**CASE STUDY**

Enhancing Inventory Planning Using Machine Learning | A Quantzig Success Story

Inventory management is a common problem area in supply chain management. To address this issue, maintaining optimal inventory levels to fulfill customer demands at all times is crucial. Meanwhile, it's also important to note that inventories have holding costs that can be lost if the inventory remains frozen for a prolonged period. This is where effective **inventory planning solutions** come into the picture. Inventory planning aims to help find the optimal inventory level required to fulfill the demand while avoiding overstocks.
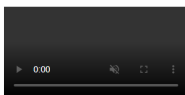
Inventory planning is a holistic approach that aims to help businesses strike the right balance between customer service levels, product availability, and the cost of inventory maintenance. Several reasons make effective inventory planning and management crucial from a business viewpoint:

1. The growing need to meet anticipated demand
2. Dynamic production requirements
3. To prevent stock-outs through inventory planning
4. The need to take advantage of order cycles and quantity discounts
5. To evade price increase with real-time inventory tracking
6. To decouple components of the production-distribution system

Having analyzed its benefits, it's clear that inventory management is a financial trade-off between inventory costs and stock-out costs. The more the stocks, more working capital is needed to maintain them, and the more significant will be the impact of stock depreciation. On the other hand, not maintaining optimal stocks will lead to inventory stock-outs, missing potential sales, possibly interrupting the whole production process.

Case in Point – How Inventory Planning Strengthened Service Levels for an FMCG Client

Challenge

An FMCG company was looking to leverage the power of machine learning to optimize inventory levels at each distribution center to improve their fill rate and ROI.

Objective

Right-sizing inventories have proven to produce financial benefits in excess of several millions of dollars annually for FMCG, thereby increasing the return on inventory investment. However, accomplishing this in itself can be a challenging task filled with complexities if you lack inventory visibility and the right inventory planning solutions for segmenting your inventory system and building optimal inventory tracking plans that take into consideration factors like demand variance, supply reliability, and market demand.

Our approach

The key factors that define the success of an inventory planning process are safety stock levels and order replenishment levels since these two parameters control the critical factors in a supply chain, i.e., the amount of inventory and the ability to maintain favorable service levels. Hence we adopted a comprehensive inventory planning approach that helped the client analyze replenishment planning cycles, achieve optimal safety stock levels, forecast demand, and track inventory in real-time.

High inventory holding costs are an outcome of several factors that include demand variability, order frequency, suppl lead time, and service levels. A detailed understanding of these factors can help businesses avoid employing the wrong policies, which can impact business performance. To gain detailed insights into the impact of these factors on your business- Request a free proposal.

Data from various sources were leveraged for analysis, including sales, inventory, warehouse data, and other supply chain data sets.

Time period: Three years

Sales data: Weekly sales data from the distribution center to the dealer at the SKU-distribution center were considered for the given period in this analysis.

Supplier data: It included supplier level information for each SKU at the regional level.

Inventory data: Weekly snapshot of in-hand inventory and data on inventory levels at distribution centers, including safety stock levels, were leveraged for analysis.

The inventory planning solutions offered by our experts helped the client to leverage historical data sets to determine demand variability and gauge the optimal inventory required to meet their target service levels. *Request more information* on inventory planning to understand its benefits from a supply chain viewpoint.

Outcome

Our experts leveraged machine learning algorithms and statistical methods to drive process improvements across the supply chain. We also helped the client pre-process the time-series data on demand, supply, and supply lead-time to compute the mean and standard deviation of these series. This, in turn, helped them achieve a **37%** uplift in **service levels** by accurately predicting the optimal inventory and safety stock levels.

Insights and recommendations on improving the following decision parameters were also provided –

- Optimal safety stock levels
- Reorder levels
- Order up-to levels (OUTL)
- Order quantities for the fixed order quantity scenarios