OPTIMIZING INVENTORY MANAGEMENT AND SERVICE EFFICIENCY FOR AN AUTOMOBILE PARTS TRADING AND SERVICE COMPANY

BDM CAPSTONE PROJECT

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ABOUT THE COMPANY

New Supreme Auto Engineering Works, established in 2010 in Udaipur, Rajasthan, India, operates as a trading and service provider in the automobile parts industry. The company specializes in supplying genuine engine parts for reconditioning automobile engines and offers expert engine servicing solutions.

Its offerings include a wide range of essential parts, such as pistons, bearings, rings, cylinder liners, gaskets, etc along with comprehensive repair services tailored to both individual and commercial customers.

PROBLEM(S)

Overstocking and Understocking Issues

Inefficient inventory management leads to overstocking, increasing costs, and understocking, causing delays in fulfilling customer orders, impacting customer satisfaction and operations.

Service Delays Due to Inventory Issues

Poor inventory availability disrupts timely engine repair services, resulting in longer customer wait times and diminished service quality.

DATA AND ANALYSIS OVERVIEW

About Data

Primary data was obtained directly from the company's inventory management records, covering a six-month period from January 2024 to June 2024. This dataset includes fields such as opening balances, inwards, outwards, and closing balances.

Analysis Overview

- Descriptive Analysis
- ABC Analysis
- Segmented Analysis
  - Comparison of Overstocked vs. Regular Items
  - Overstock Clearance Prioritization and Deadstock Risk Analysis
  - Identification of Overstock Root Cause

