Optimizing Inventory Management and Service Efficiency for an Automobile Parts Trading and Service Company

A Final report for the BDM capstone Project

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1 Executive Summary and Title

Effective inventory management and streamlined service operations are critical challenges for the operational success of New Supreme Auto Engineering Works, a leading player in automobile parts trading and repair services. Building upon the insights gained from previous analyses, this report provides a further in-depth examination of the organization's inventory management and service inefficiencies, offering data-driven solutions to enhance operational efficiency and customer satisfaction. The objective is to identify key bottlenecks, analyze their root causes, and propose actionable strategies to optimize processes and drive better business outcomes.

The study began with a comprehensive analysis of stock data, which revealed significant inefficiencies in inventory management, including overstocking and slow-moving items. Advanced analytical techniques, such as inwards-outwards ratio analysis, slow-moving item identification, and categorization of overstocked versus regular items, were employed. Visual tools like pie charts, scatter plots, and bar graphs provided clear insights into inventory imbalances and highlighted root causes, such as high opening balances and excessive restocking. Additionally, the scoring systems—Clearance Priority and Deadstock Risk Scores—were developed to strategically prioritize inventory clearance and mitigate risks associated with deadstock accumulation.

An evaluation of service inefficiencies was also conducted based on qualitative data gathered through observations and verbal communication with the team. This analysis highlighted delays in quotation preparation, inefficient procurement processes, and gaps in coordination between service and sales teams. These issues collectively lead to prolonged service turnaround times and reduced customer satisfaction. Solutions such as introducing a dedicated dismantling resource, digitizing the quotation preparation process, and implementing real-time inventory checks were proposed to address these bottlenecks effectively.

Through insights gained from the analysis, the company is recommended various strategies to address its challenges comprehensively. For inventory management, a focus on refining demand forecasting, optimizing stock clearance strategies, and revising procurement practices is emphasized. For service inefficiencies, the report suggests process automation, resource allocation improvements, and enhanced team coordination to reduce delays and improve service quality. These recommendations are expected to significantly reduce operational costs, minimize overstocking, and enhance customer experience.

In summary, this report underscores the importance of integrating data-driven decision-making with strategic operational improvements. By addressing both inventory inefficiencies and service challenges through proposed solutions, New Supreme Auto Engineering Works can achieve a balanced approach to operational excellence, ensuring sustainable growth and enhanced stakeholder satisfaction.

2 Detailed Explanation of Analysis Process and Method

Business Problem Identification and Interaction with Stakeholders

The first step in the analysis was to interact with the founder of New Supreme Auto Engineering Works to understand the operational challenges faced by the firm. The interviews and discussions with the company founder and stakeholders, provided insights into the dual concerns of inventory mismanagement and service inefficiencies. The discussions highlighted overstocking issues, slow-moving inventory, imbalances in stock inflow and outflow, and concerns about the efficiency of service operations. These challenges served as a foundation for defining the direction for analysis and ensured the analysis remained aligned with the company's strategic goals.

Data Acquisition and Validation

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 for 742 unique items. The data's authenticity was validated through a formal letter from the organization, accompanied by photographs of the workspace and an interview with the founder. This step ensured that the dataset accurately represented real-world operations, forming a reliable basis for analysis.

Tools and Technologies Used

The analysis was conducted using a range of tools and technologies to ensure accuracy and efficiency. Python and its libraries, including Pandas, NumPy, Matplotlib, Seaborn, and Scikit-learn, were extensively used for data cleaning, visualization, and statistical modeling. Google Colab provided a collaborative coding environment, while Microsoft Excel was used for initial data exploration and cross-verification of results. These tools facilitated seamless execution of complex analysis tasks and ensured reproducibility of results.

Data Cleaning and Preparation

Data cleaning was a critical step to ensure accuracy and consistency. Missing data points were addressed using appropriate imputation techniques or exclusion where appropriate. Outliers in rates and values were carefully examined to distinguish genuine business scenarios from errors. The data was standardized for consistent units, formats, and scales, particularly for rates and quantities. Specific checks were applied to validate stock transactions, ensuring internal consistency between opening, inward, outward, and closing balances. These cleaning processes ensured the data was ready for subsequent statistical and visual analysis.

Descriptive and Inferential Analysis of Inventory Data

Descriptive statistics such as mean, median, standard deviation, and interquartile range were computed for key variables like opening balances, transaction rates, and closing stock. These metrics provided insights into the variability and distribution of inventory levels.

Comparative analysis between overstocked and regular items was performed, focusing on slow-moving items, inflow-outflow balance, and potential financial impacts.
Inferential analysis, such as identifying relationships between stock inflow and outflow, between high-opening balances and extensive inwards, and between clearance need and deadstock risk, supported decision-making by uncovering underlying trends.

