How Data Improves Inventory Decisions

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Executive Summary

This analysis was conducted for a retail company that manages and distributes a wide range of products through multiple warehouses.

By examining historical order data, we aimed to support smarter inventory decisions by identifying demand patterns across products, time periods, and warehouse locations.

The goal is to help the company answer essential questions like:

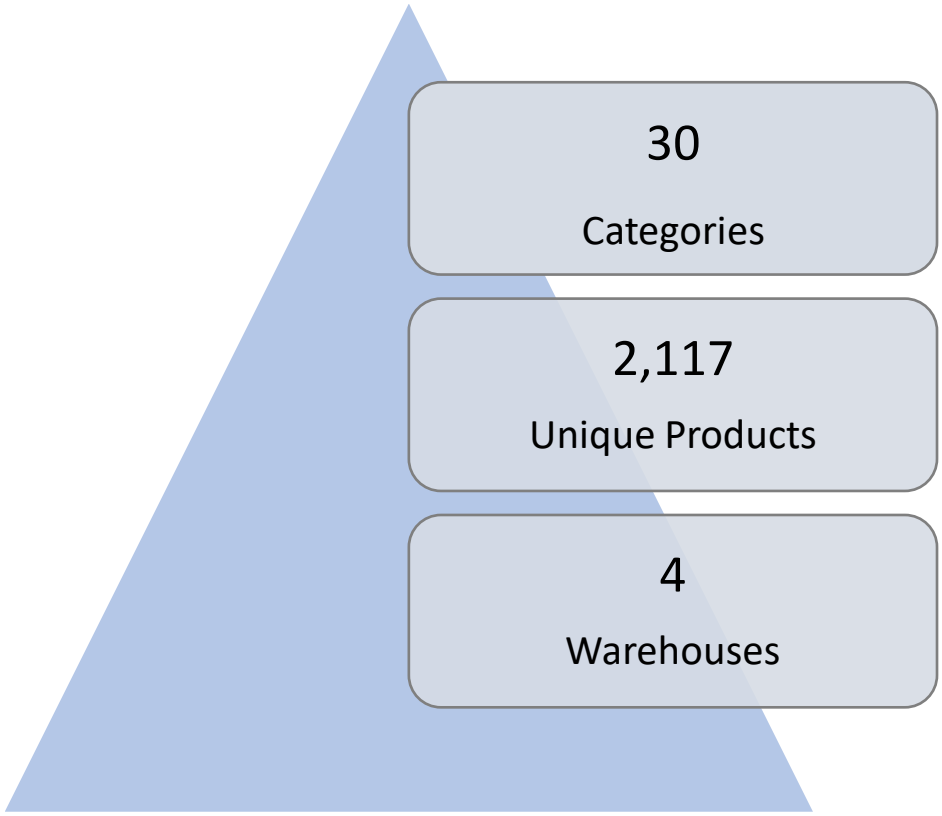
- Which high-demand products should be prioritized to ensure availability and reduce lost sales?
- Which warehouses require which items during which months?
- How can storage space and operational costs be optimized?

With these insights, the company can reduce excess stock, avoid shortages, and build a more efficient and responsive inventory system powered by data.

Objective & Dataset Overview

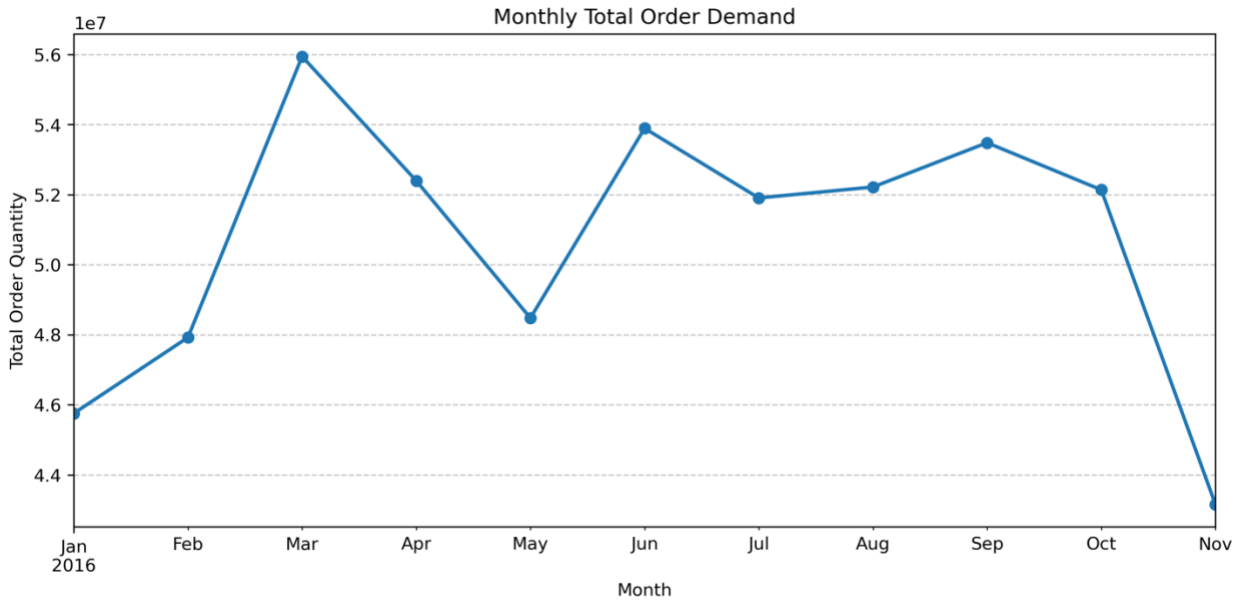
Objective:
To explore historical order behavior and guide smarter inventory decisions for the company.

