

What We Did: Enabled inventory managers at a specialty retailer to set optimal stock levels for over 30 million store-SKUs

The Impact We Made: Increased sales by 3% while releasing over \$40 million worth of inventory from stores

Summary - Reducing lost sales

Legacy inventory planning systems failed to predict demand patterns and set the right stock levels in stores leading to loss of sales and excess inventory levels. Mu Sigma collaborated with a large retailer to set inventory levels for over 30 million store-SKU combinations. This solution was integrated with the client's IT systems and is used to compute safety stock and set re-order policies for stores to reach desired customer service levels. This unique simulation-based approach resulted in significant business value by reducing lost sales and the overall amount of inventory stocked in stores.

About The Client - Leading specialty retailer

The client is one of the world's largest retailers and specializes in home improvement and construction products & services.

The Challenge - Inefficient replenishment methodology

The client was facing severe lost sales and high inventory holding costs because of poor demand planning and inefficient replenishment policies. Legacy systems and packaged solutions that were being used operated under various assumptions to calculate inventory levels in stores. These assumptions were not applicable for specialty retailers whose assortment primarily consisted of slow-movers and serviced different customer segments.

The Approach - Agent based business simulation

An exploratory analysis of demand patterns validated the hypothesis that inventory planning was inefficient because the assortment consisted of slow moving items that were purchased in varying pack sizes. Further exploration led to the following insights:

- Significant seasonality in demand patterns, which varied across product categories

- Difference in customer behavior during week days and weekends
- High variance in supplier performance and lead times
- Significant difference in demand between regular customers and contractors who purchased in bulk

These findings led to discussions with business around developing an improved module to plan inventory policies and safety stock levels across 3,000 stores for select product categories.

An innovative approach with strong emphasis on first principle thinking was used to develop a custom solution for the home improvement client.

- A host of demand and supply metrics were used to classify item-store combinations based on historical patterns
- Standard best practices were abolished and discrete event simulation models were used to overlay demand and supply patterns to generate probabilistic demand scenarios
- These scenarios were used to define new inventory policies and set safety stock as per desired customer service levels
- Algorithms were validated by using an order simulator, which replicated the ordering process while adhering to a variety of systemic and vendor constraints
- Results from preliminary models were tested in stores and indicated significant drops in lost sales and in-stock levels
- This custom algorithm was automated and integrated with the client's legacy system; simulations were pre-run and parameters were loaded to the retailer's database to scale implementation to over 30 million item-store combinations

The Outcome - Increased sales

- Today, this solution is consumed on a daily basis to look up item attributes and fetch appropriate inventory levels based on future estimated demand
- Migrating to this novel approach of setting inventory levels resulted in 3% increase in sales and close to \$40MM reduction in inventory levels across all stores
- This also resulted in a 50% reduction in manual effort that was being spent by category managers and demand planners to override existing inventory policies

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