Visualization Techniques for Insightful Representation

Various visualization techniques were employed for interpreting complexities in data, identifying insights, and convey findings. Pie charts are used to visualize inward vs. outward quantity distribution and to break down the root causes of overstock. Scatter plots are used to identify items with unusual transaction behaviors, prioritize clearance and deadstock items, and demonstrate the impact of high-opening balance items on stock dynamics. Bar charts are used to compare overstock and regular items, showing stock level disparities and financial implications. All these visualizations were created using Python libraries like Pandas, Matplotlib, and Seaborn, ensuring clarity, accuracy, and effective communication of findings.

Data Segmentation and Overstocking Analysis

The inventory data was segmented into overstocked and regular items, allowing for a detailed comparative analysis. This segmentation highlighted overstocked and slow-moving items, especially in high-cost categories, which were disproportionately draining financial resources. By comparing overstock and regular inventory, actionable insights emerged for inventory reduction and optimization. Furthermore, this segmentation method facilitated the prioritization of overstocked items for clearance based on their clearance and deadstock risk scores, computed during the analysis, while also uncovering the root causes of overstocking.

Integration of Business Context into Analysis

Throughout the analysis process, business context remained a guiding factor. The analysis consistently incorporated qualitative inputs from stakeholders providing insights into market trends, supplier relationships, and operational constraints, which complemented quantitative data. This contextual integration ensured that the analysis results were not only statistically robust but also aligned with practical business realities.

3 Results and Findings

The analysis conducted revealed several critical insights into the inventory management inefficiencies and service performance challenges. These findings serve as a foundation for addressing overstocking issues and enhancing overall operational efficiency. Here is the link for code used in analysis – Google Colab

Inventory Management Problem

Inwards-Outwards Ratio Analysis

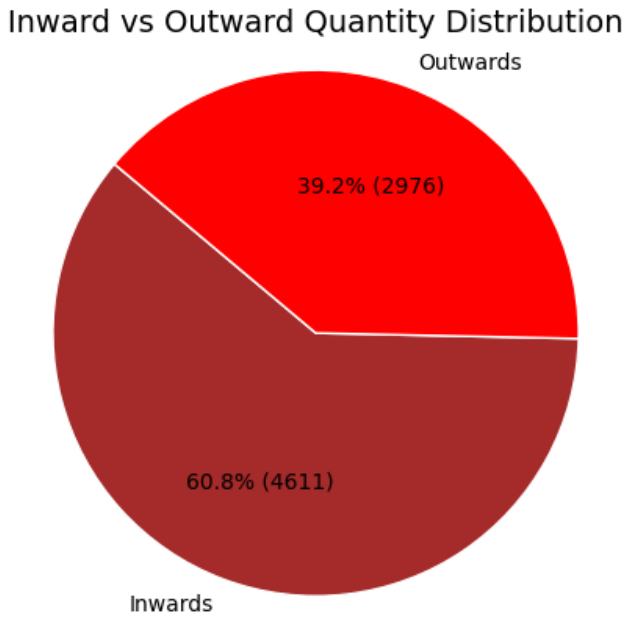

Figure 1: Pie chart for Inward vs Outward Quantity Distribution

An analysis of the total stock movements revealed that the ratio of inward to outward quantities is approximately 1.55, highlighting that the stock inward movement is substantially higher than the outward movement. This imbalance indicates an increase in inventory levels, which might lead to overstocking if not aligned with actual demand trends.

The pie chart (figure 1) clearly shows that 60.8% (4,611 units) of the total stock transactions are attributed to inward movements, while 39.2% (2,976 units) represent outward movements. This emphasizes the disproportionate nature of inventory transactions, which could contribute to higher holding costs or potential obsolescence of inventory items.

