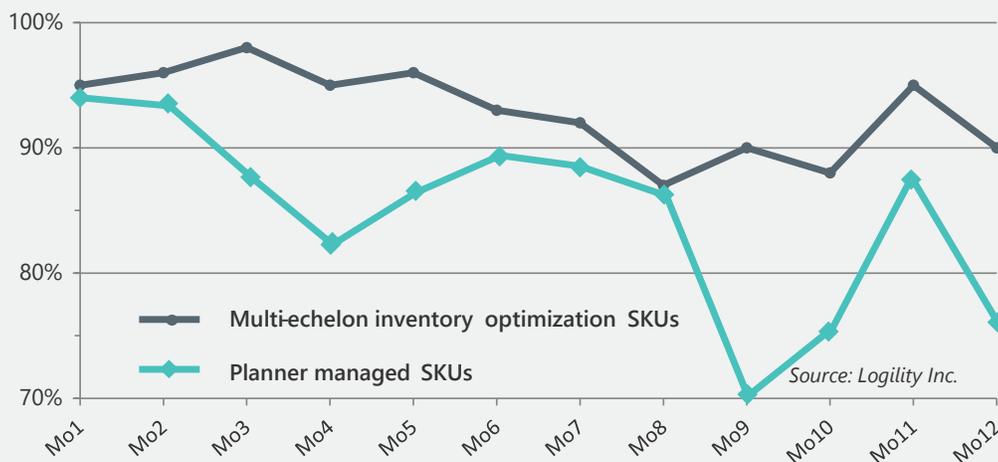
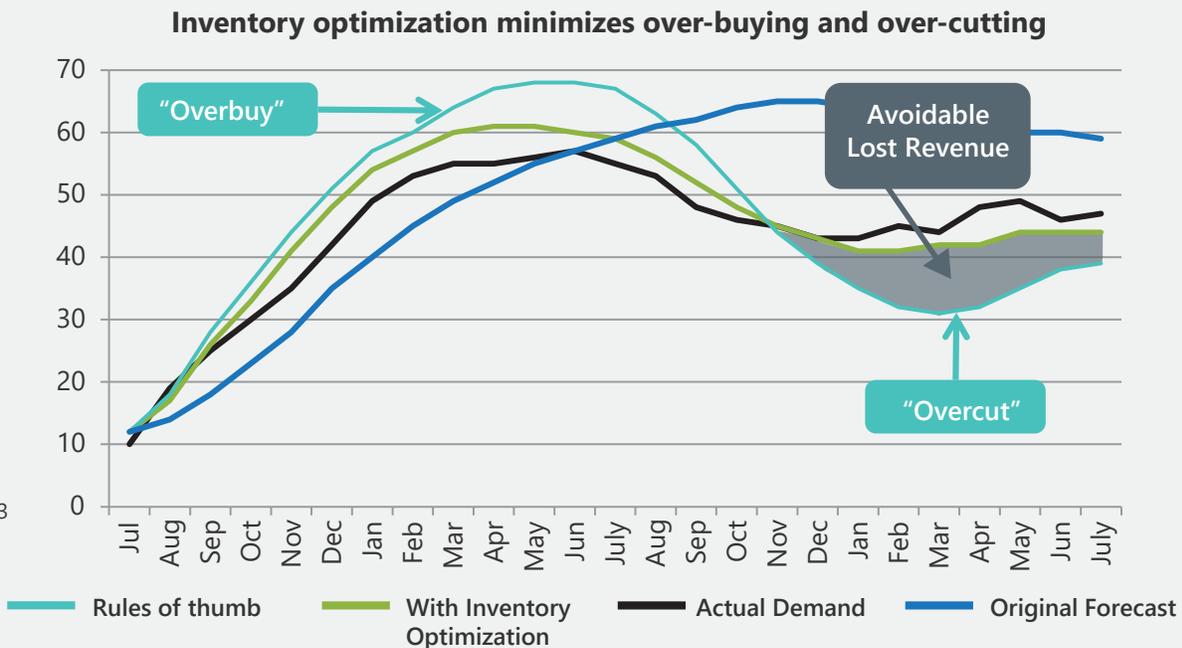


Figure 2

Mastering Demand Uncertainty to Prevent Over-buying and Over-cutting

After product launch, a crucial factor in maximizing lifetime profitability is continually right-sizing inventory. Too much inventory creates excessive discounting, obsolescence and write-offs. Too little inventory or inventory in the wrong location causes missed sales revenue. There are several classes of inventory, such as cycle stock, prebuild stock, promotion stock and others, but safety stock is the most difficult to optimize. To prevail over demand uncertainty, planners must be confident they know the best amount of inventory to build and just where to position it.

MEIO solutions handle uncertain demand better than rules-of-thumb, ERP or advanced planning and scheduling [APS] systems [which do not take variability into account]. By recognizing the interrelationships between supply chain stages, MEIO can react more quickly to real-time demand signals and recommend holistic inventory adjustments across the entire network. Only an inventory optimization solution can “process the uncertainty” of demand in a time-phased forecast spanning months, with different phases displaying different levels of uncertainty. [Figure 3]



Action Item: Evolve from single-stage optimization toward an MEIO process with monthly target reviews. Exception-based target setting is key, with alerts guiding planners to the SKUs that are deviating from plan. Strategic inventory policies can be established to achieve an optimal trade-off between inventory costs and service level for all classes of products and customers.

Conclusion: Two Key Weapons in the Battle Two Key Weapons in the Battle Against Inventory Excess

First, with their short life cycles, demand uncertainty, and forecasting difficulties, high-ticket consumer electronics products pose a special challenge to supply chain teams. Demand planners need hybrid forecasting methods that mix related historical demand with real-time empirical data to tune forecasts to market demand.

A derived modeling approach proportionately inherits a forecast from related products, containing the base, trend and seasonal elements of the associated category. The new product's derived forecast changes as the forecast for the associated category is adjusted.

Attribute-based modeling works from a variety of demand profiles built on historical sell-in and sell-through data. A forecast is patterned after the profile that best characterizes the product [the number of profiles required is smaller than one might expect—perhaps only a dozen].

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A second key to maximizing profitability for consumer electronics products is Multi-Echelon Inventory Optimization [MEIO]. MEIO-driven inventory targets outperform rules of thumb and dramatically exceed the service level performance of single-stage inventory optimization. MEIO solutions handle uncertain demand better than rules-of-thumb, ERP or APS systems.

As a result, MEIO reduces over-buying and over-cutting of inventory by taking the emotion out of the equation and recommending holistic inventory adjustments across the entire supply chain. MEIO may recommend increasing safety stocks in some locations, but reduces overall inventory to the minimum amount necessary to meet service level goals.



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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