

Long Term Inventory Planning: Identifying the Path to Optimal Inventory Through Modeling

As increasingly advanced tools become available, optimal inventory planning is becoming not only possible, but essential for retailers. Even today, many retailers rely on a merchandise planner's past experience and gut feel to determine not only the rate at which a product will sell, but also the rate at which they will buy. Driven by top-down, growth-focused forecasts, this frequently results in bloated inventory levels and deep discounting to move unwanted product.

This method can be drastically improved by understanding, and accounting for, the unique business constraints faced. TCS has helped a number of retailers do precisely this, resulting in decreased costs, increased margins and increased total sales. Remember selling generates revenues, but proper buying generates profit.

About the Author

Rahul Mittal

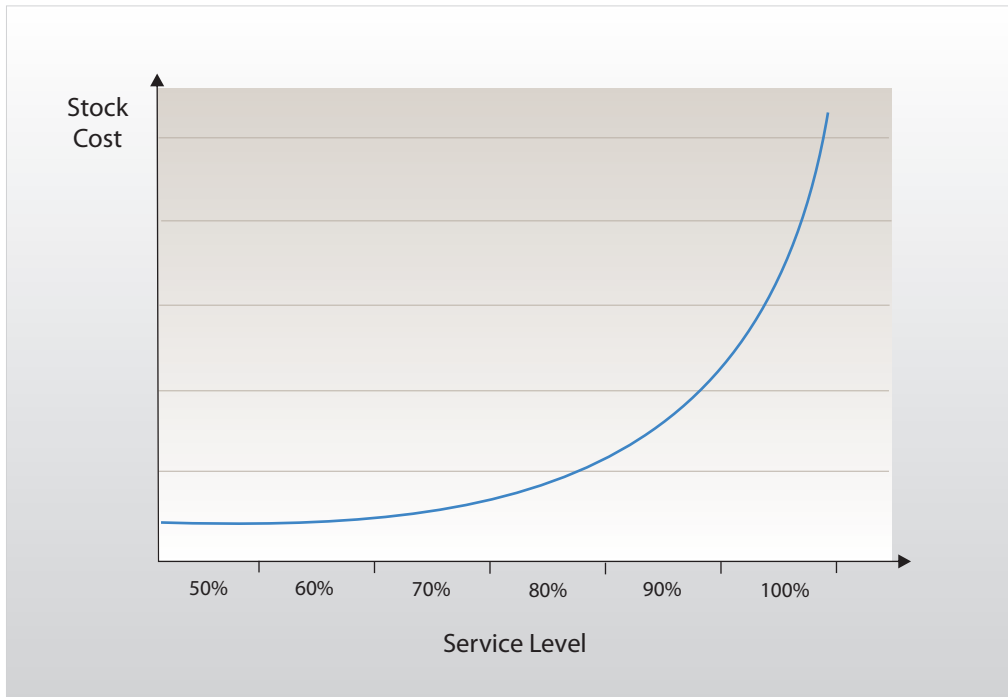
Rahul Mittal is a senior member of TCS Retail Supply Chain Practice. He focuses on Retail Inventory Management domain. He specializes in managing retail inventory reduction initiatives to help large retail organizations realize quick working capital improvements by pulling inventory relevant inventory levers that results in significant inventory savings. He comes from a comprehensive US based management consulting profile with strong experience in retail supply chain.

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Understanding the “Optimal” Inventory Level

Retailers strive to deliver an optimal level of service to their customers. However, “optimal” does not always mean “best” when it comes to in-stock percentage. Typically, the higher the service level is targeted to be, the higher the associated inventory level will be. Raising inventory levels offers decreasing returns to in-stock percentage, with 100% in-stock being enormously inefficient, if not impossible, to achieve.



The desire to keep inventories as low as possible is compounded by the high carrying cost of inventory. Inventory carrying costs are often estimated to be as high as 30-40% of the total inventory value. The capital used to purchase this inventory is unnecessarily tied up, and could be better leveraged in higher return initiatives.