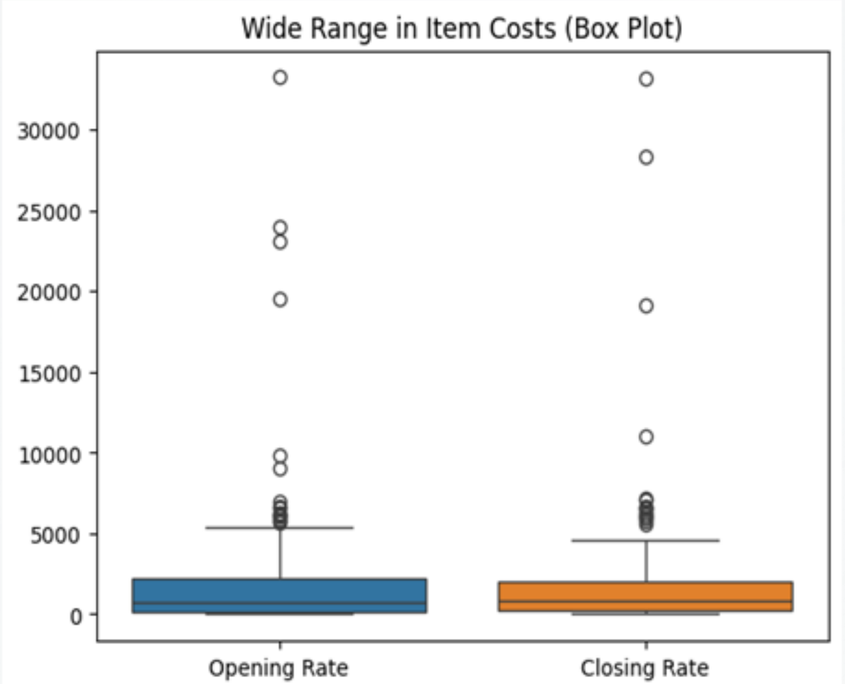
DESCRIPTIVE ANALYSIS

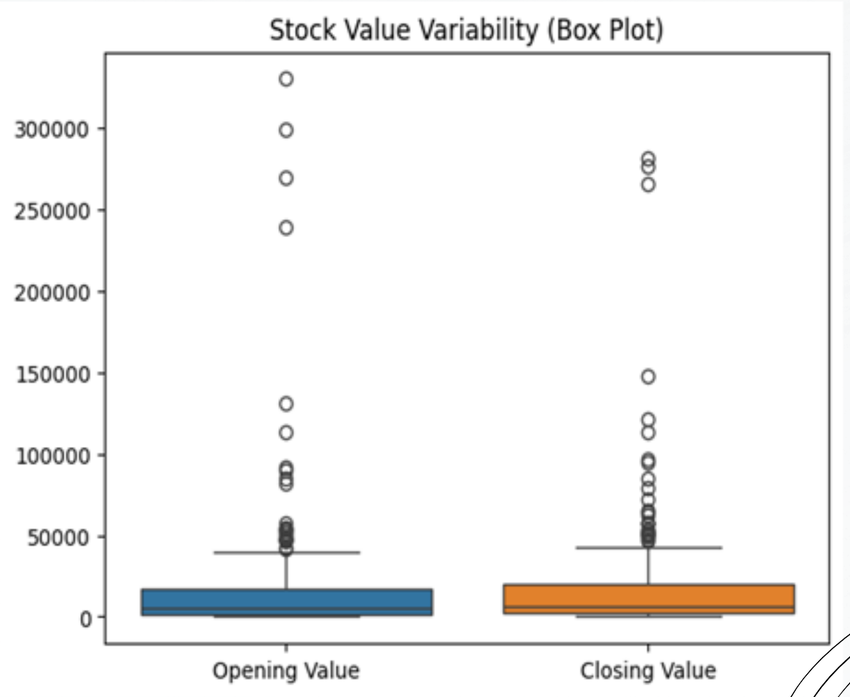
- The dataset reveals a broad range of item costs, from affordable parts to high-value components. For instance, Opening Rate have median of ₹787 while max of ₹33,240. Similary Closing Rate have median of ₹797 while max of ₹33,166.
- Highlights the need for diverse inventory management to balance affordability and profitability.

- The stock values show significant dispersion. For instance Opening value have a mean of ₹17,232, median ₹5,111, and max of ₹329,903.
- This shows positively skewed distribution with significant outliers, requiring careful monitoring of high-value items.

Key insights:

- Diverse inventory with varying costs and values requires tailored management strategies.
- High variability and outliers highlight the need for improved procurement and storage practices.

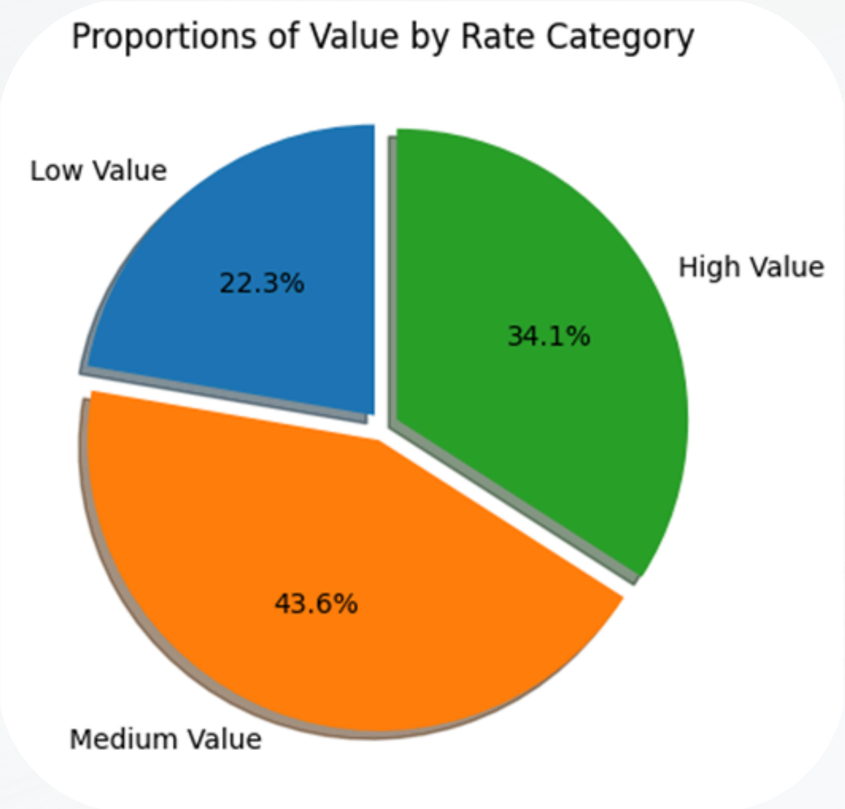




ABC ANALYSIS

Categorized inventory into Low, Medium, and High value based on stock rates:

1. Low Value (22.3%):
    - Priced below ₹1,000.
    - Frequent, low-cost items; essential for daily operations.
2. Medium Value (43.6%):
    - Priced between ₹1,000 - ₹5,000.
    - Core inventory items; balanced affordability and demand.
3. High Value (34.1%):
    - Priced above ₹5,000.
    - Significant value share; smaller portion by count but significant by value having high financial impact.



