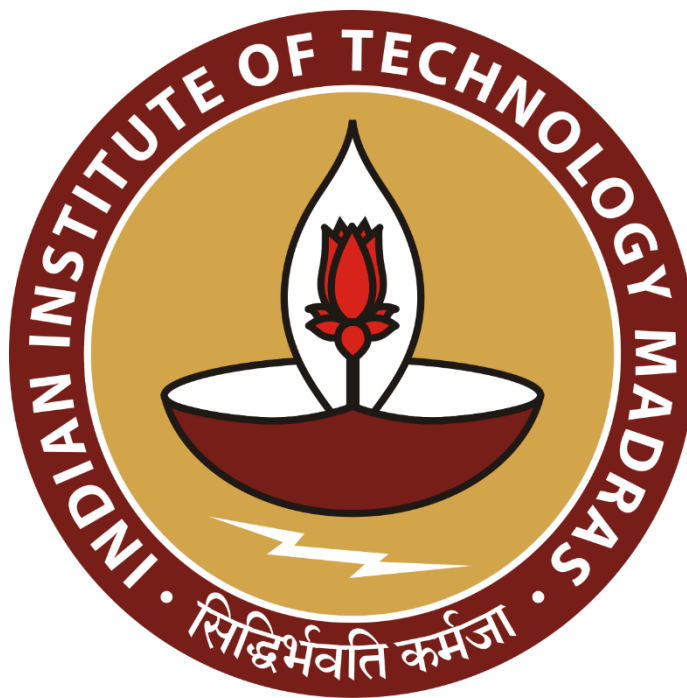# ENHANCING OPERATIONAL EFFICIENCY AT SFP SONS

A FINAL REPORT FOR THE BDM CAPSTONE PROJECT

Submitted by

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Contents

1. Executive Summary

SFP Sons (India) Pvt. Ltd., founded in 2004, is a B2B fragrance manufacturer producing perfumes, attars, and deodorants for both domestic and export markets. While the company has grown with a wide product range, it struggles with key operational issues such as delays in fulfilling high-demand items, underused capacity for fast-moving products, and inefficient focus on low-performing ones. This project aims to address these inefficiencies by providing a data-driven strategy to align production with market demand.

The analysis employed several key methods, including ABC classification, SARIMA demand forecasting, overproduction analysis, and ABC category fulfillment analysis, all supported by a comprehensive production shortfall assessment. These methods utilized the provided sales, production, and cost data to diagnose the core issues.

Key findings reveal a critical imbalance: a small group of high-value products (Class A-Number of products 5 and Class B-Number of products 15) generates the majority of sales, while a large volume of low-value Class C-items(Number of products 356) consumes disproportionate production resources. This has resulted in substantial overproduction (e.g., JASS CHAT EDP overproduced by 35,833 units), leading to waste. Simultaneously, high-demand A and B items (e.g., JASS NUMBER ONE DEODORANT with 2,588 unfulfilled units) are not consistently supplied, directly impacting sales. Overall production targets are frequently missed, with a notable decline in completed units in January 2025, indicating systemic operational strain.

Based on these insights, the project recommends a strategic shift towards a focused, forecast-driven production model. This involves deprioritizing C-item production to reallocate resources to high-demand A and B items, integrating SARIMA forecasts into planning, and optimizing critical production lines. Establishing fulfillment KPIs will monitor progress. These recommendations are designed to reduce waste, improve order fulfillment for key products, and enhance overall operational efficiency and profitability for SFP Sons.

2. Detailed explanation of the analysis process/methods

Data Cleaning and Preprocessing (Link : 🖼 Datasets)

- **Explanation:** The raw datasets (Production, Cost, and Sales) underwent a methodical cleaning and preprocessing process. This included standardizing column names and removing only business specific columns(such as HSN Codes). A key feature engineering step to extract product volume (ML) from the item names and mapping them to the provided ML-to-Cost Mapping as the costs are dependent on the Volume of the product . Irrelevant data, such as non-fragrance products and gifts, were removed to focus the analysis. Finally, the cleaned datasets were prepared to create a unified view.
- **Importance:** This process was foundational to the project's success, ensuring that all data used for analysis was consistent, accurate, and relevant. By preparing the data rigorously, we ensured the reliability of all subsequent findings and provided a solid basis for the final recommendations.

The core of this analysis focuses on the period from November 2024 to January 2025. This specific three-month window represents the most recent and complete operational cycle where both comprehensive sales and production data are available, providing a precise snapshot of SFP Sons' recent performance dynamics.

2.1 ABC Analysis

ABC Analysis is a standard method used to categorize a company's products based on their sales contribution. This helps in prioritizing attention and resources where they matter most. Products are grouped into three categories (A, B, C) based on their sales impact.

How it was implemented:

Data Aggregation : The first step is aggregating sales data by product, summing the sales over a specified period. This creates a ranked list of products, from highest to lowest sales contribution.

Cumulative Sales Percentage : Next, we calculate the cumulative sales percentage, which shows each product's relative contribution to total sales. This percentage accumulates from the highest-selling product downward, helping identify key thresholds that distinguish high-impact from low-impact products.

Products are categorized into three groups based on their cumulative sales percentage:

- Category A: Products that make up the top 70% of total sales, representing the highest impact items.
- Category B: Products contributing to the next 20% of sales, important but less critical than Category A.
- Category C: Products that account for the remaining 10% of sales, with low individual contributions. These are lower-priority items.

How it helps the problem:

This analysis directly supports the objective of optimizing resource allocation by focusing production capacity on high-demand products and minimizing operational strain from an extensive product range.' By clearly categorizing products into high-impact (Category A) and low-impact (Category C) groups, ABC analysis provides a data-driven framework to strategically allocate production capacity and resources, thereby reducing the operational burden of managing a diverse product portfolio.

2.2 Product Demand Forecasting using SARIMA

To enhance order fulfillment and sales responsiveness, the SARIMA (Seasonal AutoRegressive Integrated Moving Average) time-series forecasting method was applied. This model predicts future demand based on historical data, making it ideal for datasets with recurring patterns, such as monthly sales cycles. The focus was on forecasting demand for products identified in the ABC analysis.