While surplus inventory is costly, low in-stock rates can be even more damaging. They result not only in the short term loss of sales, but the company’s reputation may also be damaged in the long term, creating lost sales opportunities. This means that the business must balance a number of factors when determining the “optimal” level of service for any given product. Striking the best balance between inventory and customer satisfaction will result in the “optimal” inventory level for each product.

Understanding the Levers

When striving to optimize inventory levels, retailers face a unique set of constraints. These are best categorized by the point at which they occur: vendor, retailer or customer.

Vendor Constraints – Includes Lead Time and Minimum Order Quantity (MOQ). Lead Time is the duration from order receipt by the vendor to product receipt by the retailer. MOQ is the smallest batch size that a supplier will produce and ship.

Retailer Constraints – Includes the Assortment List, Case Pack Size (CPS), DC to Store Lead Time, Minimum Presentation Quantity (MPQ), and Service Level. The Assortment List includes all of the active items that represent a single book of business. CPS is the minimum number of units that can be shipped from the DC to the store. DC to Store Lead Time is the required time from order receipt at the DC to product receipt at the store. MPQ is the desired quantity visible to the customer at each store. Service Level is the desired store in-stock percentage for a given item.

Customer Constraints – The largest customer constraint demand, the rate at which customers will purchase a given product. For inventory planning, we capture this as Forecasted Sales.

Any one of these constraints can adversely affect total inventory levels, but working together they have an incremental affect that can drastically inflate total inventory. For instance, see the example below detailing how a supply chain can easily end up with over twice the inventory needed.

Case In Point

If a 1,500 outlet retailer forecasted that Item X will sell 6 units per store, it would have to order 9,000 units of X to fulfill predicted demand.

Forecast Demand: 6 units per store

Total Demand: $6 * 1,500 = 9,000$

Unfortunately, a number of factors frequently combine to increase the buy above 9,000 units. These include Case Pack Size and Minimum Order Quantity. Case pack is the number of items in a case, which is generally sent directly to the store. Vendors want large case-pack quantities to lower packaging costs and increase shelf space. Running a production is costly, thus vendors also set a minimum order quantity (MOQ) for retailers. In this example, let's assume the vendor makes item X in packs of 8. In other words, the retailer can only order in multiples of 8. Each store will have 2 extra item X.

Case Pack: 8 units

Revised order quantity due to Case Pack: $8 * 1,500 = 12,000$

Total extra units of item X: $(8-6) * 1,500 = 3,000$

% increase in inventory due to Case Pack = $3,000 / 9,000 = 33.33\%$

In addition, the vendor has a minimum order quantity of 24,000 units.

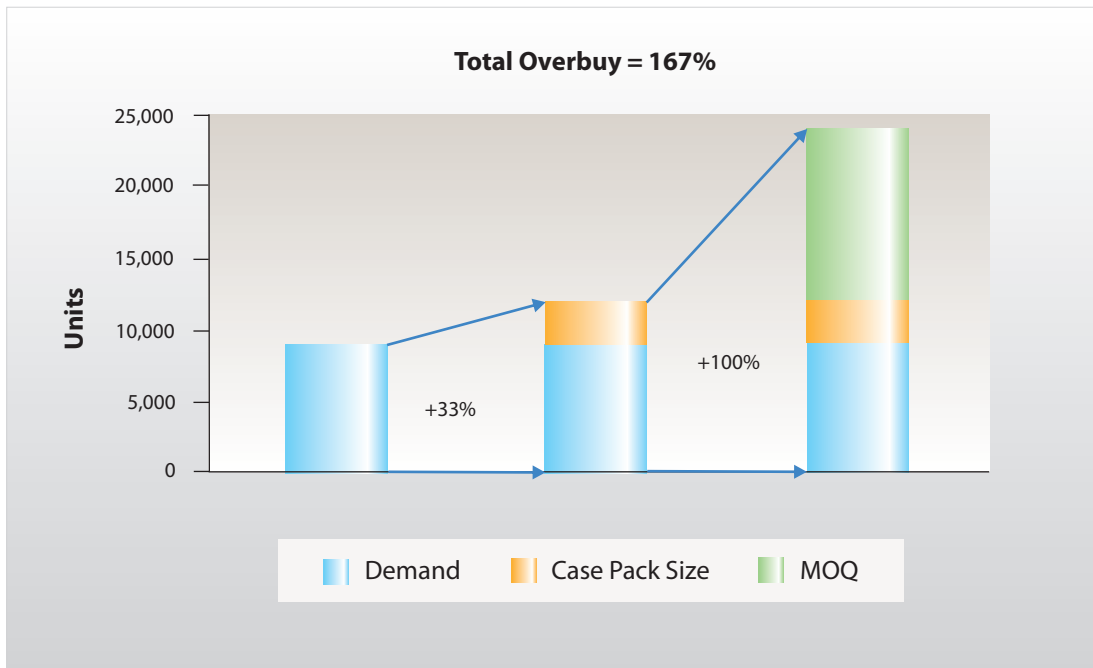
Revised order quantity due to Minimum order quantity: 24,000

