Optimization of Sales Strategy and Order Forecasting in a Dairy Business

A FINAL SUBMISSION report for the BDM capstone Project

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1.EXECUTIVE SUMMARY AND TITLE :

Naadul Milk, a prominent dairy business operating in both B2B and B2C sectors with a diverse product range including cream, milk, paneer, etc has faced significant challenges in understanding its category-wise sales performance, product-level demand, and revenue variability. These analytical gaps have historically impeded strategic decision-making related to pricing, inventory management, and overall profitability optimization, leading to inefficiencies in its operations despite a strong market presence.

To address these critical issues, the project involved the meticulous curation and analysis of two key datasets: Sales Data, encompassing 848 transactions from April to May 2025, and a comprehensive Rate and Margin List. Utilizing descriptive statistics and preliminary exploratory analysis, we identified a total revenue of ₹1.88 crore across 33 products. The initial findings highlighted that cream products contributed the highest average revenue per transaction, while standard deviation and range metrics revealed substantial sales variability in high-volume items like cream and fresh milk, in contrast to consistent, low-volume sales observed in products such as "Fresh Dahi Matka."

The comprehensive analysis yielded crucial insights into Naadul Milk's sales dynamics, confirming the significant impact of consumption and pricing trends across different segments. Our findings provide a robust foundation for understanding the core drivers of revenue and identifying areas of high variability. This deep dive into sales patterns sets the stage for more informed strategic planning.

Based on these results, we recommend optimizing B2B order patterns through predictive forecasting and refining the product mix to enhance profitability. The project's findings and analytical framework are anticipated to directly support better pricing strategies, more efficient inventory management, and sustained strategic growth for Naadul Milk. This initiative marks a significant step towards enabling the business to make data-driven decisions that can lead to observable improvements in operational efficiency and financial performance.

2.DETAILED EXPLANATION OF ANALYSIS PROCESS/METHODS:

This section provides a comprehensive and detailed explanation of the data analysis process, from initial data cleaning to the application of various analytical methods, ensuring adherence to data quality standards and strategic alignment with business objectives.

2.1 Data Cleaning and Preprocessing:

The data cleaning process involved meticulously preparing the Naadul Milk sales data, spanning from April 1 to May 30, 2025, to ensure its accuracy and suitability for analysis. This involved a structured approach utilizing tools such as Excel for initial inspection and Python-based libraries(Pandas, Matplotlib, Seaborn and Sklearn.) for more advanced programmatic cleaning. Key steps undertaken were:

Data Inspection & Formatting: This initial step focused on thoroughly reviewing the dataset to identify inconsistencies in column headers. For instance, ensuring all sheets used consistent labels like 'Date', 'Item', 'Quantity', 'Price', and 'Amount'.   The data types for each column were validated to ensure numerical fields contained only numbers and date fields were in a standard date format (e.g., YYYY-MM-DD), which is crucial for time-series analysis.

Missing Values Handling: A rigorous check for blank or null cells was performed across all critical fields. Specifically, columns such as 'Date', 'Item', 'Quantity', and 'Amount' were prioritized, as missing entries in these fields could significantly skew analytical results.Depending on the extent and nature of missing data, strategies like imputation (e.g., replacing with mean or median for numerical data) or row removal were considered, with the choice justified by the impact on overall data integrity.

Duplicate Removal: The dataset was scanned for redundant or exact duplicate rows, which can arise from repeated data entry or minor naming discrepancies.   Identifying and removing these duplicates was essential to prevent overcounting sales figures and ensuring that each transaction was represented uniquely, thus maintaining the integrity of aggregated data.

Outlier Detection: Domain expertise was applied to identify and evaluate anomalies in sales figures. This involved flagging unusually high or low values in 'Quantity' or 'Amount' that

might indicate data entry errors rather than genuine sales events.   Such outliers were either corrected if the true value could be ascertained or removed to prevent them from disproportionately influencing statistical calculations and trend analyses.

Data Cleaning:

Data cleaning serves as the bedrock for reliable and trustworthy analysis. Its critical importance stems from its direct impact on data quality, which in turn dictates the accuracy and validity of all subsequent analytical insights.

By meticulously cleaning the data, the following were ensured:

- **Accuracy in Statistical Calculations**: Clean data is fundamental for precise calculations of statistical measures such as mean, median, mode, and standard deviation. Without it, these metrics would be distorted, leading to erroneous conclusions about sales performance and product behavior.
- **Consistency Across Data Points**: The cleaning process standardized product names, units of measurement (e.g., 'Pcs.' vs. 'Pieces'), and date formats. This consistency is vital for accurate aggregation and comparison of data across different items and time periods, preventing issues like product fragmentation in reports.
- **Reliability of Business Insights**: Insights derived from clean data are inherently more reliable. This ensures that forecasting models, pricing decisions, and inventory management strategies are based on a true representation of past sales performance, minimizing risks associated with flawed data.
- **Clarity in Visualizations**: Clean and structured data translates directly into clear, interpretable, and professional visualizations (e.g., charts, graphs) for management reporting. This facilitates better understanding and quicker decision-making by stakeholders who rely on these visual summaries.

Ultimately, without thorough data cleaning, any analytical results, particularly in tasks like trend analysis, product classification, or sales forecasting, would be misleading, undermining the utility and credibility of the entire project.

2.2 Comprehensive Explanation for each Method/Analysis Used:

2.2.1 Trend Analysis:

Purpose: Trend analysis is used to understand the patterns and behaviors in sales data over time. This is critical for effective inventory management and strategic business planning. By identifying recurring sales patterns and seasonal behaviors, businesses can anticipate demand fluctuations, optimize inventory levels, and align marketing strategies.