The model extends ARIMA (AutoRegressive Integrated Moving Average) by incorporating seasonal components. It is denoted as:

$$SARIMA(p, d, q)(P, D, Q, s)$$

Where:

- **p**: Number of autoregressive (AR) terms
- **d**: Number of non-seasonal differences needed for stationarity
- **q**: Number of moving average (MA) terms
- **P**: Number of seasonal autoregressive terms
- **D**: Number of seasonal differences
- **Q**: Number of seasonal moving average terms
- **s**: Seasonality period (e.g., 12 for monthly data with annual seasonality)

The full SARIMA model can be expressed as:

$$\Phi_P(B^s)\phi_p(B)(1 - B)^d(1 - B^s)^D y_t = \Theta_Q(B^s)\theta_q(B)\varepsilon_t$$

Where:

- y_t is the actual value at time t
- ε_t is white noise (random error)
- B is the backshift operator: $By_t = y_{t-1}$
- $\phi_p(B)$ is the non-seasonal AR operator
- $\theta_q(B)$ is the non-seasonal MA operator
- $\Phi_P(B^s)$ is the seasonal AR operator
- $\Theta_Q(B^s)$ is the seasonal MA operator

Differencing terms $(1 - B)^d$ and $(1 - B^s)^D$ are used to make the series stationary by removing trend and seasonality respectively.

How SARIMA Model Works:

Removes Trend & Seasonality

- Uses regular differencing (1−B)^d to remove the trend.
- Uses seasonal differencing (1−B^s)^D to remove seasonality.

Uses Historical Patterns

- Incorporates past values (AR terms)
- Learns from past past mistakes (MA terms)
- Includes seasonal AR and MA components

Trains the Model:Optimizes parameters to minimize prediction error during training using Maximum Likelihood Estimation (MLE).

Forecasts Future Value:Predicts using past data and model structure

Captures Seasonality :Effectively models repeating seasonal patterns (e.g., monthly or quarterly trends)

Explanation of Choosing the Right parameters:

In typical SARIMA modeling, parameters like p, q, P, and Q are often selected by analyzing ACF (Autocorrelation Function) and PACF (Partial Autocorrelation Function) plots, while d and D (differencing orders) are determined using statistical tests such as the ADF (Augmented Dickey-Fuller) test. The seasonal period (m) is usually informed by business cycles for example, 12 for monthly data with yearly seasonality.

However, due to the limited historical data (only 10 months) in this case, ACF and PACF plots were not reliable. With such a small sample size, these plots tend to fluctuate and produce noisy or misleading patterns, making manual parameter selection statistically unstable.

Instead of relying on those methods, a grid search-based hyperparameter tuning approach was used. By systematically testing combinations of (p,d,q) values and evaluating model performance on a validation set using Mean Absolute Error (MAE), I ensured a data-driven and objective parameter selection process. The seasonal parameters (P,D,Q) were held constant (at 1, 1, 1) and the seasonal period (m = 3) was chosen based on observed short-term cyclic patterns in the available data.

SARIMA was chosen over a standard ARIMA model because midterm analysis explicitly identified seasonal patterns in the sales data. Ignoring this inherent seasonality would have significantly reduced forecast accuracy, as ARIMA cannot explicitly model recurring cycles.

How it was implemented:

Data Preparation: Historical sales data for the identified products is aggregated into monthly time series, making it suitable for SARIMA forecasting.

Model Training and Validation: The dataset is split into training and validation sets. The model is trained on historical data, and the forecasted demand is compared against actual sales during the validation period to evaluate accuracy.

Hyperparameter Tuning and Future Forecasting:Different model configurations are tested to identify the optimal parameters. The best model is then used to generate future demand forecasts, accompanied by confidence intervals to indicate possible variations.

How it helps the problem:

The SARIMA model forecasts demand based on historical data, enabling better decision-making for product focus and resource allocation. It helps identify which products to prioritize or reduce, improving order fulfillment and supporting sales responsiveness.

2.3 Overproduction Analysis of least Important Products

To directly address the project's objective of minimizing operational strain, a core principle of Lean Manufacturing was applied. This analysis was used to identify and quantify overproduction and compare with the sales and forecast to understand the severity of that.This method focuses specifically on the low-priority, low-selling Category C (from the ABC analysis) items to determine which of them are consuming disproportionate production resources.

How it was implemented:

Overproduction Identification and Calculation : The analysis began by directly comparing the total quantity produced against the total quantity sold for each low-priority Category C item over a three-month period. Mismatch was then calculated by subtracting the total quantity sold from the total quantity produced. A positive mismatch value directly indicates overproduction, where the number of units manufactured exceeds demand. Also these were being compared to the forecasted demand of those products by the SARIMA model. This key metric quantifies the extent of the inefficiency.

Visualization : The products with the highest positive mismatch values were ranked to identify the top 10 most overproduced items. A bar chart was then created to visually represent this ranking. This visualization powerfully highlights which low-value products are consuming the production capacity without generating a corresponding return in sales, providing concrete evidence to support decisions on product rationalization.

How it Helps the problem:

By quantifying overproduction of low-value (Category C) items, this method highlights wasted production capacity and resources. It provides clear evidence for rationalizing the product portfolio, thereby reducing operational strain and freeing up resources for high-demand products

2.4 A & B Category Product Unfulfillment Analysis

This analysis addresses the objective of improving order fulfillment for high-demand products .Focusing on Category A and Category B products, the method quantifies unfulfilled orders to identify key areas for operational improvement.

How it was implemented:

The analysis used sales data and the orders were categorized as:

- Total Orders: The combined sum of both fulfilled and unfulfilled units, representing total demand.

- Fulfilled Orders: Units successfully delivered to customers.
- Unfulfilled Orders: Units that were ordered but could not be delivered.

A Fulfillment Rate was calculated as the percentage of total demand that was successfully met.

Fulfillment Rate (%)= (Fulfilled Orders/Total Orders) × 100

This highlights which A and B items are facing the most severe fulfillment challenges, enabling clear prioritization for production. A bar chart was created to visually represent the unfulfilled orders for each A and B category product. This provides a clear and compelling visual argument for directing production capacity to these specific items.

How it Helps the problem:

This analysis directly addresses the objective of enhancing sales and revenue By quantifying unfulfilled orders for high-demand A and B category products, this method precisely identifies missed sales opportunities. This insight is crucial for strategically directing resources released from the overproduction of C-items, ensuring they are reallocated to fulfill the actual demand for the most valuable products, thereby improving order fulfillment and enhancing overall sales and revenue.

2.5 Production Shortfall Analysis

This analysis quantifies and identifies production shortfalls to enhance operational efficiency. It uses a two-part approach to pinpoint where and when planned production targets are not being met, highlighting bottlenecks.

How it was implemented:

Monthly Production Shortfall :This part of the analysis provides a high-level overview of production performance over time. A clustered bar chart is used to visually compare total planned production against total completed production each month. The difference between the bars highlights the magnitude of the production shortfall over time.