% increase in inventory due to MOQ = 100%

As a result, the retailer has to order much more inventory than needed.

% inventory overbought = $(24,000 - 9,000) / 9,000 = 167\%$

From this example, we can see that MOQ is a much larger driver of increased inventory, as compared to Case Pack. In other situations, the reverse could be true. Additionally, this example only accounts for two of the 8 constraints identified by TCS. It is essential that retailers understand which constraint has the greatest influence on inventory level for a given product, and optimize them to the extent possible.



The above example highlights how inventories can quickly become overstuffed without the retailer noticing. To mitigate this risk, it is essential to pinpoint the factors heavily influencing inventory, minimum order quantity and case pack size in the example above. Scenario based inventory analysis can identify the optimal levels for each of these factors. Retailers must then collaborate and negotiate with business partners, both internal and external, to minimize these constraints. Using the example above, reducing only the minimum order quantity from 24,000 to 15,000 units would result in a 38% decrease in inventory overage.

The Benefits to Be Gained

There are both short and long term benefits to optimal inventory planning. Short term benefits include: inventory reduction, supply chain visibility, product segmentation and store segmentation:

Inventory Reduction – An immediate decrease inventory frees up capital for other investments, ranging from additional inventory of fast moving items to new stores and distribution facilities.

Supply Chain Visibility – Insight into the location and quantity of inventory along the supply chain provides opportunities for rationalization of both inventory levels and flow.

Product Segmentation – Not all products have the same impact on the business, and understanding which have the greatest impact on sales and margin allows a retailer to focus its attention in the most important areas.

Store Segmentation – Much like products, not all stores have the same impact on the business, and understanding which stores have the greatest impact will allow the retailer to prioritize product distribution.

As short term benefits are realized, long term benefits can begin to take shape. The long term benefits can include: Assortment Rationalization, Efficient Ordering Quantity and Strategic Supplier Selection and Evaluation.

Assortment Rationalization – Understanding an article's contribution to sales and margin, as well as its impact on company strategy, creates an opportunity for educated decisions around which items to continue and discontinue.

Efficient Order Quantity – Ordering in the most efficient quantity can positively impact inventory levels. Knowing this quantity on an article by article basis will create an opportunity to negotiate with suppliers to obtain the most favorable order quantities without increased costs.

Supplier Selection and Collaboration – Understanding which levers drive your inventory costs allows for better selection criteria and collaboration. A supplier switch may drastically reduce total costs, even though their cost per unit is slightly higher.

TCS' Industry Perspective and How We Can Help

Understanding and optimizing inventory levels has been, and will continue to be, one of the most important success factors in the volatile retail market. Retailers must not only understand their inventory drivers, but also determine the optimal balance between inventory and service levels on a product by product basis. Based on our extensive experience with leading retailers, TCS can help.

Inventory Modeling – TCS has designed and developed a unique modeling methodology to identify key inventory drivers, understand the optimal inventory level for each product and identify the steps needed to reach that level.