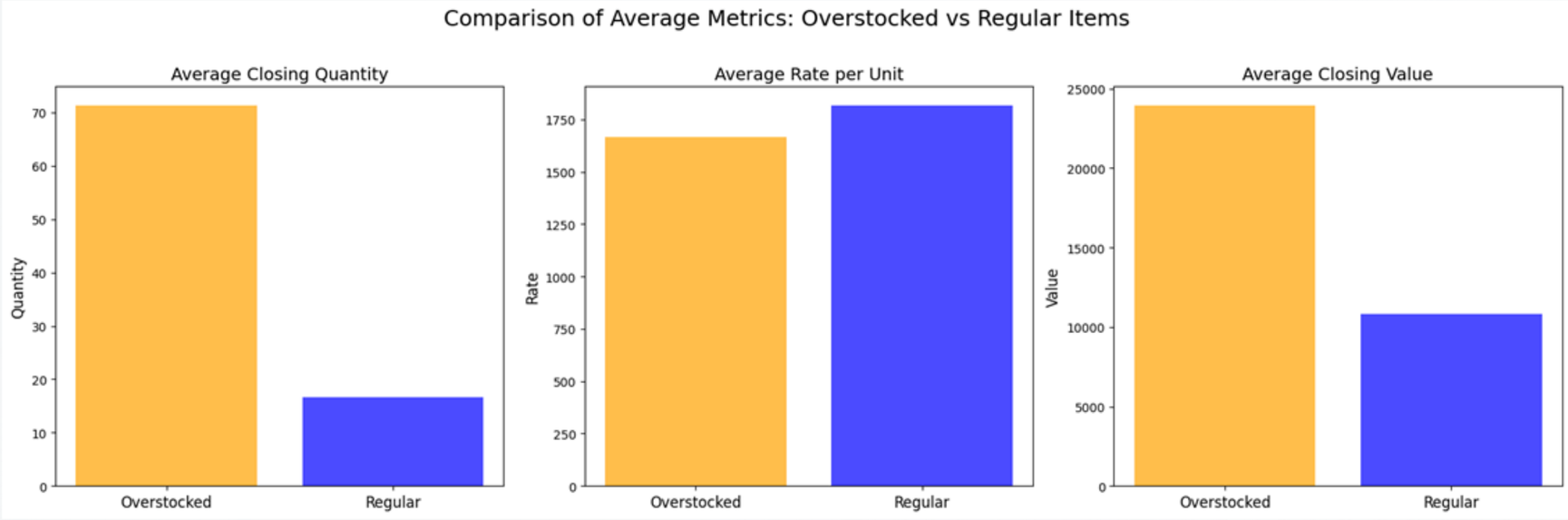
Key Insights:

- Majority (43.6%) of inventory value is in the medium category.
- High-value items require strategic management to optimize cash flow.
- Low-value items ensure steady demand fulfillment.

SEGMENTED ANALYSIS

For analyzing the slow-moving items, the dataset has been categorized into two groups:

1. Overstocked Items (slow-moving): Total outflow < 30% of total inflow (opening + inwards).
2. Regular Items (balanced movement): Total outflow ≥ 30% of total inflow.



OVERSTOCK VS REGULAR ITEMS

Insights from Comparison:

1. Inventory Characteristics
   - Overstocked items have average closing quantities (71 units) significantly higher than regular items (16 units), consuming more storage and resources.
   - Average closing value for overstocked items is more than double that of regular items, causing financial strain.
2. Cost and Procurement Patterns
   - Overstocked items have a slightly lower average rate per unit (1663.72) compared to regular items (1816.00).
   - Indicates over-purchasing of cheaper items, possibly due to bulk procurement or supplier policies.
3. Implications
   - High-value, highly variable overstocked items should be prioritized for intervention.
   - Highlights the need for better procurement strategies.