Production Shortfall by Category : This method offers a more detailed view by breaking down the total shortfall by product category. By calculating the average DiffQty (the difference between planned and completed quantities), a bar chart is created to show which product categories are the source of the most severe production gaps.

How it helps the problem:

This method supports the objective of enhancing sales and revenue through the implementation of effective production strategies.By quantifying the overall production shortfall and identifying specific categories experiencing significant gaps, this method pinpoints operational bottlenecks and areas of underutilized capacity. This understanding is crucial for developing targeted production strategies to improve overall operational effectiveness and responsiveness.

2.6 Performance of A-Category Products in All the States

This analysis evaluates the sales performance of SFP Sons' most valuable (Category A) products across different states. It aims to identify key geographical markets where these star products are performing highest compared to lowest , guiding targeted marketing and distribution efforts.

How it was implemented :

Data Preparation: Sales data for Category A products was filtered to the analysis period.

Sales Aggregation: The total sales revenue for Category A products was calculated for each state.

Performance Identification: States were then ranked by the total sales of Category A products to identify both top-performing and lowest-performing regions. A bar chart visually represents these sales, sorted in descending order.

How it Helps the Problem: By pinpointing states where Category A products are underperforming, SFP Sons can strategically direct marketing and distribution resources to strengthen these key markets. This targeted approach aims to maximize the sales potential of critical products, thereby enhancing overall revenue and optimizing resource deployment across the distribution network.

3. Results and findings

3.1 ABC Analysis

ABC Category	Number of Items	Total Sales	Cumulative Sales Percent	Avg Sales Per Item
A	5	128,968,202.85	69.11%	25,793,640.57
B	15	38,232,149.55	89.60%	2,548,809.97
C	356	19,407,235.76	100.00%	54,514.71

Table 3.1.1 : ABC Analysis summary

Category A : These are the top-performing products that generate the majority of the company's sales revenue:

- JASS CLASSIC EDP
- AHSAN ATTAR FULL EDP LIVE FRESH
- JASS CLASSIC DEODORANT

- CRAZY MOMENTS PINK EDP
- AHSAN BLACK MAGNET EDP

Category B : This group represents a moderate segment of products that provide a steady and consistent contribution to overall revenue:

- JASS NUMBER ONE DEODORANT
- JASS SILVER EDP
- AHSAN BLACK MAGNET EDP (L)
- AHSAN GOLDEN MAGNET EDP
- JASS SPORT DEODORANT
- and 10 others..

Category C : This large category consists of products with low sales and minimal revenue contribution:

- TARA SANDAL WOOD GREEN GREEN AIR FRESHENER
- JASMINE (ATTAR FULL) AIR FRESHENER-
- JASS BOYFRIEND BY HER EDP
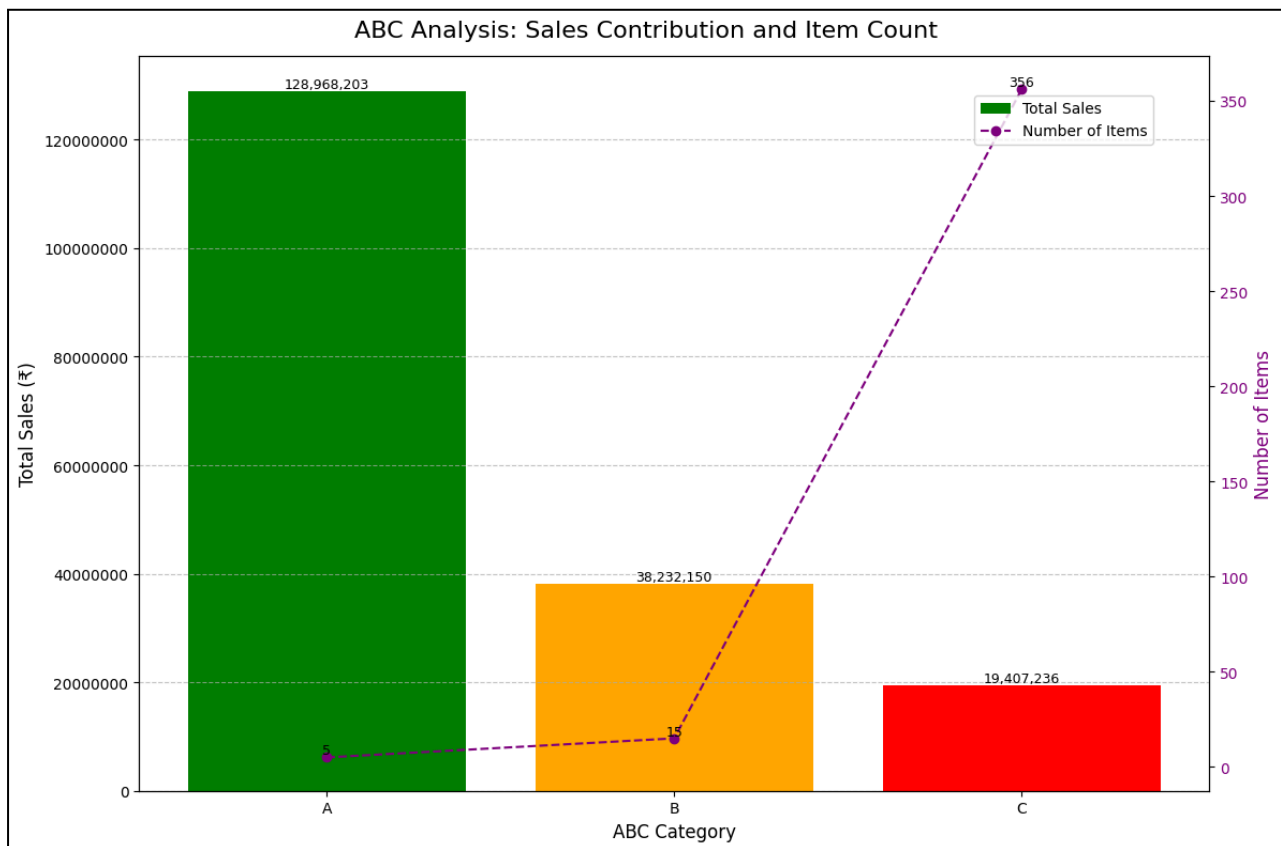- JASS KICK DEODORANT
- TARA MILE STONE DEODORANT
- and 351 others…

Figure 3.1.1 : ABC Analysis visualization

9

The ABC analysis highlights a clear imbalance in product contribution. Just 5 Category A items generate over ₹128.96 million, accounting for the majority of total sales. In comparison, 15 Category B items contribute ₹38.23 million, while Category C, with 356 items, brings in only ₹19.41 million. Despite comprising over 90% of the product portfolio, Category C contributes the least to revenue. This underscores the need to focus resources on high-performing items and reassess the value of low-impact SKUs.