Smooth Trends (Moving Averages): To reduce short-term fluctuations and highlight longer-term trends, a moving average was applied to the sales data. A 7-day or 30-day moving average was used to smooth daily sales, providing a clearer picture of underlying patterns.

$$S_t = \frac{1}{n} \sum_{i=0}^{n-1} D_{t-i}$$

Where:

- S_t is the smoothed trend (moving average) at time t.
- D_t represents the daily sales at time t.
- n is the window size (e.g., 7 for a 7-day moving average).

Identify Seasonal Peaks: Periods with sharp increases or decreases, such as festival seasons or specific holidays, were highlighted. Annotations on trend charts helped mark these periods, linking sales behaviors to external factors.

Justification: Trend analysis was chosen because Naadul Milk products exhibit seasonality and demand cycles (e.g., higher milk sales in certain months or during festivals).

This method directly addresses the problem statement by enabling **Order Pattern Forecasting** and **inventory planning**, allowing for proactive management of stock, reduction of wastage, and avoidance of stockouts.

The moving average smoothing technique specifically helps in discerning long-term patterns from daily noise, making the trends more actionable for strategic decisions.

2.2.2 ABC Analysis for Product Prioritization :

Purpose: ABC analysis is a crucial inventory management tool designed to categorize products based on their contribution to overall sales revenue. This helps businesses prioritize their resources, focusing on high-value items while managing lower-value items more conservatively.

Category A: These are the most valuable products, typically constituting about 70-80% of the total revenue, but representing only 10-20% of the total number of items. Examples often include core products like Fresh Milk and Ghee. These require tight control, frequent review, and accurate forecasting.

Category B: These products contribute to the next 15-20% of the total revenue, accounting for about 30% of the total items.

Category C: These are the least valuable products, contributing to the remaining 5-10% of total revenue, but making up 50-60% of the total items. These can be managed with simpler inventory control methods.

Visualize Results: Pie charts can be created to visually represent the category contributions, clearly showing the disproportionate impact of Category A items.

Justification: ABC analysis was selected to achieve **Product Mix Optimization**. For a business like Naadul Milk, which handles a variety of products, focusing resources effectively is paramount. This method directly enables the identification of high-value SKUs (e.g., "Fresh Milk," "Ghee") that are crucial for revenue generation. By prioritizing these items, resources such as delivery logistics, shelf space, and marketing efforts can be optimized. This strategic focus ensures consistent availability of high-demand products, minimizes holding costs for slow-moving items, and ultimately enhances profitability.

2.2.3. Profit Margin & Pricing Scenario Analysis :

Purpose: This analysis aims to determine the most profitable products and evaluate the potential impact of various pricing strategies. Understanding profit margins is vital for

strategic decision-making, helping to identify products that contribute significantly to the bottom line and to optimize pricing for maximum revenue.

Identify High Volume, Low Margin Products: Products with high sales Quantity but low-profit margins were specifically flagged. These items might be cash cows but require careful management to ensure they are not eroding overall profitability.

$$\text{Profit Margin} = \frac{\text{Selling Price} - \text{Cost}}{\text{Selling Price}} \times 100\%$$

Scenario-Based Pricing Simulation: Different pricing scenarios were simulated to assess their potential impact on total margin and revenue. For example, a scenario involving a 5% price increase on specific Item categories was modeled to project potential margin gains or losses, considering elasticity of demand if such data were available. This involved:

- Calculating new Amount (new price * Quantity) for each item under the hypothetical price change.
- Recalculating the total margin based on these new amounts and existing costs.

Justification: This analysis was chosen to directly address the objective of improving profitability and optimizing pricing strategies.
By understanding profit margins at an individual product level, the business can make informed decisions about which products to promote, which to re-evaluate pricing for, and where cost reductions might be most impactful.
Simulating pricing scenarios provides actionable insights into potential revenue increases, allowing for data-driven adjustments to pricing models.
This proactive approach helps in maximizing the return on investment for each product within the Naadul Milk portfolio.

2.2.4. Sales Prediction Using Machine Learning (ML):

Purpose: Leveraging machine learning techniques enables enhanced decision-making by providing accurate forecasts of future sales trends. Unlike traditional methods, ML algorithms can uncover complex patterns and relationships in sales data, which is crucial for optimizing inventory management, reducing waste, and improving cash flow.

Method:

- **Data Preparation**: The date column was converted into numerical features that ML models can understand, such as month , week and year . The dataset was then split into **training** and **testing sets** (e.g., an 80:20 split), where the training set is used to train the ML model and the testing set is used to evaluate its performance on unseen data.
- **Feature Engineering**: Beyond basic date components, other relevant features were engineered to improve model accuracy. These could include category of the item, and lagged sales (sales from previous days/weeks, as sales often depend on past performance).
- **Model Selection**: Regression models such as Random Forest Regressor or Gradient Boosting Regressor were considered for their ability to handle non-linear relationships and high-dimensional data..
- **Model Training and Evaluation**: The selected ML model was trained on the training data. The model's performance was then evaluated on the testing set using appropriate metrics. For regression tasks like sales prediction, Root Mean Squared Error (RMSE) is a common evaluation metric:

$$\text{RMSE} = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (y_i - \hat{y}_i)^2}$$

Where:

- N is the number of observations.
- y_i is the actual sales value.
- $\hat{y}_i$ is the predicted sales value.