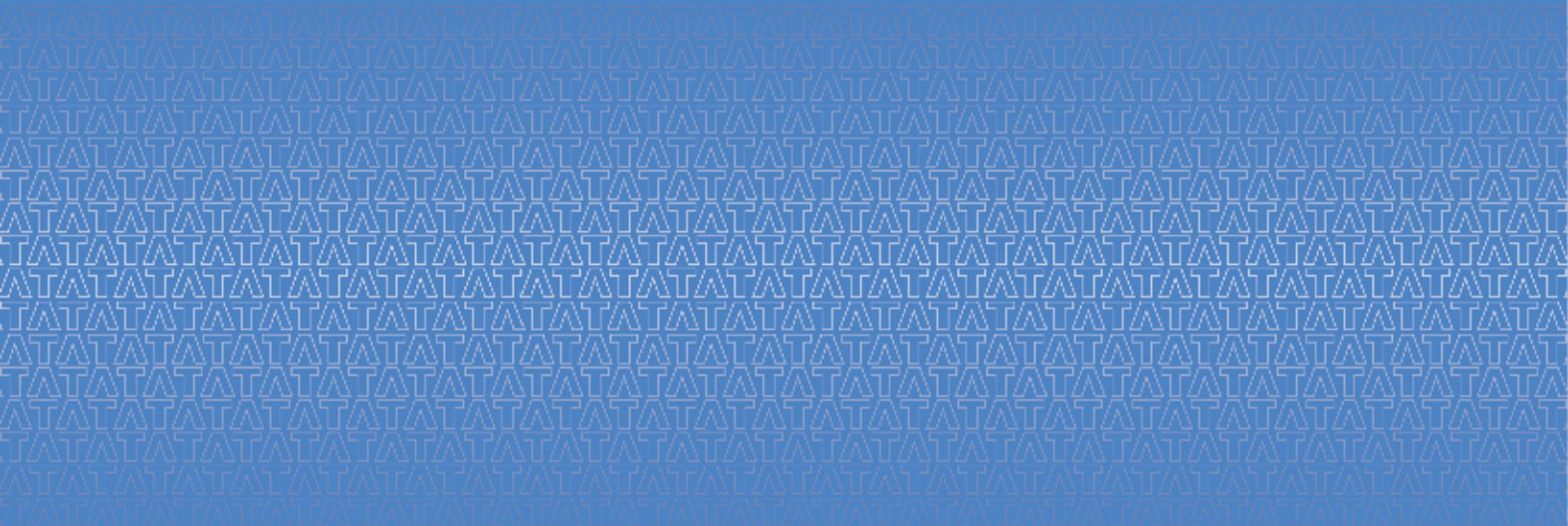
Supply Chain Strategy – Recognized by Analysts as a top four supply chain services provider, TCS combines its expertise and experience to turn the modeling recommendations into quantifiable business benefits.

Application Development & Integration – Solves critical business and technology problems by developing custom software. Our collaborative methods, efficient development techniques, and alliances with top technology companies allow us to develop high-quality software solutions quickly and cost effectively.

Systems Integration – Applications and business processes must often span systems and enterprises to create real value. Our systems integration teams help clients move in an incremental, pragmatic way—away from the ad-hoc integration patterns of the past towards a well-planned future.

Organizational Change Management – Like any initiative, it is imperative to have team members onboard. Our OCM practice has the experience to ensure that new processes and systems are adopted, and the benefits are derived.

Retail Transformation – We have extensive experience assisting leading retailers with large-scale transformation. Today's winners have adjusted to today's market realities. TCS' structured approach will assess the readiness of your organization, technology infrastructure and process to develop a comprehensive plan to take your organization to the next level.



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A part of the Tata Group, India's largest industrial conglomerate, TCS has over 143,000 of the world's best trained IT consultants in 42 countries. The company generated consolidated revenues of US \$6 billion for fiscal year ended 31 March 2009 and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

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Contact us at
retail.solutions@tcs.com

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