3.2 Demand Forecasting for 'A-Items'

Based on the SARIMA forecasting model, a comprehensive demand forecast was generated for all Category A products to inform future production strategies. The results provide a data-driven outlook on anticipated demand and offer critical insights into the performance and future needs of the company's most valuable products.

Validation of Forecast Accuracy :

A pivot table comparing actual and forecasted demand for the validation set December 2024 and January 2025 revealed the following:

Product Name	Actual Demand 12-2024	Forecasted Demand 12-2024	Actual Demand 01-2025	Forecasted Demand 01-2025
AHSAN ATTAR FULL EDP LIVE FRESH	10,286	15,004	10,646	12,154
AHSAN BLACK MAGNET EDP	3,045	1,886	9,084	9,262
CRAZY MOMENTS PINK EDP	3,938	3,920	5,172	4,954
JASS CLASSIC DEODORANT	32,961	32,585	23,862	19,477
JASS CLASSIC EDP	262,952	217,250	240,428	200,178

Table 3.2.1 : Validation Results Pivot Table (Actual vs. Forecasted Demand)

Table 3.2.1 shows a strong alignment between actual and forecasted demand for most Category A products, validating the reliability of the SARIMA model. Forecasts for CRAZY MOMENTS PINK EDP and JASS CLASSIC DEODORANT closely match actual figures, while AHSAN BLACK MAGNET EDP and JASS CLASSIC EDP show minor deviations. AHSAN ATTAR FULL EDP LIVE FRESH was slightly overestimated. Overall, the model captures demand trends effectively, making it suitable for guiding production planning.

Demand Forecast Trends (Figures 3.2.1 and 3.2.2):

The analysis segmented the 'A-items' into two groups to better visualize their distinct demand patterns.

High-Volume 'A-Items' (Figure 3.2.1):

● The forecast for **JASS CLASSIC EDP** projects continued strong demand, with a clear upward trajectory.The model predicts that sales for this product will remain high, reaffirming its status as the top-performer and a critical item for production prioritization. The forecast aligns with the product's historical performance, which shows significant fluctuations but consistently high volume.

Low-Volume 'A-Items' (Figure 3.2.2):

● For the remaining Category A products, the forecast indicates stable and consistent demand. Products like **AHSAN ATTAR FULL EDP LIVE FRESH** and **CRAZY MOMENTS PINK EDP** are expected to maintain their current demand levels, with some showing minor seasonal variations. The forecast for **JASS CLASSIC DEODORANT**, in particular, projects a slight decline in demand, which should be monitored closely.

The SARIMA forecasts are a reliable tool for proactive production planning. They confirm sustained strong demand for high-volume items and project stable trends for others. These insights are essential for aligning production with market demand and ensuring optimal order fulfillment.
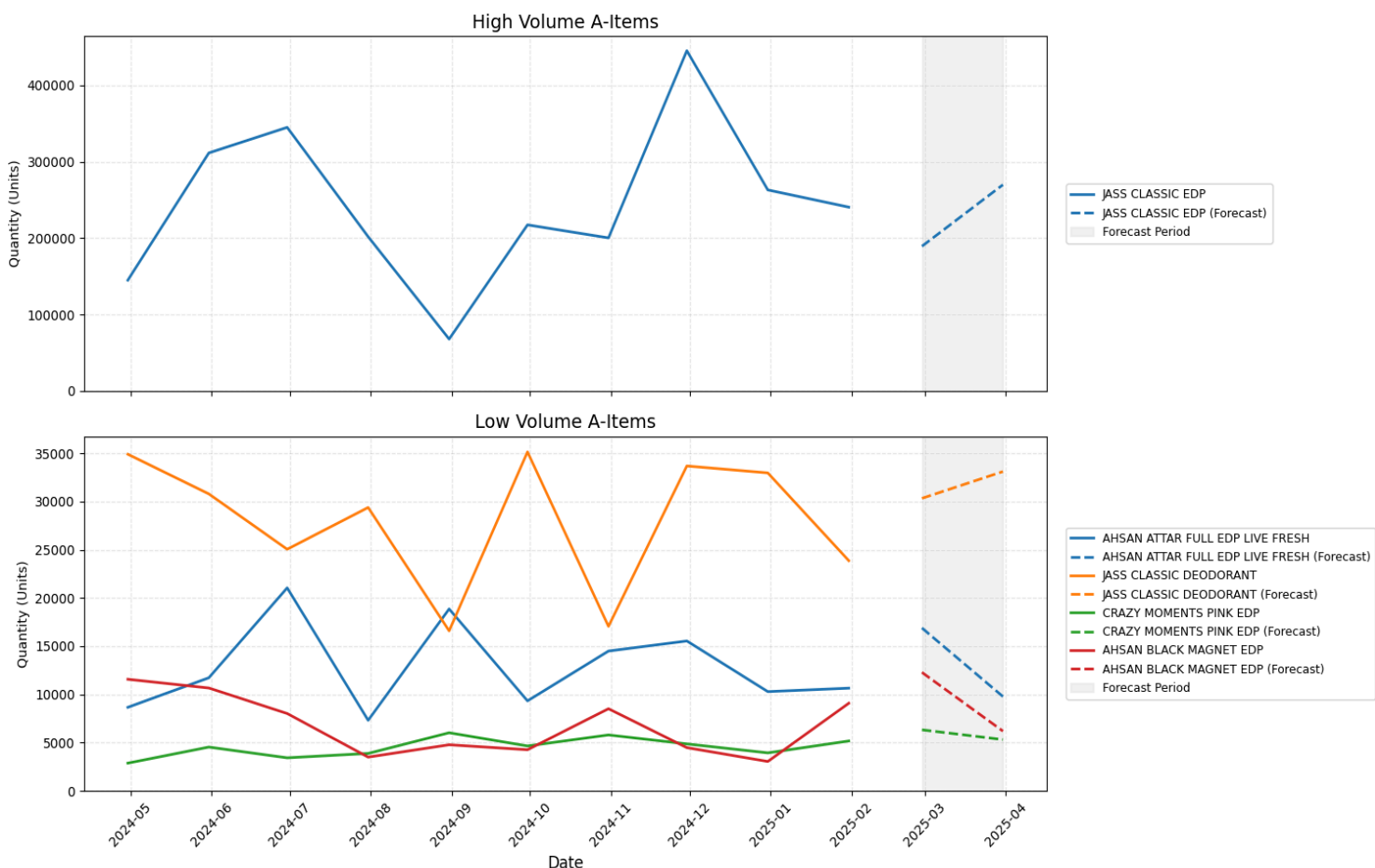