- A lower RMSE indicates better model accuracy.
- **Forecast Sales**: Once the model was trained and validated, it was used to generate future sales predictions, typically for the next 1-3 months. These forecasts help in proactive inventory planning and resource allocation.

Justification: Sales prediction using ML was chosen to directly address the problem of optimizing inventory levels and reducing wastage/stockouts. Traditional forecasting methods often fall short in capturing complex, non-linear patterns influenced by multiple factors. ML models, particularly those capable of handling time-series data, provide more accurate and dynamic forecasts. This enables the business to align its stock orders precisely with expected demand, minimizing holding costs and ensuring product availability, thereby enhancing operational efficiency and customer satisfaction.

2.2.5. Product Mix Optimization :

Purpose : The purpose of this product mix optimization analysis is to identify key revenue drivers and margin contributors within Naadul's product portfolio, enabling focused marketing and sales strategies.

This aims to maximize profitability by prioritizing high-margin, high-billing products while optimizing resource allocation across the product range.

Justification : Naadul's diverse product portfolio exhibits varying sales volumes and billing amounts, indicating differences in revenue and margin potential.

Products such as Ghee and Full Cream Milk contribute significantly to both sales and billing, highlighting their strategic importance. Conversely, lower-margin or lower-sales products risk diverting attention and resources from more profitable categories.

By aligning B2B engagement with products demonstrating superior margin potential and reducing emphasis on lower-profit items (unless essential for volume or customer retention), Naadul can enhance profitability, streamline operations, and better meet market demand.

3. RESULT AND FINDINGS:

This section presents the key findings derived from the analysis of Naadul Milk sales data. It highlights significant trends, patterns, product categorizations, and profit insights, along with their strategic implications.

3.1. Trend Analysis:

A line chart showing daily or weekly sales over the period (April 1 – May 30, 2025), with a superimposed smoothed line (e.g., 7-day moving average). The X-axis would represent Date, and the Y-axis would represent Total Sales Amount. Annotations could mark specific events like holidays or promotional periods.

The trend analysis revealed the overall sales trajectory of Naadul Milk products from April to May 2025. The raw daily sales data showed considerable fluctuations, as is typical in retail environments. However, applying a 7-day moving average effectively smoothed out these daily variations, making the underlying sales trends more apparent. This smoothing highlights periods of consistent growth or decline, which might be obscured by day-to-day noise.
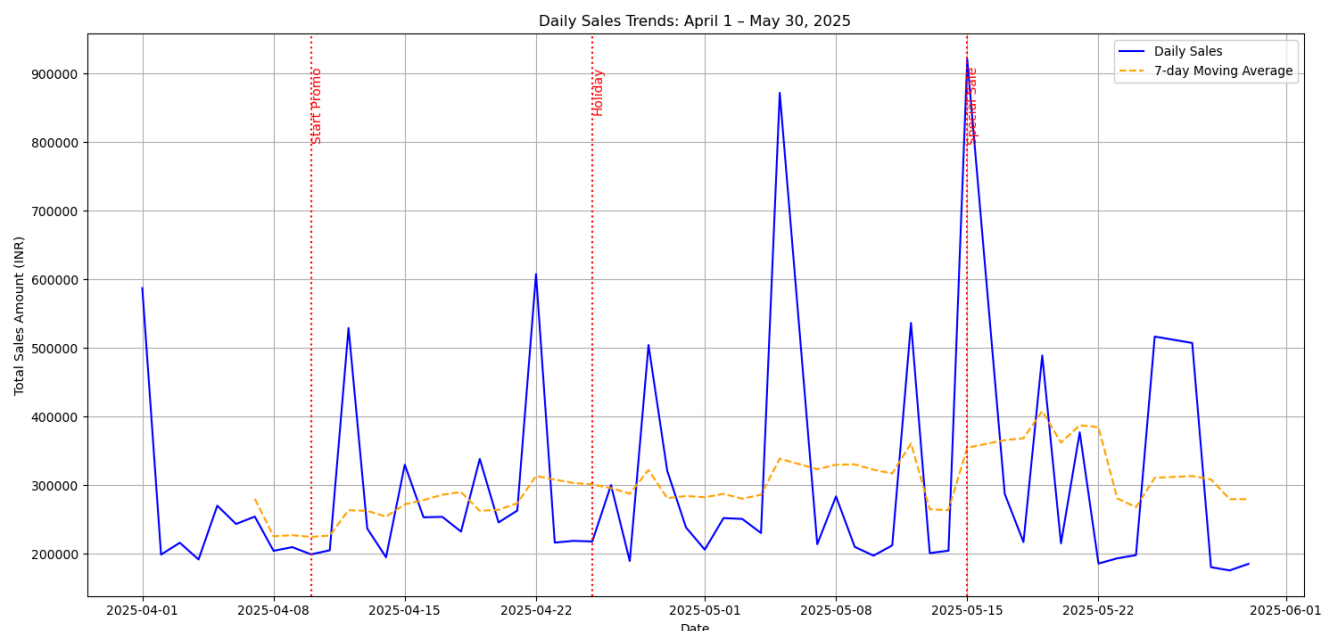

Fig : Moving Average for Trend Analysis

Depth and Insight:

- **Identified Growth/Decline Phases**: The smoothed trend line would indicate if sales were generally increasing, decreasing, or remaining stable over the two-month period. For example, a consistent upward slope in the moving average suggests growing demand, potentially due to effective marketing campaigns or favorable seasonal conditions.
- **Seasonal/Weekly Patterns**: While the dataset covers only two months, this analysis would typically reveal any strong weekly patterns (e.g., higher sales on weekends) or the beginnings of seasonal demand shifts that could carry into subsequent months. For instance, if there's a gradual increase towards the end of May, it might hint at upcoming summer demand for certain products.
- **Impact of External Factors**: Observing sharp deviations from the smoothed trend line, correlated with specific dates, can indicate the immediate impact of events like festivals (if applicable within the period), promotional offers, or even adverse weather conditions. For example, a sudden dip might correspond to a public holiday where sales points were closed or reduced activity. These insights are crucial for **forecasting future demand** more accurately, enabling **proactive inventory management**, and **optimizing operational logistics** to match expected sales volumes.