Slow-Moving Items

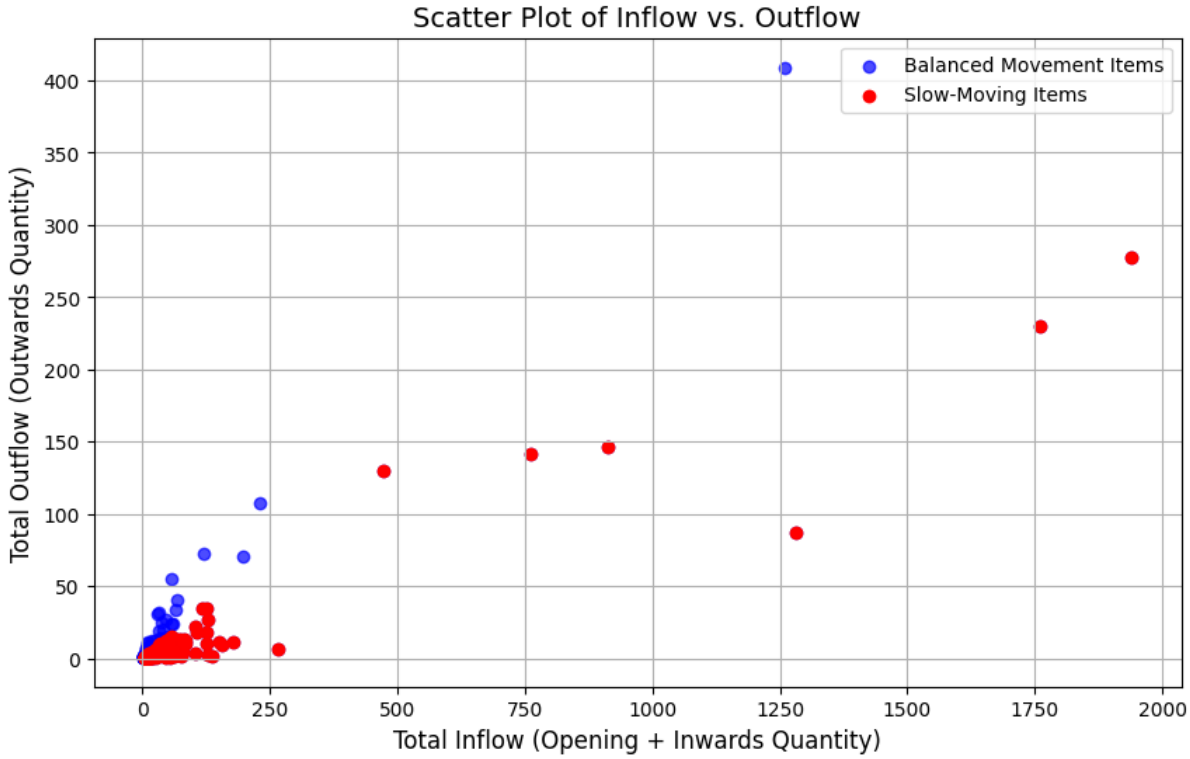

Figure 2: Scatter plot of Inflow vs. Outflow

The scatter plot (figure 2) illustrates the relationship between total inflow (sum of opening and inwards quantities) and total outflow (outwards quantity) for all inventory items. It helps identify items with significant inflow but relatively low outflow, commonly referred to as slow-moving items, which lead to higher storage costs and the risk of obsolescence.

Slow-moving items were identified by comparing the total outflow to the total inflow. Specifically, this classification was based on a threshold where the outflow constituted less than 30% of the total inflow, which was chosen to balance inventory efficiency and minimize carrying costs. These items are highlighted in red on the scatter plot, while items with more balanced movement are shown in blue.

The plot reveals that while many items have comparable inflow and outflow, a subset exhibits disproportionately high inflow with minimal outflow, emphasizing inefficiencies in inventory movement. Outliers with exceptionally high inflow (>1000 units) and low outflow indicate potential overstocking or mismatched demand, reinforcing the classification of these items as slow-moving.

Comparison of Overstocked vs. Regular Items

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

- Overstocked Items: Items identified as slow-moving, where the total outflow is significantly lower than the total inflow (less than 30% of total inflow).
- Regular Items: Items with a more balanced movement, where the outflow constitutes 30% or more of the total inflow.

	Overstock			Regular		
Metric	Quantity_Closing_Balance	Rate_Closing_Balance	Value_Closing_Balance	Quantity_Closing_Balance	Rate_Closing_Balance	Value_Closing_Balance
mean	71.29	1663.72	23934.04	16.70	1816.01	10801.47
std	223.06	3185.63	39624.59	83.73	3474.73	27583.14
sum	10408.00	242903.76	3494371.00	1770.00	192496.70	1144956.00