Dataset Details:



Timeframe: Jan 3, 2016 – Nov 23, 2016

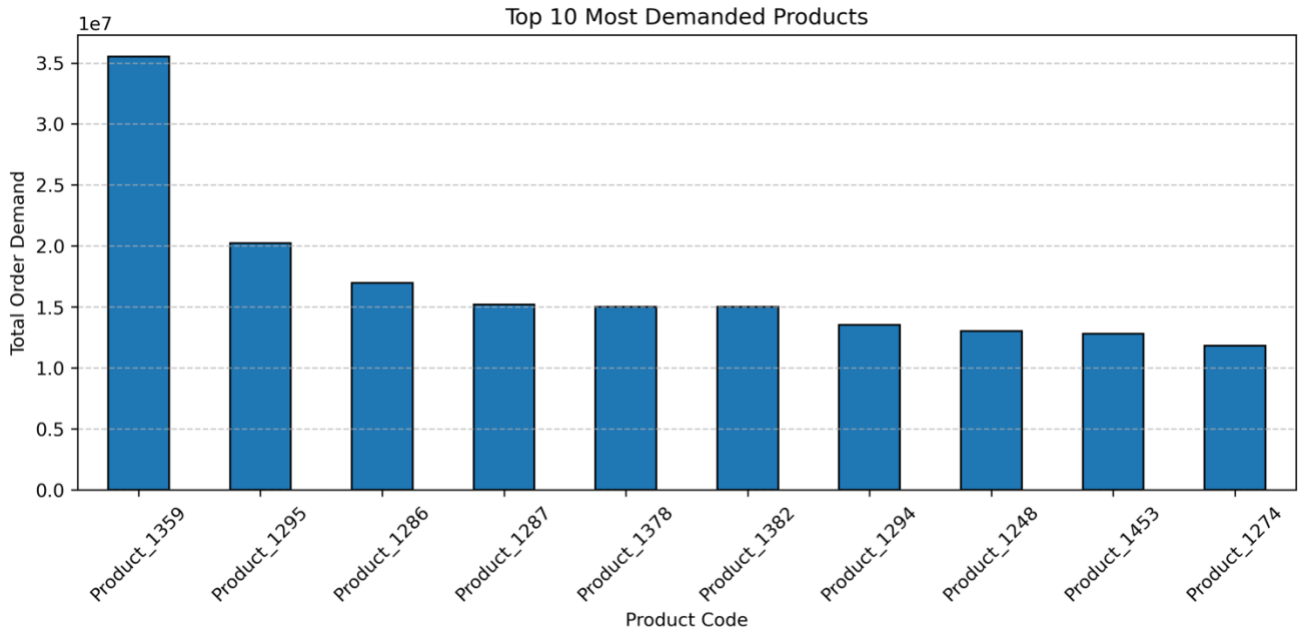
Monthly Demand Trend



Key Insights:

- **March** recorded the **highest total demand**, suggesting a peak season.
- A significant **drop occurred in May**, potentially indicating reduced market activity.
- **June to October** showed relatively **stable demand**, representing a consistent performance period.
- **November** had the lowest demand, likely due to **incomplete data** (only covering up to November 23) and should be interpreted with caution.