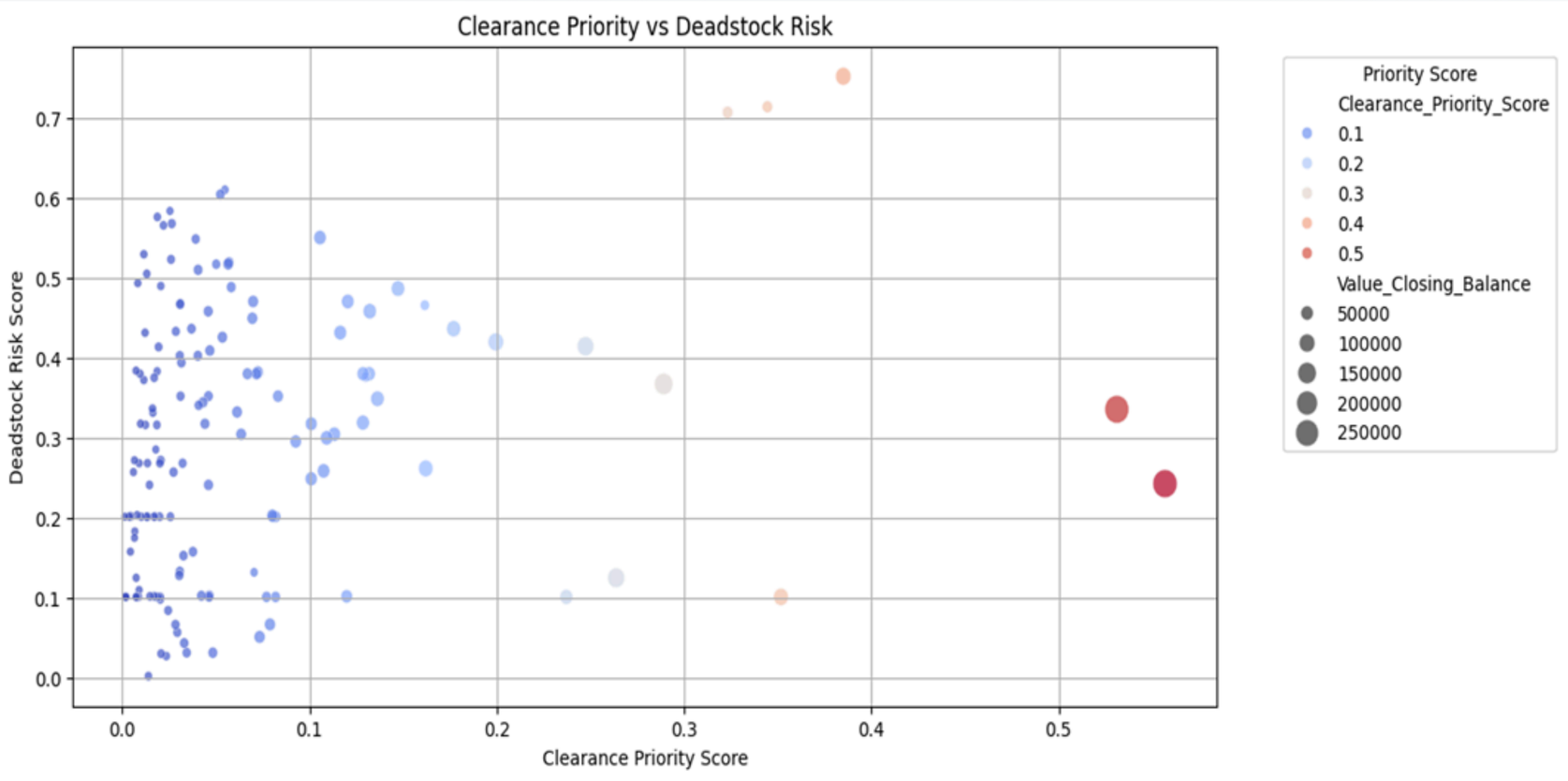
OVERSTOCK CLEARANCE PRIORITIZATION AND DEADSTOCK RISK ANALYSIS

Clearance Priority Score:

- Prioritizes overstocked items for clearance based on financial and operational impact.
- Calculated based on closing balance.

Deadstock Risk Score:

- Assesses risk of inventory becoming obsolete or unsellable.
- Calculated based on ratio of quantity outflow to total inflow.



Prioritization Strategy:

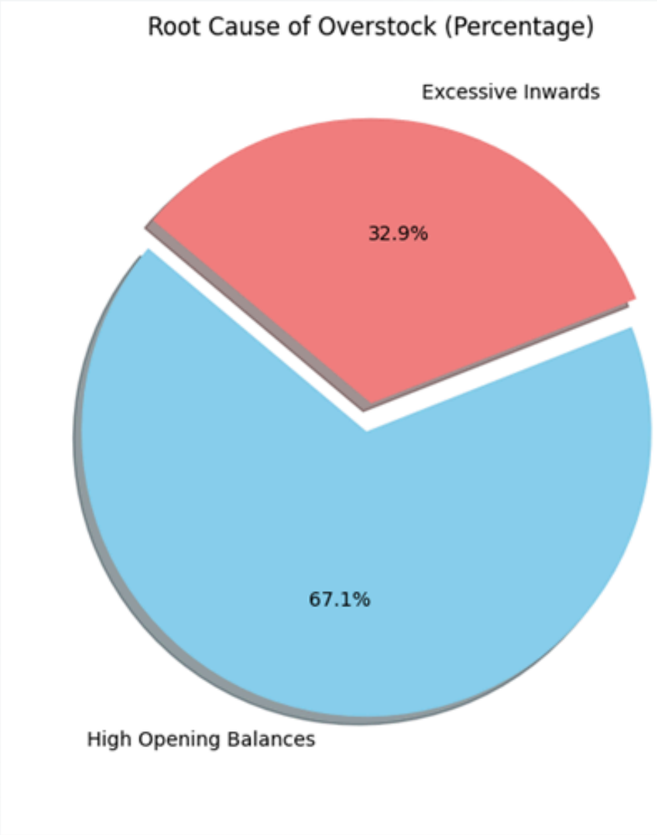
- **High Priority & High Risk:** Immediate clearance needed to minimize losses (upper-right).
- **High Priority & Low Risk:** Good outward potential, but still require clearance (lower-right).
- **Low Priority & High Risk:** Gradual clearance to prevent obsolescence (upper-left).
- **Low Priority & Low Risk:** Manage with standard practices (lower-left).