Statistics of Overstock and Regular Items

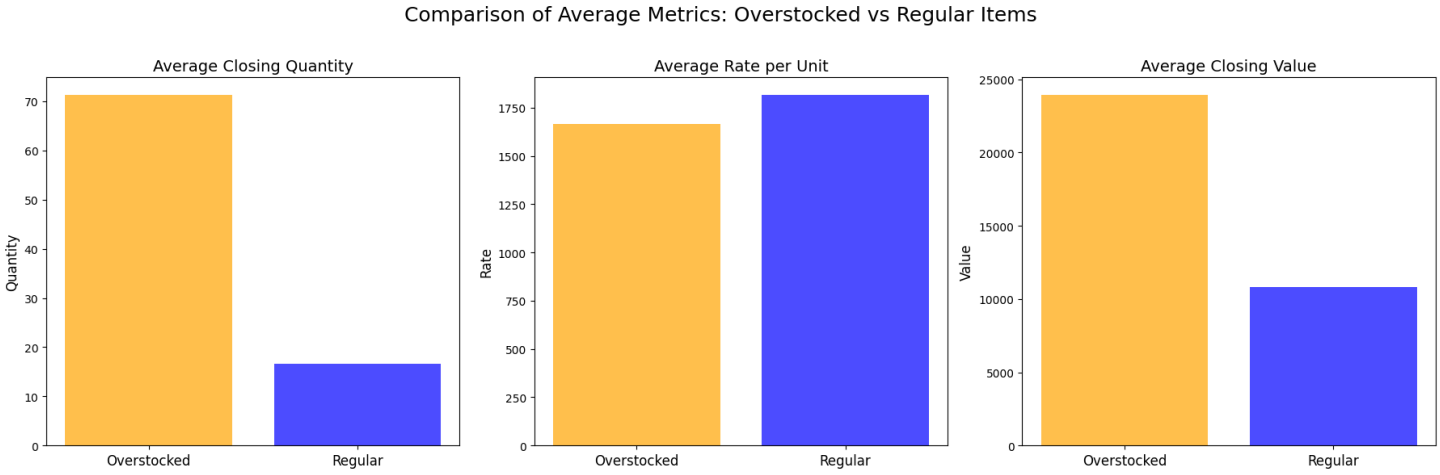

Figure 3: Bar charts for Comparison of Overstock vs Regular Items

The comparison between overstocked and regular items highlights significant differences in inventory characteristics as shown in bar charts (figure 3). Overstocked items exhibit significantly higher average closing quantities (71 units) compared to regular items (16 units). This disparity highlights that overstocked items are consuming a disproportionate amount of storage space and tying up valuable resources.

The average closing value for overstocked items is more than double that of regular items, indicating a significant financial burden. High-value overstocked items represent a larger sunk cost, emphasizing the need for targeted interventions to manage these items effectively.

Interestingly, the average rate per unit for overstocked items (1663.72) is slightly lower than that of regular items (1816.00). This suggests that over-purchasing may be occurring for cheaper items, potentially driven by bulk procurement or misaligned demand forecasts. Variability in the rate and value of overstocked items further indicates inconsistencies in procurement strategies or supply chain management.

This comparison provides crucial insights for prioritizing actions. High-value and highly variable overstocked items should be addressed first to optimize storage and reduce financial strain.

Overstock Clearance Prioritization and Deadstock Risk Analysis

To address the overstocking problem more strategically, I have conducted an analysis that prioritizes items for clearance while simultaneously assessing their risk of becoming deadstock.

Calculation of Clearance Priority Score:
The Clearance Priority Score is a measure of how urgently an overstocked item should be cleared. This score is calculated based on closing balance value, closing balance quantity, and closing balance rate. These attributes are normalized to account for differences in scale and then weighted according to their relative importance:

- Value (50% weight): Represents the monetary impact of the item's overstock.
- Quantity (30% weight): Reflects the physical storage burden of the item.
- Rate (20% weight): Captures the cost or price sensitivity of the item.

The score is computed as a weighted sum of these normalized attributes. Items with higher scores are prioritized for clearance because they hold higher closing balances, which could strain storage capacity or tie up working capital.

Calculation of Deadstock Risk Score:
The Deadstock Risk Score assesses the likelihood of an item becoming obsolete or unsellable due to poor movement. This score is calculated using the ratio of quantity outflow (outwards balance) to the total inflow (sum of inwards and opening balance). The ratio provides insight into how effectively inventory is being utilized or sold.

A score closer to 1 indicates a higher risk of the item becoming deadstock. This suggests that the inflow significantly outweighs the outflow, leaving a large portion of the inventory unsold or unused. Conversely, a score closer to 0 reflects efficient movement, with most of the inflow being consumed or sold.

Deadstock risk includes items with both high and low closing balances. However, those with higher balances are more critical as they pose greater financial risks due to higher storage

costs and obsolescence potential. These items should be closely monitored and prioritized for special clearance strategies.

Please find the overstocked items with Clearance Priority Score and Deadstock Risk Score from here – Google sheet