📈 Top 10 Most Demanded Products

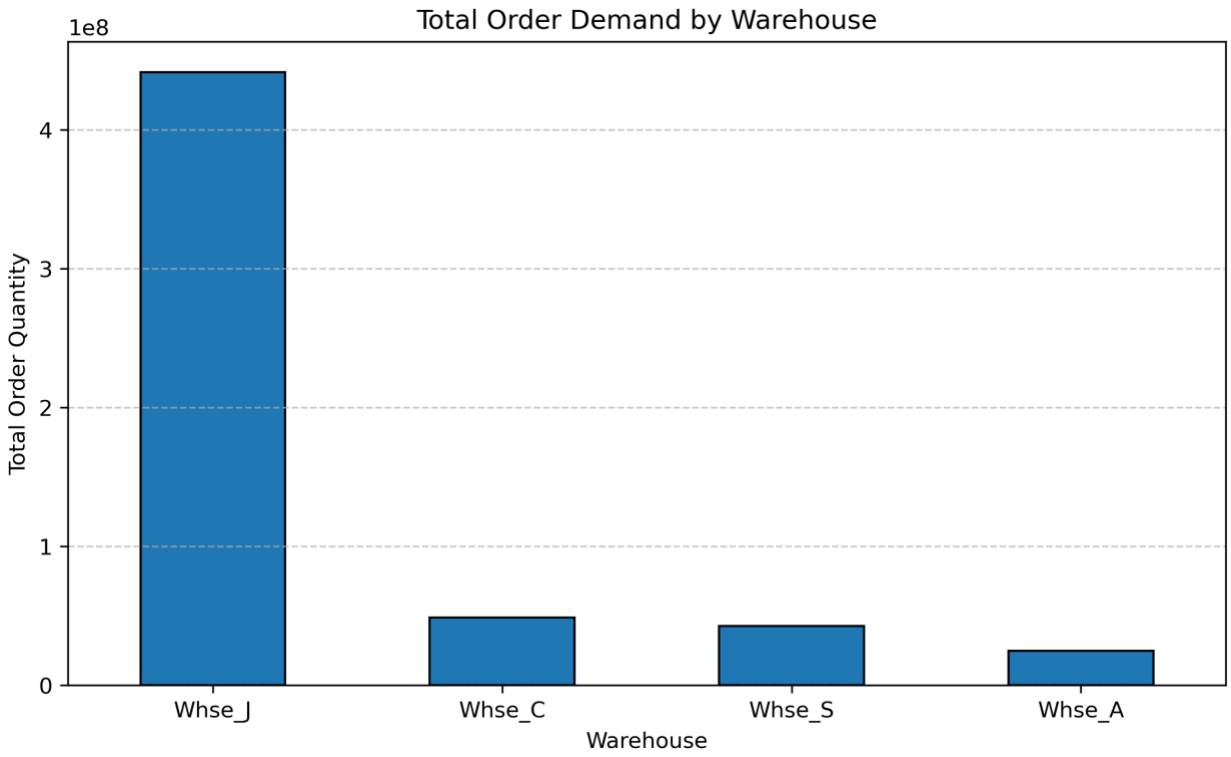


Key Insights:

- The **Top 10 most demanded products** account for **30%** of total demand.
- This means **less than 0.5% of all products** (10 out of 2,117) generate nearly **one-third of demand**.
- Prioritizing the availability of these products can significantly reduce the risk of stockouts and lost revenue

📎*The full product demand list is available upon request.*

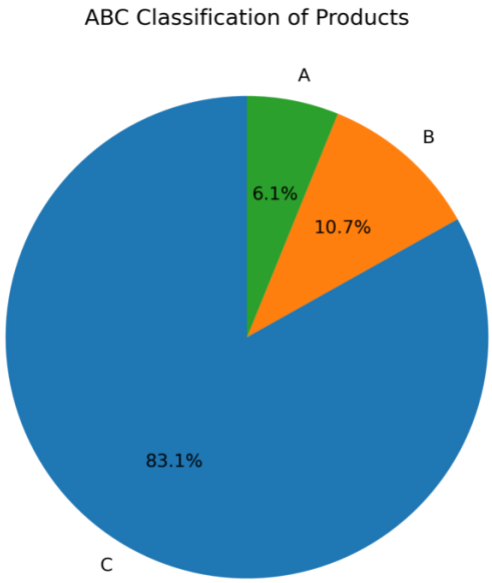
Warehouse Demand Distribution



Key Insights:

- Warehouse J handles **79% of total demand**
- Potential over-reliance on one warehouse
- Useful for planning logistics and balancing load

ABC Classification



Breakdown:

- **A Class Products:** Represents **6% of products**, but accounts for **80% of total demand**
- B Class Products: Represents 11% of products, but accounts for 15% of total demand
- C Class Products: Represents 83% of products, but accounts for 5% of total demand

Insight:

- Focus stocking and planning on A-Class items.
- C-Class can be made-to-order or minimally stocked.