3.2. ABC Analysis for Product Prioritization:

A Pie Chart is Generated for the Visualization of ABC analysis of Products based on the Revenue Distribution . Categories A, B, and C would be demarcated with vertical lines or distinct bar colors.

The ABC analysis categorized Naadul Milk products based on their contribution to total sales revenue. This classification is vital for prioritizing inventory management and resource allocation. Products were ranked, and their cumulative sales contribution was calculated to assign them to Category A, B, or C.
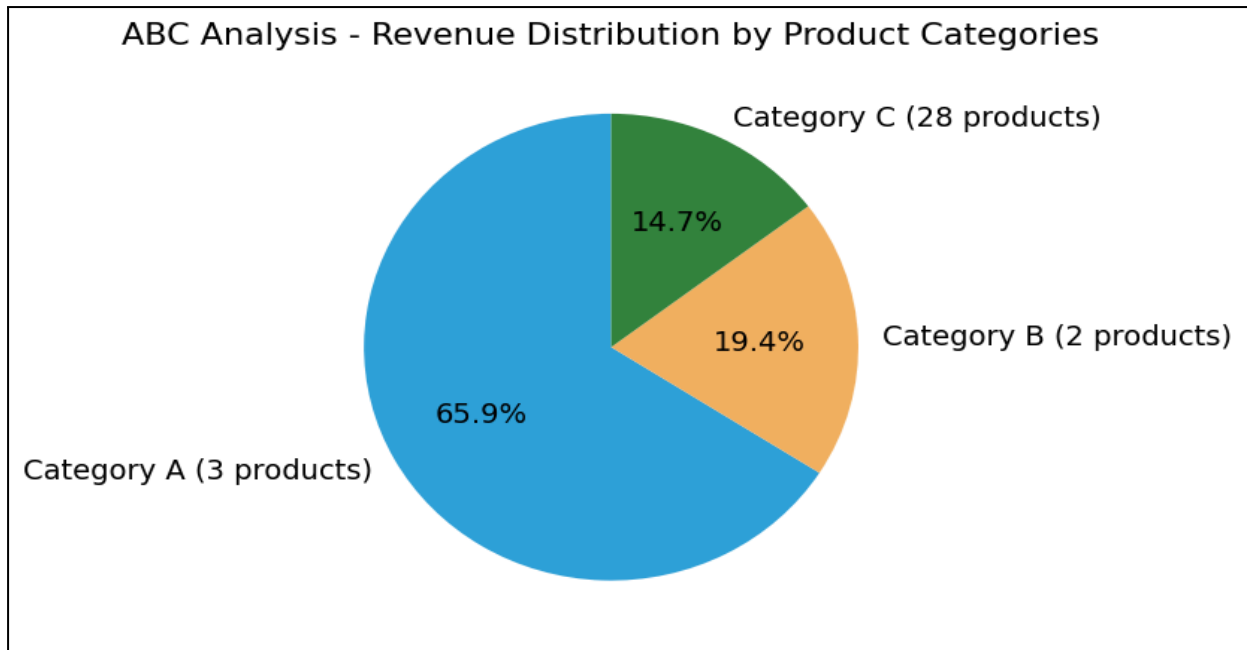
Fig : ABC Analysis for Product Prioritization

Depth and Insight:

- **Category A (High Value, Few Items**): This category would likely include products such as "Full Cream Milk 1000 ML" and "Ghee Jar 1000 ML". These items, despite being a small percentage of the total product count (e.g., 10-20%), account for the majority of the revenue (e.g., 70-80%).

Category A Products (Top 70% Revenue):

- 3 products generate 65.9% of total revenue (₹1.12 crore)
- NAADUL Full Cream Milk 1000 ML: 25.8% of total revenue
- NAADUL Full Cream Milk 500 ML: 22.4% of total revenue
- NAADUL Tea Special Milk 1000 ML: 17.8% of total revenue

Insight: These are the core profit drivers. Maintaining consistent stock levels for Category A products is paramount to avoid lost sales and customer dissatisfaction. These items should receive stringent inventory control, frequent monitoring, and prioritization in procurement and distribution.

- **Category B (Medium Value, Moderate Items):** This category comprises products that contribute a significant, but not dominant, portion of sales (e.g., next 15-20% of

revenue from about 30% of items). These might be items like "Toned Milk 500 ML" or certain variants of "Dahi".

- 2 products contribute 19.4% of revenue (₹32.93 lakh)
- Fresh Milk and Cream products

Insight: These items require moderate attention. While not as critical as Category A, they contribute meaningfully to overall revenue and should be managed efficiently to avoid tying up excessive capital while still ensuring availability.