Figure 3.2.1 and 3.2.2 : Demand Forecast for A Items (Split by Volume)

3.3 Lean Manufacturing: Overproduction Analysis

The Overproduction Analysis on Category C products reveals a significant and recurring issue of resource waste. This analysis, focused on a three-month period, provides concrete evidence of where production is misaligned with actual demand. The overproduction was identified by comparing production output against the SARIMA-forecasted demand for these items also with the number of items sold in the time period, directly addressing the project's core problem of operational inefficiency. This table provides a granular view of the production, sales, and mismatch data for the top 10 overproduced items:

Item Name	Total Forecasted Demand	Total Produced	Total Sold	Mismatch	Initial Opening Stock
JASS CHAT EDP	201	36047	214	35833	0
AHSAN RED MAGNET EDP	0	10000	0	10000	0
JASS SPICE DEODORANT	2458	7949	1190	6759	720
JASS CHOCO DEODORANT BODY SPRAY	95	8080	1345	6735	1440
JASS NATURE DEODORANT BODY SPRAY	37	5360	4	5356	0
JASS ULTIMATE DAISY BODY MIST	0	4750	354	4396	1440
AHSAN BLUE MEN EDP	0	5044	992	4052	100
AHSAN FLORA EDP	0	4944	992	3952	100
AHSAN MOLTEN SPICE EDP	0	4945	993	3952	100
AHSAN RED HOT EDP	0	4564	992	3572	100

Table 3.3.1: Top 10 Overproduced Items of Category C

Key findings from the table above:

- **Significant Mismatch:** The analysis, which compared production against the SARIMA-forecasted demand and the sales , reveals a substantial disconnect. JASS CHAT EDP is a prime example of this inefficiency, with an overproduction of over 35,000 units against a minimal forecasted demand of 201 units. This highlights a critical flaw in the production planning for low-value SKUs.
- **Zero Demand:** The table shows that AHSAN RED MAGNET EDP and other items with a forecasted demand of zero were still produced in large quantities. This represents a complete waste of resources, as production was initiated for products that had no market pull.
- **Compounded Waste:** Several products, such as JASS SPICE DEODORANT and JASS CHOCO DEODORANT BODY SPRAY, had substantial initial stock levels. Despite this existing

inventory, production continued far beyond sales and forecasted demand, resulting in compounded inventory buildup and increased carrying costs. The total mismatch for these products indicates a systemic issue with inefficient planning.
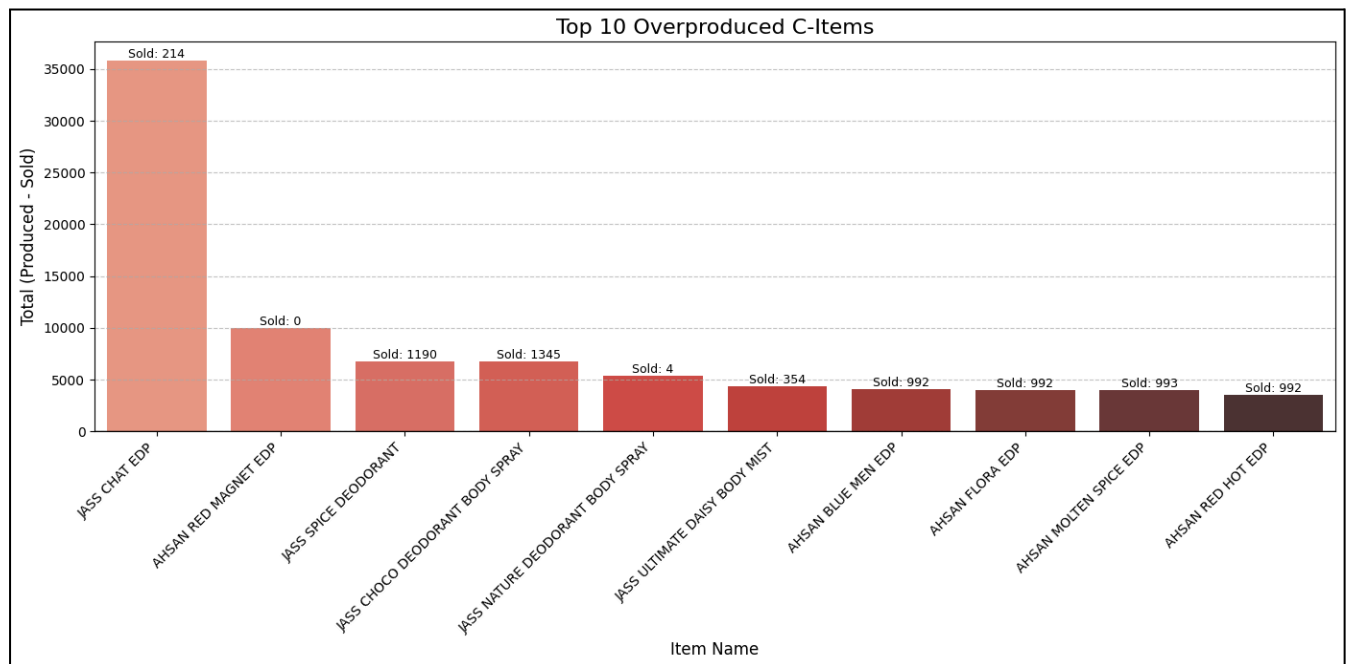

Figure 3.3.1 : Top 10 Overproduced Items of Category C

The bar chart in Figure 3.3.1 visually represents the top 10 most overproduced Category C items by their Mismatch value. The graph clearly shows that JASS CHAT EDP is the most overproduced product by a significant margin. This visualization powerfully highlights which low-value products are consuming the most production capacity without generating a corresponding return in sales. The consistent pattern of overproduction across the top 10 items provides compelling evidence that a systemic issue exists within the production planning process for Category C products.

3.4   A & B Category Product Unfulfillment Analysis

The unfulfillment analysis for Category A and B products reveals a significant operational challenge in meeting demand for the company's most valuable items. This analysis, focused on the three-month period , provides a quantitative view of the fulfillment gaps that directly impact sales and customer satisfaction.

The table shows unfulfilled orders are a recurring issue for popular items.