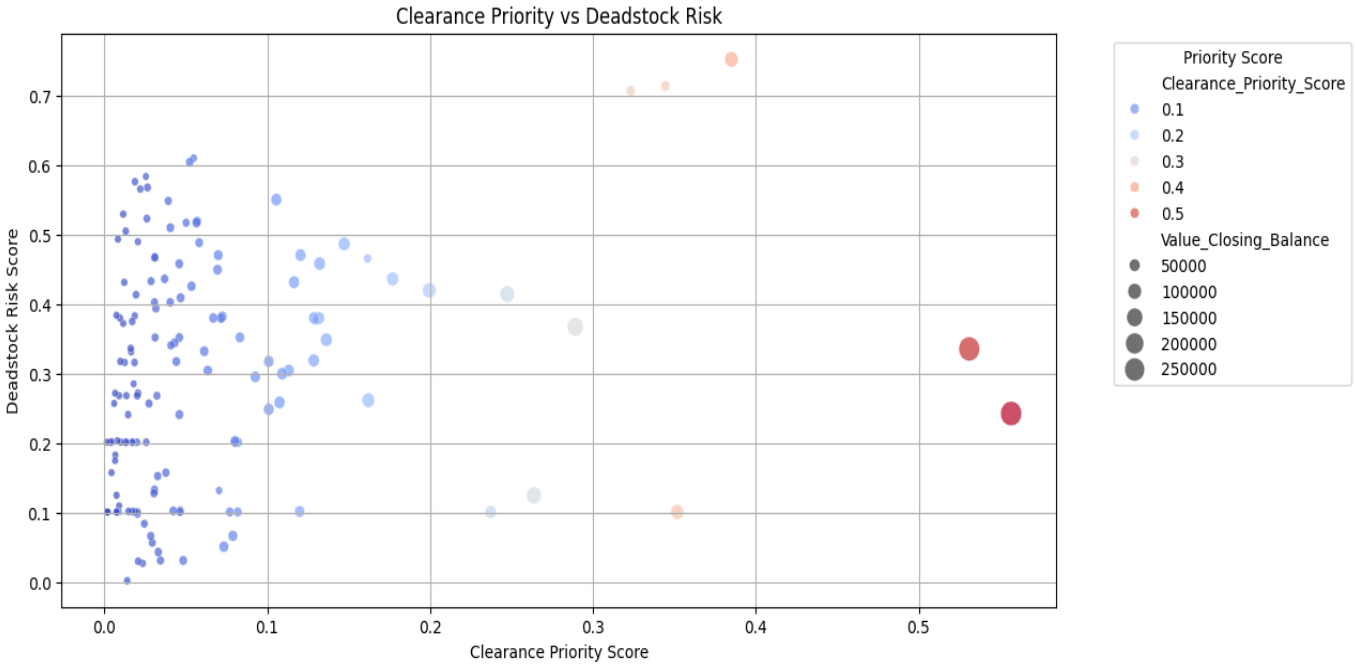

Figure 4: Scatter plot for Clearance Priority vs Deadstock Risk

The scatter plot (Figure 4) visually represents the Clearance Priority Score against the Deadstock Risk Score. The color gradient emphasizes the Clearance Priority Score, while the size of each point represents the item's financial value in the closing balance. This dual representation allows for a quick identification of items with high financial and operational implications.

Based on the interplay between the Clearance Priority Score and Deadstock Risk Score, the following prioritization strategy has been developed to address overstocking effectively:

- **High Priority & High Risk**: Items scoring high on both Clearance Priority and Deadstock Risk (upper-right region of the scatter plot) are urgent for immediate clearance to minimize financial losses and inefficiency.
- **High Priority & Low Risk**: Items with high Clearance Priority but low Deadstock Risk (lower-right region) have good outward movement potential despite their high closing balances.
- **Low Priority & High Risk**: Items scoring low on Clearance Priority but high on Deadstock Risk (upper-left region) are less urgent but require gradual clearance strategies to avoid obsolescence.

- **Low Priority & Low Risk**: Items with balanced movement (lower-left region) have lower immediate concern and can be managed through standard inventory practices.

This combined analysis not only identifies critical items for clearance but also highlights those requiring close monitoring. By integrating these insights into inventory management, the company can optimize its stock levels, reduce overstocking, and mitigate risks of deadstock accumulation.