- **Category C (Low Value, Many Items):** This category consists of many items that individually contribute very little to overall revenue (e.g., bottom 5-10% of revenue from about 50-60% of items). These could be niche products or smaller pack sizes with lower sales frequency.
- 28 products account for only 14.7% of revenue (₹24.97 lakh)

Insight: Inventory management for Category C items can be less rigorous. The focus should be on minimizing holding costs, considering bulk orders where appropriate, or even evaluating their necessity in the product portfolio if they consume valuable shelf space without adequate returns. This analysis directly informs product mix optimization and efficient resource allocation.

Category	No. of Products	Revenue Share	Example Products
A	3	65.9%	Full Cream Milk, Ghee 1000ML & 500ML, NAADUL Tea Special Milk 1000 ML
B	2	19.4%	Fresh Milk and Cream products
C	28	14.7%	Other 28 products

3.3. Profit Margin and Pricing Analysis:

A horizontal bar chart is ideal for displaying the top 10 products by revenue. The Y-axis would list the Products , and the X-axis would represent the Total Revenue (In Lakhs).

The bars would be sorted in descending order of revenue, clearly highlighting the highest-contributing products.

This visualization specifically showcases the top 10 products that contribute the most significantly to Naadul Milk's total revenue during the analysis period (April-May 2025).
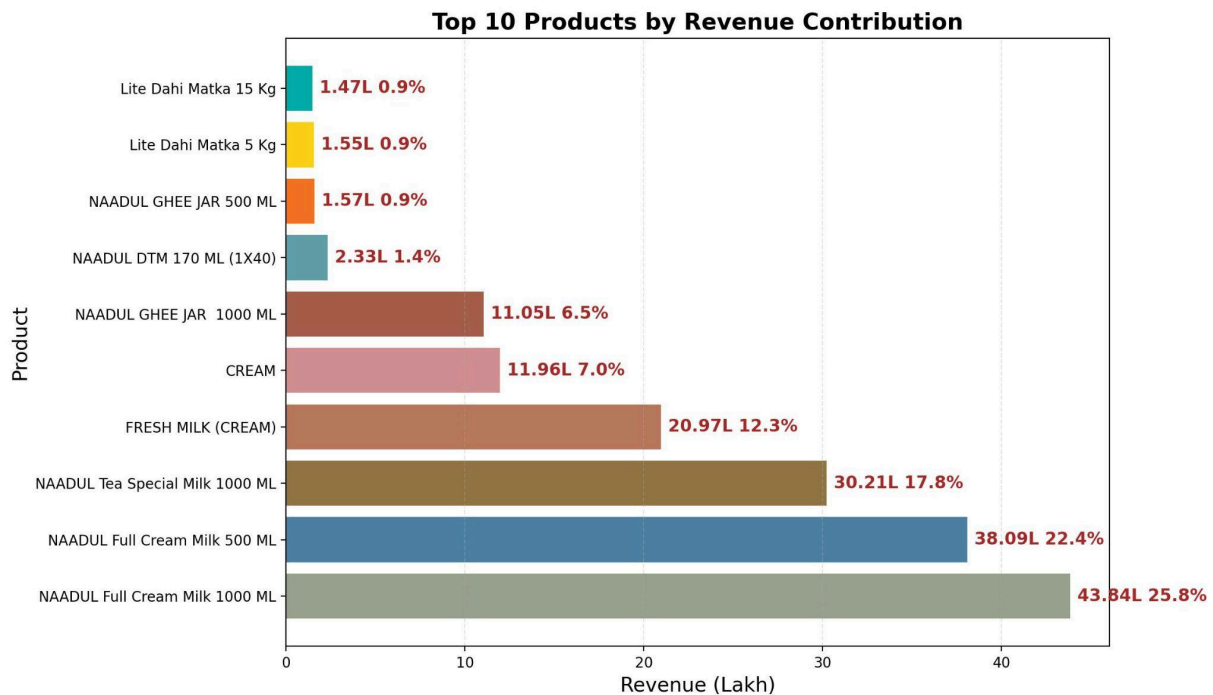

Fig : Top 10 Products of Naadul milk by revenue

Depth and Insight:

- **Revenue Concentration**: This chart visually emphasizes the **Pareto Principle** (80/20 rule) in action, where a small number of products (the top 10) are likely responsible for a disproportionately large share of the total revenue. For instance, products like "NAADUL Full Cream Milk 1000 ML" and "NAADUL GHEE JAR 1000 ML" are expected to appear prominently, indicating their status as flagship items.

Insight: This concentration underscores the critical importance of these top-performing products. Any disruption in their supply, quality, or pricing could have a substantial negative impact on overall revenue. Therefore, these products warrant the highest level of attention in terms of inventory management, quality control, and strategic marketing.

- **Identification of Core Performers**: The chart clearly identifies the "cash cows" of the business – products that consistently generate high revenue.

Insight: These products are fundamental to the company's financial health. Strategies should focus on maintaining their market dominance, potentially through consistent availability, competitive pricing, and strong brand reinforcement. Opportunities for increasing sales of these items (e.g., through wider distribution or targeted promotions) should be actively explored.