Item Name	Total Orders	Fulfilled Orders	Unfulfilled Orders	Fulfillment Status	Fulfillment Rate (%)
JASS NUMBER ONE DEODORANT	25,696	23,108	2,588	Unfulfilled: 2,588 units	89.93
JASS AQUA DEODORANT BODY SPRAY	12,343	11,633	710	Unfulfilled: 710 units	94.25
JASS SPORT DEODORANT	24,194	23,799	395	Unfulfilled: 395 units	98.37

13

TARA ROSE INFUSION GREEN GREEN AIR FRESHENER	4,469	4,199	270	Unfulfilled: 270 units	93.96
JASS STRONG DEODORANT	6,267	6,073	194	Unfulfilled: 194 units	96.9
TARA JASMINE GREEN AIR FRESHENER	4,527	4,381	146	Unfulfilled: 146 units	96.77
TARA VETIVER DELIGHT DEODORANT	4,223	4,083	140	Unfulfilled: 140 units	96.68
TARA LAVENDER GREEN AIR FRESHENER	4,303	4,194	109	Unfulfilled: 109 units	97.47
TARA OCEAN BREEZE GREEN AIR FRESHENER	5,712	5,653	59	Unfulfilled: 59 units	98.97

Table 3.4.1 : A and B-Item Fulfillment Efficiency Summary

We can see that JASS NUMBER ONE DEODORANT has the highest unfulfilled orders (2,588 units) and a fulfillment rate of only 89.93%, highlighting a critical production shortfall. Other key products also have hundreds of unfulfilled units, representing lost sales opportunities. This confirms that operational inefficiencies are most pronounced in the products that drive the majority of revenue. The other items from these categories , not in the table , were 100 percent fulfilled.
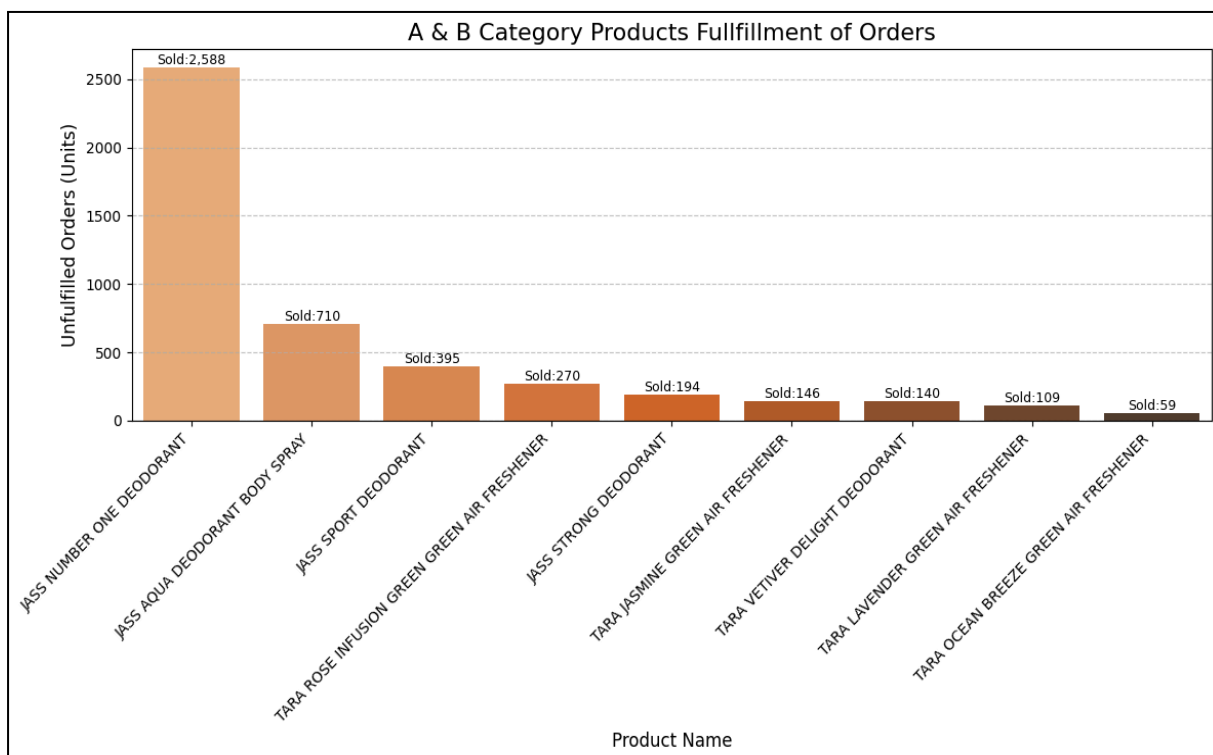

Figure 3.4.1 : A and B Category Products Fulfillment of Orders

The bar chart visually reinforces these findings. It clearly shows the scale of the unfulfillment issue, with the bar for JASS NUMBER ONE DEODORANT being significantly taller than all others. This visualization provides a compelling argument for directing production capacity and resources to this specific product.

3.5 Production Shortfall Analysis

The production shortfall analysis provides a clear and quantitative view of the company's operational challenges, directly highlighting when and where production is failing to meet planned targets.
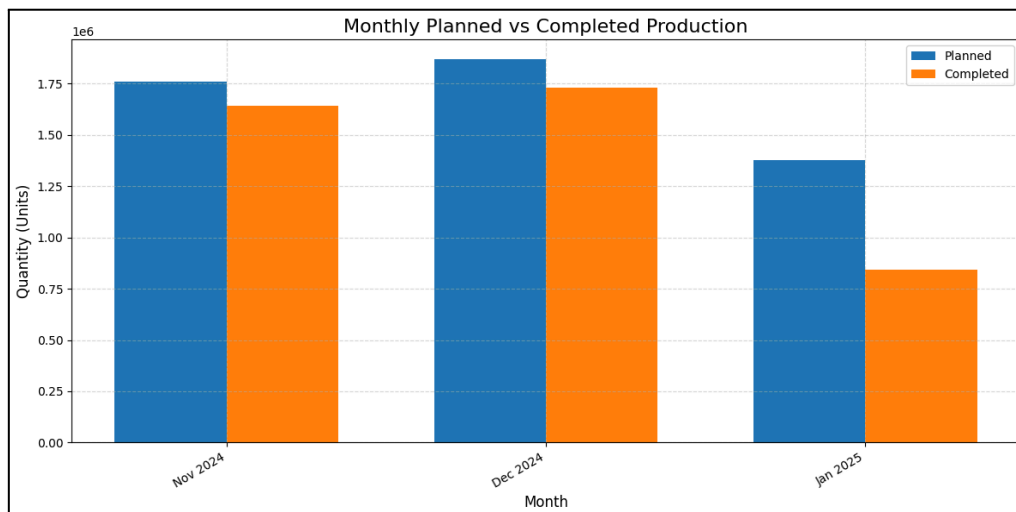

Figure 3.5.1 : Monthly Planned vs. Completed Production

The bar chart in Figure 3.5.1 provides a high-level overview of the production shortfalls over a three-month period.