Identification of Overstock Root Cause

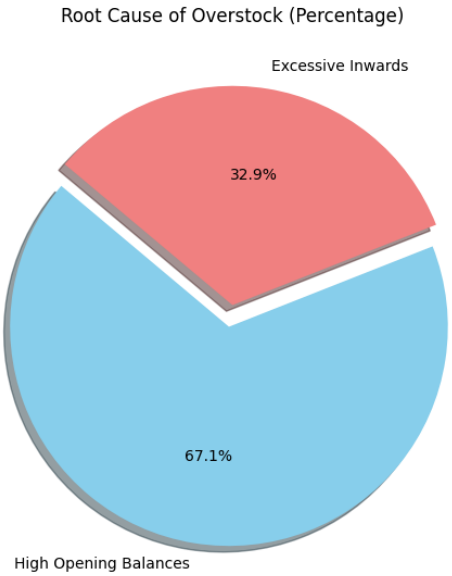

Figure 5: Pie chart for Root Cause of Overstock

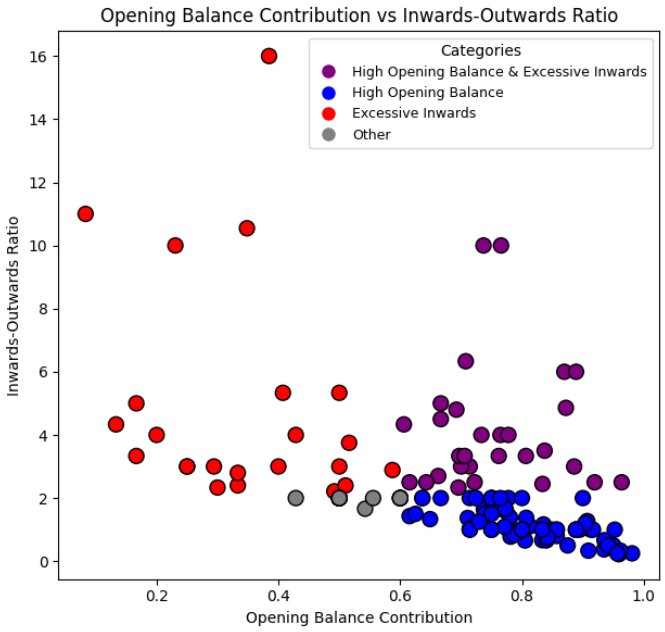

Figure 6: Scatter plot for Opening Balance Contribution vs Inwards-Outwards Ratio

To understand the root causes of overstocking, I have examined two potential contributors: high opening balances and excessive inwards. By quantifying the impact of each and categorizing items based on these factors, we will come to know which category contributes more to the overstock issue.

High opening balances are indicative of items that start with a disproportionately large stock compared to their total inflow (opening stock + inwards). This may occur due to over-procurement, inaccurate demand forecasts, or insufficient clearance of previous stock. To measure this, the opening balance contribution was calculated as the proportion of opening stock relative to the total stock managed (opening stock + inwards). Items with contributions exceeding a threshold of 60% were flagged as having high opening balances. Such items highlight inefficiencies in stock clearance and forecasting.

Excessive inwards, on the other hand, occur when inward transactions significantly exceed outward movements. The inwards-outwards ratio was used to capture this, calculated as the inwards divided by the outwards for each item. Items with ratios exceeding a threshold of 2 were identified as having excessive inwards. This scenario often points to over-ordering, supplier constraints like minimum order quantities, or discrepancies in demand alignment.

Items were categorized into four groups based on their characteristics:

- High Opening Balance & Excessive Inwards: Items exhibiting both root causes, representing the most critical overstock issues.
- High Opening Balance Only: Items with large starting stocks but no excessive restocking.
- Excessive Inwards Only: Items with balanced opening stocks but disproportionate inwards.
- Other: Items that do not significantly exhibit either issue.

The analysis revealed that 67.1% of overstock cases stem from high opening balances, making it the dominant contributor, while 32.9% are due to excessive inwards as shown in pie chart (figure 5). This quantification emphasizes the need for improved forecasting models and clearance strategies to address high opening balances. At the same time, revising procurement practices and aligning restocking policies with demand trends can mitigate excessive inflows.

The scatter plot (figure 6) provides a granular view, plotting the opening balance contribution against the inwards-outwards ratio for each item. Items are color-coded to highlight their categories: purple for items exhibiting both issues, blue for high opening balances, red for excessive inwards, and gray for others. This categorization enables targeted interventions by prioritizing the most problematic items (purple) while also addressing items in other categories.

Overall, the analysis underscores that overstocking is primarily driven by poor clearance of opening balances and restocking inefficiencies. Solutions should focus on refining demand forecasts, optimizing stock clearance strategies, and establishing more responsive restocking policies. This will not only reduce storage costs but also enhance inventory turnover and operational efficiency.

We have seen the results and findings from the analysis of stock data to address inventory management issues. Now, we let’s focus to understanding and addressing the service inefficiencies and the lack of coordination between the service and sales teams. These inefficiencies often result in delays in servicing vehicles, creating idle periods and impacting overall customer satisfaction. The company has not provided structured data on its servicing activities but based on the information gathered through verbal communication and

observations, an analysis of the current workflow and proposed improvements was conducted.

Service Efficiency and Coordination Problem

When a vehicle arrives for servicing, the company follows a series of steps:

- Quotation Preparation: The service team prepares a quotation outlining required services, replacement parts, and estimated costs.
- Quotation Review: The quotation is forwarded to the backend or sales team to verify the availability of parts in inventory.
- Parts Procurement: If parts are unavailable, they are ordered, introducing a delay of 1-2 days before the service can begin.

These steps are hindered by:

- Delays in Quotation Preparation: The manual process of dismantling and examining engines, coupled with limited labor availability, slows down quotation preparation and increases service delays.
- Delays in Part Procurement and Quotation Processing: The current practice of processing and ordering parts at the end of the day prolongs the service initiation time, introducing unnecessary delays in procurement and overall workflow.
- Coordination Gaps Between Teams: Inefficient communication between the service and sales teams leads to delays in transferring critical information, such as part requirements and stock availability, which hampers smooth service execution.