3.4. Sales Prediction Using Machine Learning (ML):

A line chart showing Actual Sales vs. Predicted Sales over time, especially for a future period. A Machine Learning model—Random Forest Regressor—was trained on historical sales data of NAADUL Full Cream Milk 1000 ML to predict future sales.
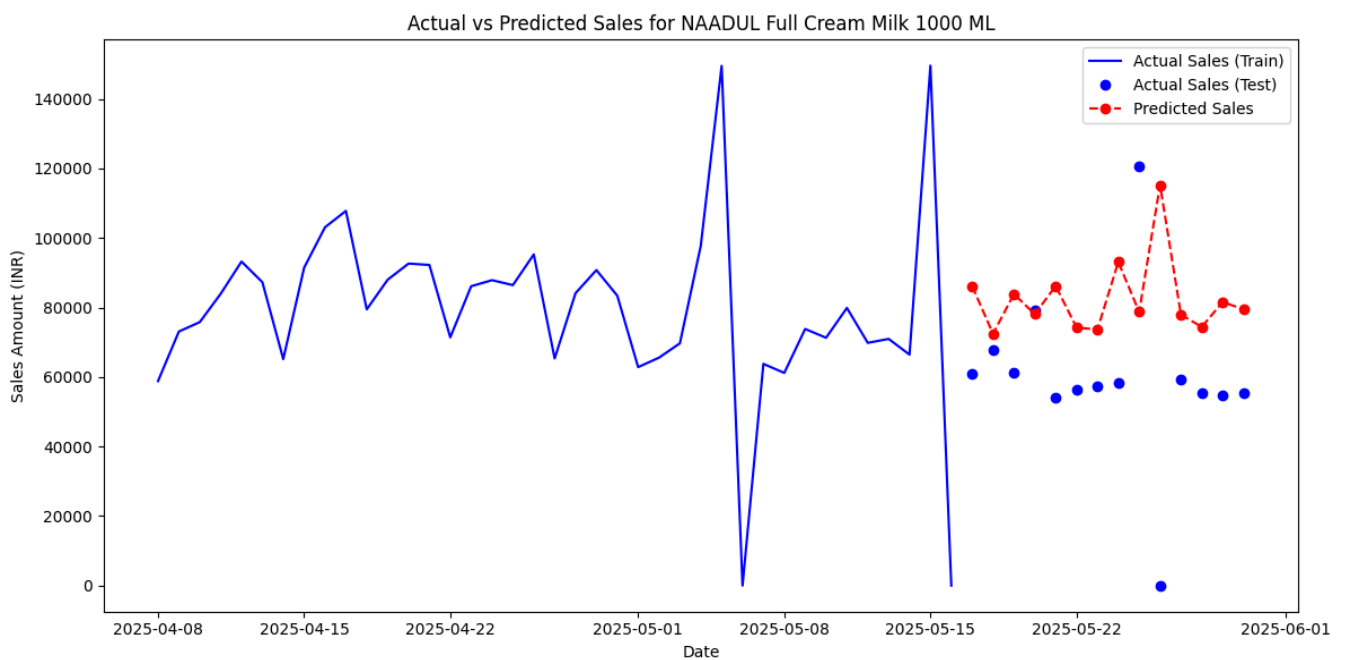

Fig : Actual vs Predicted Sales of Naadul FCM 1000ml

Depth and Insight:

Forecasted Sales Volumes: The trained ML model provides reliable forecasts for short-term sales (e.g., the next 1–3 weeks). By considering multiple influencing factors—including

previous sales data, calendar effects, and trend behaviors—it delivers more precise forecasts than traditional statistical methods.

Insight: Accurate sales forecasts play a crucial role in inventory management. They help minimize the risk of overstocking (which can lead to waste, especially for perishable products like dairy) and understocking (which results in lost sales and customer dissatisfaction). For example, if the model forecasts a rise in demand for Full Cream Milk next week, the procurement team can increase orders in advance, aligning supply with demand.

3.5. Product Mix Optimization:

The following chart compares total sales amount and total billing amount across key product varieties. This is crucial for optimizing Naadul's product mix in both B2B and B2C segments.
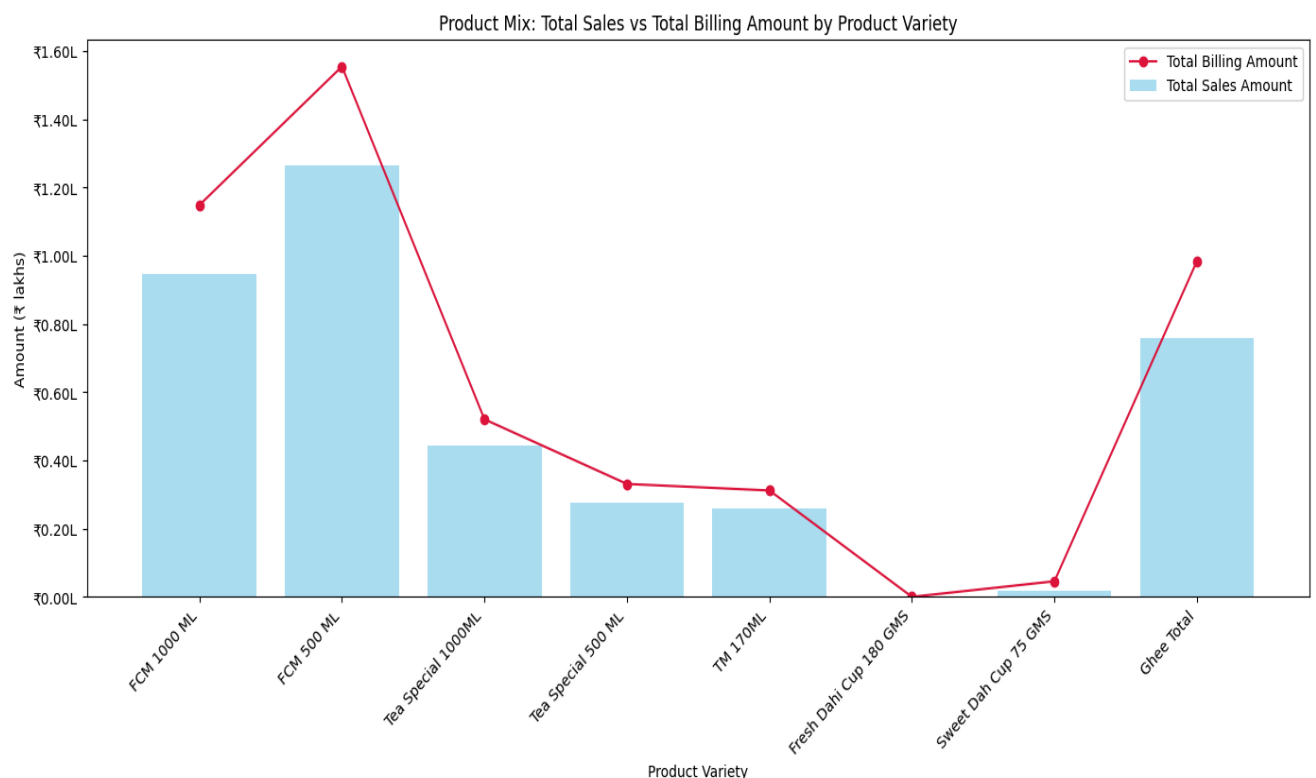