- The figure shows that in time duration , the completed production quantities fell slightly short of the planned targets.
- The most severe shortfall occurred in **January 2025**, where completed production was significantly lower than planned(Figure 3.5.1). The large gap between the planned and completed bars for this month indicates a major production bottleneck and an inability to meet objectives.
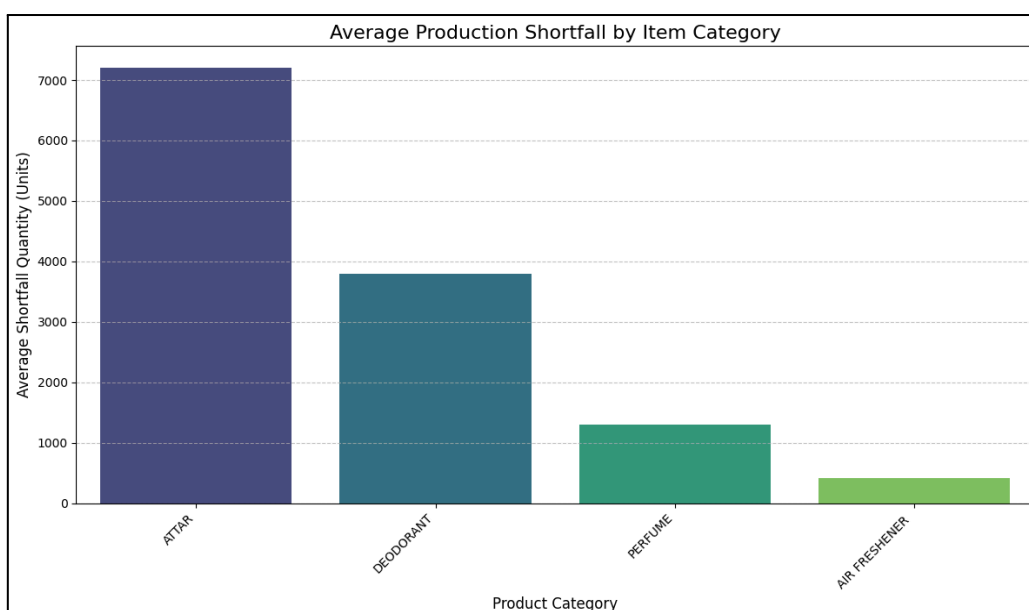
The analysis (Figure 3.5.2) by product category reveals that production issues are not uniform across the portfolio.

- Attar has the highest average production shortfall, followed by Deodorant. The categories containing the highest-value products are experiencing the most significant average shortfalls.
- This finding is critical as it connects the production inefficiency directly to the items that are most important for the company's revenue and profitability. The severe shortfalls in these key categories are likely the primary cause of unfulfilled orders for top-selling products, resulting in a direct impact on the company's bottom line and customer satisfaction.

3.6 Performance of A-Category Products in All the States
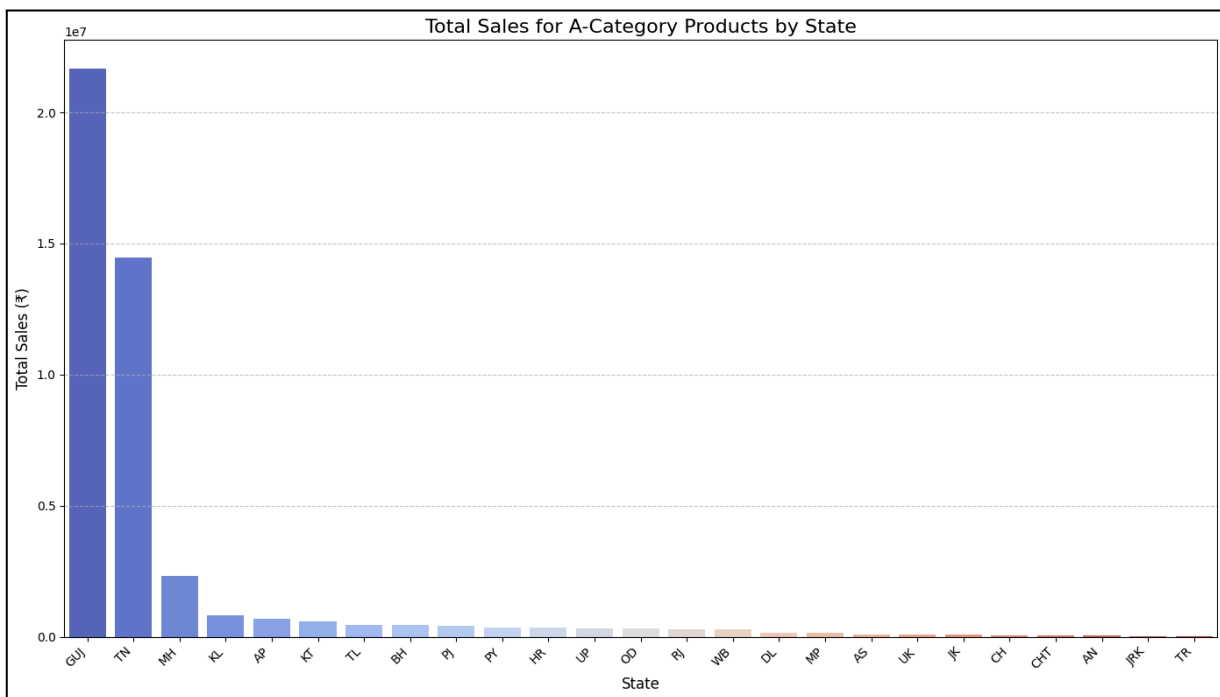

Figure 3.6.1 Performance of Category-A Products

As shown in Figure 3.6.1 The analysis reveals a significant concentration of sales for Category A products in a few key states, particularly Gujarat (GUJ) and Tamil Nadu (TN). These two states collectively account for the vast majority of revenue from SFP Sons' most critical products. Conversely, a large number of other states show minimal or negligible sales for these items. This indicates untapped market potential or significant disparities in distribution effectiveness across regions.

4. Interpretation of Results and Recommendations

This section brings together the findings from the various analyses ABC classification, SARIMA forecasting, overproduction diagnosis, and fulfillment evaluation to present a cohesive view of operational challenges at SFP Sons. The results reveal clear opportunities to realign production focus, deprioritize the resource-consuming low-impact products and improve service levels for high-performing products.