The cumulative effect of these inefficiencies results in delays in starting services and impacts overall service turnaround time. The following sections delve into these inefficiencies, analyzing their root causes and exploring practical solutions to resolve these issues.

Delay in Preparing Service Quotations

A significant delay arises in the preparation of service quotations, primarily caused by the dependency on the dismantling process for a detailed inspection of the vehicle's engine. The dismantling process is labor-intensive and requires considerable attention from the laborers, who are already occupied with ongoing servicing tasks. This makes it challenging to prioritize dismantling immediately upon receiving a service request.

To mitigate this delay, there can be an addition of a dedicated laborer whose primary responsibility would be dismantling and assisting in the quotation preparation process. This laborer would streamline the dismantling task and free up time for the rest of the team to focus on ongoing servicing activities.

Moreover, digitizing the quotation preparation process can further reduce delays. A digital tool that allows the service team to input engine details, predefined service tasks, and associated costs would generate quotations more efficiently and with fewer errors. This dual approach of assigning dedicated resources and leveraging technology is expected to improve the speed and accuracy of the quotation preparation process significantly.

Delays in Part Procurement and Quotation Processing

Post-quotation, the availability of required parts in stock is checked. If parts are unavailable, they are ordered, often resulting in additional delays. Currently, the company processes all quotations and orders at the end of the day, which causes inefficiencies in handling service requests received earlier in the day.

To optimize this process, a shift-based ordering system can be introduced. For instance, service requests received before midday can have their quotations finalized and parts ordered in the first half of the day, allowing suppliers to dispatch items earlier. Similarly, a second shift can handle requests received later in the day. By aligning the company's ordering process with the supplier's dispatch timings, delays can be reduced, improving service turnaround times.

Furthermore, integrating the stock database with the quotation preparation tool would provide real-time visibility of parts availability. This integration would eliminate manual stock checks, enabling the immediate identification of missing parts during the quotation process and expediting part procurement.

Enhancing Team Coordination

A lack of coordination between the service and sales teams is another critical issue contributing to delays. Miscommunication or delays in transferring information about service requests, quotations, and parts requirements often prolong the servicing process.

To address this, a centralized communication platform can be implemented. This platform would allow real-time updates on the status of service requests, parts availability, and procurement progress. For example, as soon as a service quotation is prepared, it can be shared with the sales team for immediate action. Likewise, updates on part orders and deliveries can be shared with the service team, ensuring everyone is aligned on timelines and priorities.

Additionally, standardizing the pre-service inspection process through diagnostic checklists can improve accuracy and efficiency in identifying required services and parts. This standardization would streamline communication, reduce ambiguity, and foster better collaboration between teams.

By implementing these practical measures, the company can address the primary inefficiencies in its service operations. Reducing delays in quotation preparation, streamlining part procurement, and enhancing team coordination will lead to faster service completion and improved customer satisfaction. These steps also optimize labor and resource utilization, paving the way for smoother operations and more effective service-sales integration.

4 Interpretation of Results and Recommendations

Interpretation of Results

The analyses conducted on New Supreme Auto's inventory and operational data reveal several overarching insights into the organization's inventory management practices and service efficiency. These insights highlight patterns and trends that are critical for addressing inefficiencies and optimizing performance.

1. **Patterns in Pricing and Profit Margins**
   The comparison of inward, outward, and closing rates revealed that sales rates consistently include a profit margin, reflecting New Supreme Auto's pricing strategy. However, the variability in closing rates suggests inefficiencies in stock valuation practices. This variability highlights the need for tighter control over pricing mechanisms to align inventory costs with market conditions and operational goals

2. **Divergent Stock Value and Item Cost Dynamics**
   Analysis of stock value distributions reveals significant variability, with certain high-cost items disproportionately contributing to the total inventory value. These items pose heightened financial risks due to their slower turnover rates and higher holding costs. For instance, the stock value for some items is concentrated in the upper quartile, indicating potential inefficiencies in inventory allocation. Such trends emphasize the need for a more balanced approach to inventory valuation and turnover.

3. **Inventory Overstocking and Turnover Imbalance**
   The results consistently point to a significant overstocking issue, with the inward-to-outward ratio recorded at 1.55. This imbalance indicates that the inflow of goods into inventory far exceeds the demand, leading to inefficiencies in stock utilization. High opening balances (contributing 67.1% to overstocking) and excessive inward stock (32.9%) reflect systemic challenges in demand forecasting and inventory clearance. The elevated closing values of overstocked items compared to regular items further underline the strain on working capital and storage resources.