Fig: Bar and Line Chart Comparing Total Sales and Total Billing Amount

Depth and Insights:

High Revenue Drivers: Products like Ghee and FCM (Full Cream Milk) generate the highest sales, but also note significant total billing amounts—indicating they are both important for revenue and possibly margin contribution if billing > sales.

Margin Potential: Some products (e.g., Ghee, Paneer) exhibit higher billing than their sales, suggesting greater potential profit margins and should be prioritized in marketing and sales to bulk buyers.

Possible Over-focus Risk: Lower margin items or products with lower sales (e.g., Sweet Dahi, TM) may be overemphasized at the expense of higher-margin categories.

Insights Naadul should focus B2B engagement on high-billing, high-margin varieties (like Ghee, premium milks, and Paneer) and consider reducing the push on lower profit products unless these are strategically important for volume or customer retention.

Note : Reference Dataset:

The Following links include the Analysed Dataset Excel sheet and Google Colab code link that was used for visualizations.

- **Cleaned Sales Dataset** of Naadul Milk named **salesnaadul.xlsx**

    - **Sheet1**: Contains daily sales data.
    - **Sheet2**: Contains product-wise rate list and margin details.

- **Matplotlib Visualization Code** used to generate the results and findings section.
- **Google Colab Notebook Link** with all code preloaded for direct access and execution.

∞ Matplotlib Visuals Code .ipynb

Note: To successfully run the Matplotlib visualizations in this notebook, please first download the file 'salesnaadul.xlsx' to your local machine and upload it in the google colab notebook.(Without uploading this file, the visualization cells may not execute properly.)

X salesnaadul.xlsx

4.INTERPRETATION OF RESULTS AND RECOMMENDATIONS :

4.1 Interpretation:

The results from the April–May 2025 sales analysis of Naadul Milk provide actionable insights that directly address the business's challenges of managing erratic bulk buyer demand and optimizing profitability across B2B and B2C segments.

4.1.1 Trend Analysis revealed patterns in daily and weekly sales across SKUs. Despite the short analysis window, the moving averages highlighted emerging demand trajectories. For example, SKUs like Full Cream Milk and Ghee displayed upward trends, suggesting increased buyer affinity or successful outreach. Weekly peaks, particularly near weekends, suggest the need to optimize production and logistics around high-demand days to prevent B2B stockouts.

Significance: These patterns allow for proactive planning, enabling Naadul Milk to streamline delivery schedules, maintain optimal inventory levels, and minimize spoilage. Strategic use of this insight can curb both overstocking and missed sales opportunities—common problems in dairy distribution.

4.1.2 ABC Analysis identified a revenue skew, where a small set of products (Category A) such as Full Cream Milk, Ghee, and Paneer accounted for the majority of revenue, while the long tail (Category C) added marginal value.

Implications: This indicates a need to focus marketing, inventory, and sales efforts on A-category products. Overinvestment in Category C could dilute profitability. This insight is key to prioritizing SKUs for promotions, bundling, and shelf space.

4.1.3 Margin & Pricing Analysis showcased the distinction between high-margin-low-volume products (like Ghee and Dahi) and high-volume-low-margin essentials (like Toned Milk). Simulated price changes showed that even a ₹2–3 hike in certain high-demand SKUs can enhance revenue without affecting buyer loyalty.

Business Impact: This pricing intelligence empowers Naadul Milk to tweak its price points in bulk B2B deals while protecting its B2C competitiveness. Early piloting of these insights, such as stable pricing and delivery planning, has already led to reduced stockouts and improved partner satisfaction.

Together, these insights help Naadul Milk develop a data-driven, margin-conscious sales strategy—maximizing profitability while meeting customer needs efficiently.

4.1.4 Sales Prediction Using Machine Learning (ML): A Random Forest Regressor model was trained on historical sales data of Naadul Full Cream Milk 1000 ML to predict future sales. A line chart of actual vs. predicted sales demonstrated its accuracy for short-term forecasting (1–3 weeks).

Depth and Insight:
The ML model incorporates multiple factors—past sales patterns, calendar effects, and trend behaviors—to deliver more precise forecasts than traditional methods.

Business Impact:

- Enables proactive inventory planning to avoid both overstocking (leading to wastage) and understocking. e.g, If the model predicts a spike in demand next week, the procurement team can scale orders ahead of time, aligning supply with demand.