The full product ABC Classification list is available upon request.

Monthly Demand per Product by Warehouse

An Excel table was generated showing monthly demand per product, per warehouse. This enables:

- Location-specific stocking
- Season-aware allocation
- Inter-depot logistic planning

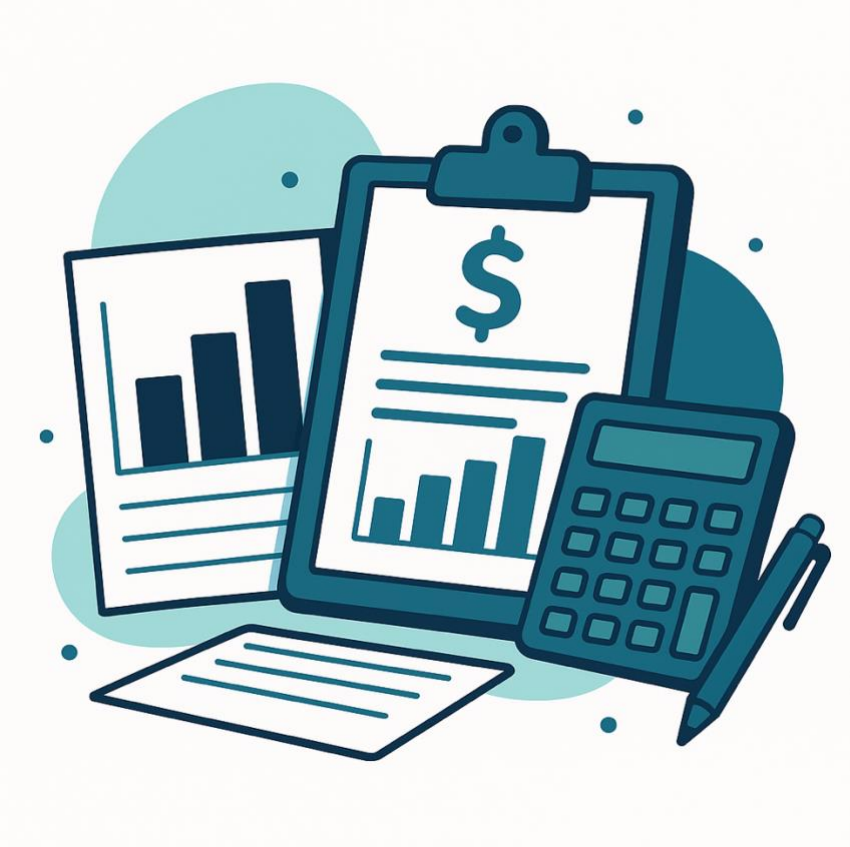
📌 *Using the pivot table, the company can simply **select a month and product code** to view historical demand across warehouses — enabling fast, data-backed stocking decisions.*

Monthly Demand Per Product by Warehouse			
Product Code	Product_1359	<- Select Product code here	
Month	2016-06	<- Select month here	
Warehouse A	**Warehouse C**	**Warehouse J**	**Warehouse S**
-	-	3.770.000,00	-
items demanded			

Notes on Excluded Analysis

- **Promotions were excluded** from the final report due to unclear impact and limited interpretability.

- **State holiday analysis was excluded** from the final report due to limited data coverage and marginal differences in average demand, which made interpretation and business actionability inconclusive.



📄 Final Business Impact

With this analysis, the company can:

- Optimize inventory by focusing on high-demand products
- Prevent overstock and reduce holding costs
- Use warehouse space more efficiently
- Plan inventory based on real seasonal trends

Excel files delivered:

- category_table.xlsx: *Shows which products belong to which category.*
- abc_classification.xlsx: *Categorizes each product into A(critical), B(moderate) or C(low) class based on its demand volume*
- warehouse_product_monthly_demand.xlsx: *Provides monthly demand of each product, broken down by warehouse*

📎 *The full pivot tables and classification files are available upon request or can be delivered alongside this report.*

Prepared by Ibrahim Caglar | 2025

For further inquiries or similar projects, feel free to reach out.