4. **Slow-Moving Items and Deadstock Risks**
   A substantial portion of the inventory comprises slow-moving items, characterized by low turnover and extended holding periods. These items significantly impact operational efficiency by increasing storage costs and tying up capital. Deadstock risks, particularly

for items with declining demand, were quantified and prioritized, revealing critical areas for intervention. For example, the segmentation of items based on clearance priority and deadstock risk scores provides actionable insights for targeted inventory reduction strategies.

5. **Systemic Issues in Inventory Management**
   Root causes of inefficiencies in inventory management were traced to gaps in clearance processes and demand forecasting. High opening balances highlight insufficient clearance of prior stock, while excess inward stock suggests over-ordering or reliance on fixed supplier agreements. These systemic issues amplify holding costs and increase the risk of obsolescence for specific inventory categories.

6. **Operational Challenges in Service Efficiency**
   Beyond inventory, operational inefficiencies were evident in service-related processes. Delays in quotation preparation and parts procurement, driven by manual workflows and misaligned coordination between teams, negatively impact customer satisfaction. Such challenges underscore the need for automation and improved communication to streamline service operations. These inefficiencies also contribute to underperformance in stock utilization and parts availability.

Overall, the analyses highlight a need for strategic interventions to improve inventory turnover, reduce overstocking, and enhance operational efficiency. The trends and patterns identified, from overstocked items to service delay, call for a comprehensive inventory management strategy that balances cost optimization with customer satisfaction.

Recommendations

Based on the results and findings derived from the mid-term and final report analysis, the following recommendations have been formulated to help the firm optimize inventory management and operational efficiency:

1. **Optimize Pricing Strategies**
   The analysis of rate distribution revealed significant variability in item costs and a marked difference between inward rates and outgoing rates due to profit margins. To maintain competitive pricing and optimize cash flow, company should regularly review and adjust the closing rates of slow-moving and high-cost items while implementing dynamic pricing strategies based on market trends and demand to improve turnover and free up working capital.

2. **Effective Management of High-Value Items**
   High-value items constitute a significant share of the inventory's financial burden but often have lower turnover rates. To optimize their management, company should adopt the ABC method to categorize inventory into low, medium, and high-value items, and

prioritize the monitoring and movement of high-value items to avoid cash flow constraints and reduce holding costs.

3. **Regular Tracking of EOQ, Safety Stock, and Reorder Points**
   Effective stock replenishment is critical to maintaining optimal inventory levels. It is recommended to regularly calculate EOQ (Economic Order Quantity), Safety Stock, and reorder points for frequently used items and align stock levels with demand patterns to prevent overstocking while ensuring smooth operations without stockouts.

4. **Clearance Strategies for Overstock Management**
   The overstock analysis identified items with high closing balances and deadstock risks. To address this, company should implement targeted clearance strategies based on Clearance Priority and Deadstock Risk scores, to expedite the sale of overstocked and deadstock-prone items while ensuring space and resources are better utilized.

5. **Refined Procurement Practices**
   Excessive inwards and high opening balances were major contributors to overstocking. To mitigate this, company should refine procurement practices by avoiding bulk orders of low-demand items and focusing on smaller, frequent deliveries. Establishing supplier agreements for more flexible delivery schedules will further help align procurement with actual demand.

6. **Data-Driven Demand Forecasting**
   Inaccurate demand forecasting was identified as a major contributor to overstocking. Company should utilize historical data and advanced forecasting techniques to predict demand trends more accurately while integrating sales trends, and market dynamics into forecasting models to align procurement with actual needs and prevent excess stock.

7. **Digitalization of Quotation Preparation**
   Delays in quotation preparation due to manual processes affect service efficiency. To resolve this, implementing digital tools for quotation preparation will automate the repetitive tasks like rate calculations and item selection, and thus reduce turnaround times and improve service delivery.

8. **Focused Labor Allocation for Key Processes**
   Delay in dismantling process for quotation preparation is a critical bottleneck in the service process. To address this, company can allocate more labor specifically to dismantling and quotation preparation tasks during peak periods which will reduce overall service cycle time.

9. **Shift-Based Ordering System**
   Supplier policies and procurement delays contribute to inefficiencies in inventory flow. Company should transition to a shift-based ordering system that aligns with supplier

schedules, enabling timely procurement. Also, establishing stronger supplier relationships can help negotiate better lead times and reduce delays in receiving critical parts.

10. **Centralized Communication Platform**
    Coordination issues between the service and sales teams result in delays and inefficiencies. To enhance collaboration, company should adopt a centralized communication platform that facilitates real-time updates and task tracking, improving information flow and synchronization between teams to resolve bottlenecks quickly.

These recommendations aim to directly address the inventory management and service inefficiency challenges identified in the analysis, ensuring streamlined operations, reduced holding costs, and enhanced profitability for the organization.