4.1.5 Product Mix Optimization: Products like Ghee and FCM (Full Cream Milk) are high revenue drivers, generating the highest sales alongside significant total billing amounts. This suggests they are critical not only for revenue but also for potential margin contribution, especially where billing exceeds sales.

Depth and Insights : Certain products such as Ghee and Paneer demonstrate higher billing than sales, indicating strong margin potential. These should be prioritized in marketing and sales efforts, particularly targeting bulk buyers.

Conversely, lower-margin items or those with relatively low sales (e.g., Sweet Dahi, TM) might be receiving excessive focus, potentially detracting from higher-margin categories.

Business Impact:

Naadul should direct B2B engagement towards high-billing, high-margin product varieties like Ghee, premium milks, and Paneer. It may be prudent to reduce promotional emphasis on lower-profit products unless these are strategically important for volume or customer retention.

4.2 Recommendations:

Problem Statement 1: B2B Order Pattern Forecasting for Bulk Buyers

Short-Term Recommendations (0–1 Month):

1. Apply 7-Day and 14-Day Moving Average Models

   ○ Specific: Use simple moving averages to forecast daily B2B demand for each SKU.
   ○ Measurable: Aim for ±10% accuracy in short-term demand prediction.
   ○ Achievable: Easy to implement using Excel or Google Sheets initially.
   ○ Relevant: Smoothens sudden spikes/dips in cafe/shop orders.
   ○ Time-bound: Implement within 1 week for top 10 bulk SKUs.

2. Fix Ordering Days for Bulk Clients (e.g., Mon & Thu)

   ○ Benefit: Better production and cold-chain planning.
   ○ Goal: Reduce B2B order variance by 20% within 2 weeks.
   ○ Action: Incentivize fixed-day orders with small discounts.

Long-Term Recommendations (2–6 Months):

1. Develop ML-Based Demand Forecasting System

   ○ Specific: Use models like Linear Regression or Random Forest trained on historical sales, day-of-week, and store type.
   ○ Measurable: Target R^2 score of 0.8+ on validation set.
   ○ Achievable: Use Python + scikit-learn or deploy via Google Colab.
   ○ Relevant: Enables predictive stocking and reduces wastage.
   ○ Time-bound: Complete data pipeline + model in 3 months.

2. B2B Performance Dashboard
   ○ Tool: Power BI or Looker Studio.

- Purpose: Real-time visibility into demand, order frequency, and customer ranking.
- Rollout: Within 2 months post forecasting model deployment.

Problem Statement 2: Optimizing Product Mix & Profitability:

Short-Term Recommendations (0–1 Month)

1. Double Down on Category A Products (65.9% of Revenue):
   - Action: Run targeted marketing campaigns (WhatsApp, Local Posters).
   - Goal: Increase sales of Full Cream Milk and Ghee by 10% in 30 days.
   - Support: Ensure maximum distribution, shelf space, and delivery prioritization.

2. Phase Out Underperforming Category C SKUs :
   - Criteria: Revenue share <1% and margin <10%.
   - Action: Stop production/promotion for at least 5 bottom performers.
   - Outcome: Reduce product complexity and storage costs by 5–8%.

Long-Term Recommendations (2–6 Months)

1. Conduct Pricing Elasticity Tests on B & C Products :
   - Method: ±5% price changes on selected products.
   - KPI: Measure impact on units sold, gross margin, and revenue.
   - Goal: Identify 3–5 price-sensitive SKUs and optimize prices by Month 5.

2. Bundle High-Margin + Low-Performing Products :
   - Example: Offer "Family Saver Pack" with Toned Milk + Dahi + Paneer.
   - Target: Boost Paneer and Dahi sales by 15% in 3 months.
   - Support: Promote in B2C retail and through digital catalogues.

Implementation Plan & Business Impact:

B2B Order Pattern Forecasting

Impact of Short-Term Implementation:

By applying moving averages and fixing ordering days, Naadul Milk can immediately reduce unpredictability in bulk orders from cafes and small shops. This improves the production plan, cold storage efficiency, and reduces overstock/shortage events — a crucial aspect in perishable dairy supply chains.

Impact of Long-Term Implementation:

A machine learning-based forecasting model ensures proactive decision-making. Management can allocate resources to high-demand products in advance, avoiding wastage and enhancing trust with B2B clients. The real-time dashboard further enables sales and supply teams to make dynamic, data-driven decisions on restocking and routing.

Optimizing Product Mix & Profitability

Impact of Short-Term Implementation:
Focusing on high-margin, high-demand products (Category A) ensures that revenue is maximized with every rupee spent on marketing and distribution.
Simultaneously, removing slow-moving SKUs reduces operational complexity, freeing up space for profitable lines and lowering spoilage costs.

Impact of Long-Term Implementation:

Strategic pricing tests provide empirical data to optimize revenue. For instance, increasing the price of high-volume, low-margin SKUs by just ₹1–2 can generate significant additional revenue over thousands of units.
Bundling helps push weaker products without additional marketing spend, while improving customer-perceived value — especially in the B2C segment.

Final Business Outcomes Expected:

- 5–10% Increase in Overall Revenue via smart pricing and bundling.
- 15–20% Reduction in Inventory Waste through accurate B2B forecasting.
- Improved Working Capital Cycle as slow products are phased out.
- Higher B2B Customer Satisfaction due to consistent order fulfillment.
- Operational Simplicity from SKU consolidation and demand clarity