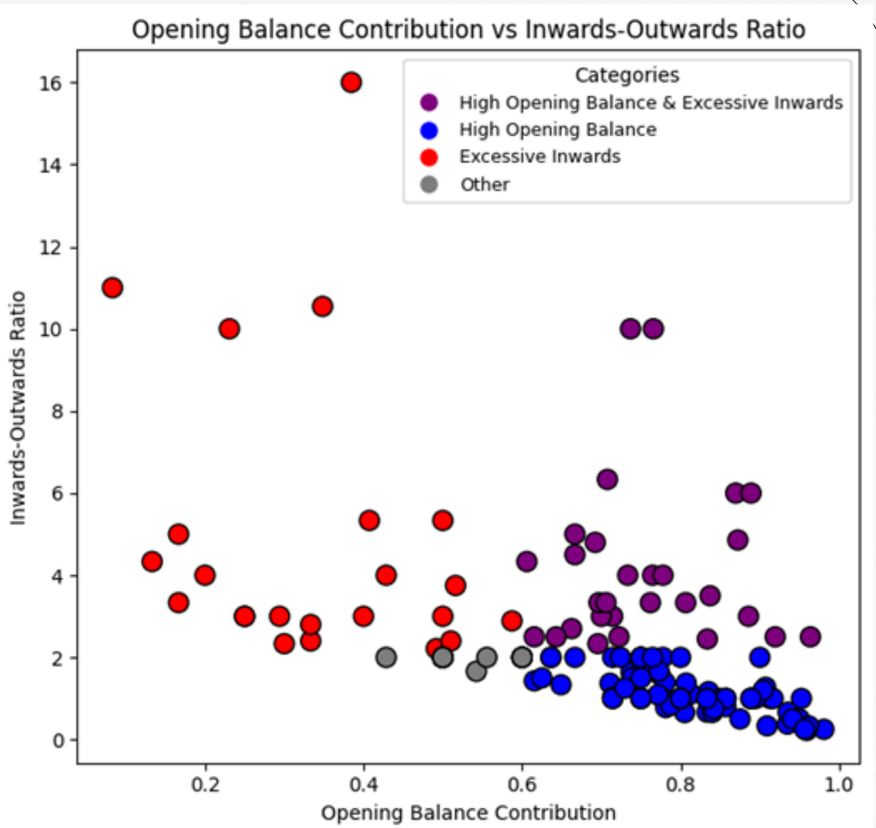
This dual analysis enables efficient stock optimization, reduction of overstock, and mitigation of deadstock risks.

IDENTIFICATION OF OVERSTOCK ROOT CAUSE

Root Cause Categories:

1. **High Opening Balance:**
   - Items with opening stock exceeding 60% of total stock (opening + inwards).
   - Causes: Over-procurement, poor demand forecasts, or inadequate clearance of prior stock.
2. **Excessive Inwards:**
   - Items with inwards-outwards ratio > 2 (inflows disproportionately higher than outflows).
   - Causes: Over-ordering, supplier constraints, or misaligned demand.





Findings:

- 67.1% of overstock cases arise from high opening balances (dominant contributor).
- 32.9% result from excessive inwards.
- This highlights the need for improved forecasting to manage opening balances and optimized procurement practices for inflows.

RECOMMENDATIONS

1. Implement **dynamic pricing strategies** to optimize turnover and working capital for slow-moving, high-cost items.
2. **Prioritize the movement and efficient management of high-value items** identified through ABC categorization to optimize cash flow and reduce holding costs.
3. Apply **targeted clearance strategies based on priority and risk scores** to address overstocked items.
4. **Refine procurement practices** to avoid bulk orders and reduce excessive inwards by focusing on small and frequent deliveries with demand.
5. **Regularly calculate EOQ, Safety Stock, and Reorder Points** to maintain optimal inventory levels and prevent stockouts.

THANK YOU