Interpretation:

SFP Sons currently operates with a broad and decentralized production approach, which has contributed to systemic inefficiencies. A closer look at the data highlights three core challenges:

1. **Product Portfolio Imbalance and Operational Strain**: The ABC analysis (Figure 3.1.1) highlights a significant imbalance: a small group of high-value products (Category A and B, 20 SKUs) generates the vast majority of sales (nearly 90%), while a disproportionately large portfolio of 356 Category C items contributes minimally (just 10.4%). This extensive product range, particularly the sheer volume of low-impact items, inherently strains production capacity.This indicates that the company's product diversity, while offering choice, is currently a source of operational burden rather than a competitive advantage.

2. **Overproduction of Low-Demand Items**: The Overproduction Analysis on Category C products (Table 3.3.1 and Figure 3.3.1) shows that products with low market demand are still being produced in large quantities. For instance, JASS CHAT EDP was overproduced by over 35,000 units compared to its forecasted demand of 201 units. This leads to wasted production and inventory.Such overproduction directly translates into increased carrying costs, potential obsolescence, and inefficient utilization of valuable factory time.

3. **Unfulfilled Demand for Key Products:** The A & B Category Fulfillment Analysis (Table 3.4.1 and Figure 3.4.1) shows that high-demand products (A and B items) are not always fully supplied. For example, JASS NUMBER ONE DEODORANT had 2,588 unfulfilled units. As shown in point 2 it is mainly because of the overproduction of the least important products and not using that resources to produce the ones which are important.This means sales opportunities are being missed for important products.This represents a direct loss of revenue and potential damage to customer satisfaction for the company's valuable product lines.

4. **Overall Production Shortfalls:** The Production Shortfall Analysis (Figure 3.5.1 and Figure 3.5.2) shows that overall planned production targets are not consistently met. The gap between planned and completed production, particularly the sharp drop in completed

units in January 2025, indicates operational difficulties.This consistent failure to meet internal targets points to systemic issues within the production process, impacting overall output and reliability.

5. **Geographical Sales Concentration for Key Products:** The A-Category Product Performance by State (Figure 3.6.1) highlights a significant geographical imbalance in sales contribution. A substantial majority of revenue from high-value A-items is concentrated in a few states like Gujarat and Tamil Nadu, while numerous other states show minimal sales. This suggests either untapped market potential in underperforming regions or inefficiencies in the distribution and marketing strategies in those areas.

Recommendations:

Based on the interpretation of these findings, the following recommendations are proposed to rectify the misalignment and optimize operational efficiency.

1. **Implement a Focused Product Strategy**: SFP Sons should formally deprioritize the production of all Category C items. A rigorous product rationalization process should be initiated for these products, with the goal of discontinuing those with consistently low or zero forecasted demand and high production mismatches (e.g., JASS CHAT EDP, AHSAN RED MAGNET EDP). The capacity and capital freed by this action should be reallocated to meet the demand for high-value Category A and B products.

   Addresses : Objective A (Optimizing resource allocation and minimizing operational strain).

2. **Establish Robust Forecast-Driven Production Model** : The SARIMA demand forecasts for Category A and B items should be integrated into the monthly planning cycle to guide raw material procurement and production scheduling. Also, the freed resources by deprioritizing the overproduced least important products should be invented into the production of these important products. This will allow the company to anticipate market trends and prevent the production shortfalls that lead to unfulfilled orders, thereby improving service levels and revenue capture.

   Addresses: Objective B(Enhancing Sales and Revenue by implementing effective production strategies).

3. **Optimize Critical Production Lines**:The systemic shortfalls identified in the production of Attar and Deodrant products require targeted intervention. A process audit, such as Value Stream Mapping, should be conducted on these specific production lines to identify and eliminate bottlenecks. Investing in process improvements or automation for these high-priority lines can significantly increase throughput and consistency, directly resolving the unfulfilled orders for the company's most profitable products.

Addresses: **Objective A** (Optimizing resource allocation and minimizing operational strain).

4. **Establish a Fulfillment KPI:** A new Key Performance Indicator (KPI) should be established to monitor the fulfillment rate of all Category A and B products on an ongoing basis. An ideal target fulfillment rate of at least 98% should be set. This will create a metric-driven culture focused on ensuring that the improvements from the recommendations are sustained and continuously monitored.

    Addresses: Objective B(Enhancing Sales and Revenue by implementing effective production strategies).

5. **Strengthen Regional Distribution and Marketing:** Based on the identified geographical disparities in A-item sales, SFP Sons should prioritize strengthening its distribution and marketing efforts in underperforming states. This could involve targeted promotional campaigns, optimizing logistics to reduce costs in specific regions, or enhancing distributor relationships to expand market penetration for high-value products.

    Addresses: Objective B(Enhancing Sales and Revenue by implementing effective production strategies).

6. **Continuous Improvement Through Advanced Data Models** : SFP Sons should explore more advanced analytical techniques. This includes using Multiple Regression Analysis to incorporate external factors (e.g., marketing spend, promotions) into demand forecasts for greater accuracy. Furthermore, Linear Programming can be implemented to optimize production schedules and resource allocation (labor, raw materials, machine time) based on these refined forecasts, ensuring maximum profit and minimal waste.

    Addresses: Objective A & B.

7. **Strengthen Distributor Partnerships and Market Penetration:** SFP Sons should enhance support for its key distributors, particularly those handling Category A and B products. This involves implementing targeted incentive programs and providing co-marketing materials to amplify their sales efforts. Concurrently, the company should actively participate in relevant industry trade shows and B2B events. These platforms offer direct opportunities to showcase top-performing items, attract new distribution partners, and ultimately expand market penetration for high-value products. This strategy directly addresses Objective B by enhancing sales and revenue through improved market reach and strategic partnerships.

5. Conclusion

This Business Data Management final report systematically identified and analyzed critical operational inefficiencies at SFP Sons. Through detailed data analysis, the report uncovered a fundamental disconnect between the company's current production approach and actual market

demand. This misalignment has resulted in the overuse of resources on lower-priority, low-value products, while a few higher-demand items continue to face shortages.

The findings pointed to notable overproduction of Category C products and recurring unmet demand in Category A and B segments. In addition, persistent production shortfalls in key categories were identified as a major constraint on the company's ability to meet customer expectations and optimize performance.

Based on these insights, the report proposes actionable recommendations aimed at improving production planning, streamlining operations, and enhancing fulfillment. These include adopting a demand-driven strategy, optimizing the focus on high-performing products, and introducing performance metrics to guide future decisions.

By implementing these measures, SFP Sons stands to improve operational efficiency, reduce unnecessary resource use, and better align its output with market needs—ultimately supporting more sustainable and profitable business outcomes.