

CASE STUDY OF SATYANARAYAN GROCERY STORE

BDM capstone Project Presentation

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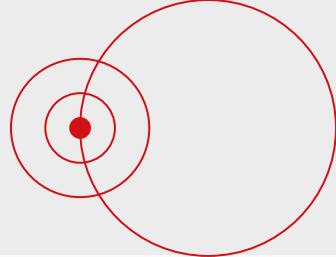
ORGANIZATION BACKGROUND

- Satyanarayan Grocery Store is located near Bahanaga Railway Station in Bahanaga, Baleswar, Odisha.
- The store operates as a traditional B2C retail shop serving the everyday grocery needs of the local community.
- It specializes in offering staples such as rice, wheat, and pulses, as well as spices, oils, dairy, dry fruits, and packaged snacks.
- The store's strength lies in strong customer loyalty, which is built on quality products, affordable pricing, and personalized service.
- Presently, the business faces challenges, including inventory mismanagement, shrinking profit margins, and rising competition from online grocery platforms.

Image 1: Store

Image 2: Owner

PROBLEM STATEMENTS



Inefficient Inventory Management

The store relies on manual tracking, leading to frequent overstocking of slow-moving items and stockouts of high-demand items. This causes both wastage and missed sales opportunities.

Declining Profit Margins

Rising procurement and operating costs, combined with poor stock planning, have reduced overall margins. Capital gets tied up in unsold inventory, making it harder to sustain profitability.

Lack of Data-Driven Decision Making

Decisions are made by intuition rather than systematic analysis. Without demand forecasting or product insights, the store struggles to adapt to changing customer needs and online competition.

DETAILS ABOUT THE DATA

Data Type	Key Variables	Purpose
Sales Data	Product Name, Quantity Sold (kg), Selling Price (₹/kg), Daily Revenue	To track demand trends and measure contribution to total revenue
Purchase Data	Product Name, Quantity Purchased (kg), Purchase Price (₹/kg), Purchase Cost	To analyze procurement efficiency and monitor capital tied in inventory
Inventory Data	Opening Stock, Closing Stock (kg), Daily Stock Movement	To identify stockouts, overstocking, and turnover patterns
Cost Data	Fixed Costs (₹5,500/month: rent, electricity, EMI, etc.)	To calculate net profit after expenses and assess financial sustainability

DATA CLEANING AND PREPROCESSING

Data Collection

- Daily records of sales, purchase, inventory, and costs were manually gathered over 32 days.
- This ensured a comprehensive, day-by-day dataset for detailed trend and pattern analysis.

Standardization

- Dates were formatted uniformly (YYYY-MM-DD) and product names standardized to avoid mismatches.
- This minimized data entry errors and improved the reliability of subsequent analyses.

Handling Missing Values

- Non-purchase/non-sale days were marked as zero, and duplicates were removed for accuracy.
- Addressing missing or inconsistent entries helped prevent misleading results in the analysis.

Derived Fields

- New columns such as Revenue, Purchase Cost, Gross Profit, and Profit Margin % were created for analysis.
- These calculated metrics allowed for precise measurement of performance across products.

Algorithms & Visuals

- Descriptive statistics, ABC analysis, correlation, and charts (line, bar, heatmap) were applied.
- These analytical methods enabled the identification of key sales drivers and inventory issues.

Validation

- Cross-checks between sales, purchase, and inventory ensured consistency and correctness of data.

ABC ANALYSIS

About the analysis

- Categorizes inventory into A (high-value), B (moderate-value), and C (low-value) based on sales..
- Performed by ranking products and grouping them by their sales contribution percentage.
- Helps prioritize stock management, reduce waste, and improve profitability.

ABC Classification of Products by Total Sales

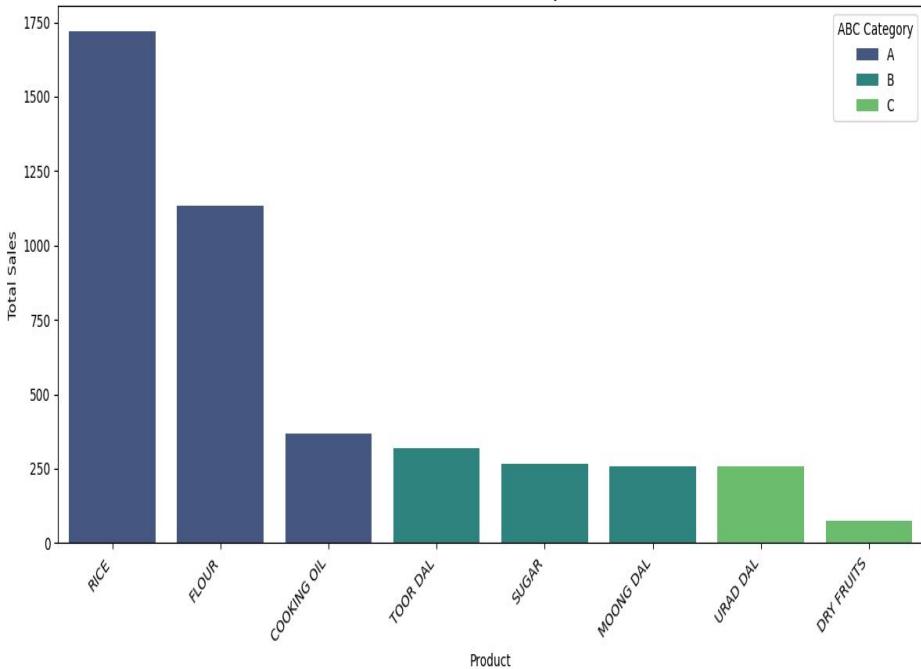


Fig. 1 (ABC analysis)

Interpretations and Findings

- Rice, Cooking Oil, and Flour (Class A) delivered the highest sales value and need strict stock monitoring to avoid lost revenue.
- Moong Dal, Toor Dal, and Sugar (Class B) offered moderate sales and should be stocked at balanced levels based on periodic review.
- Dry Fruits and other Class C items contributed the least to sales, but Dry Fruits had a high profit margin; therefore, stock levels for Class C should be reduced except for Dry Fruits, which deserve priority stocking due to strong profitability.

HEATMAP ANALYSIS

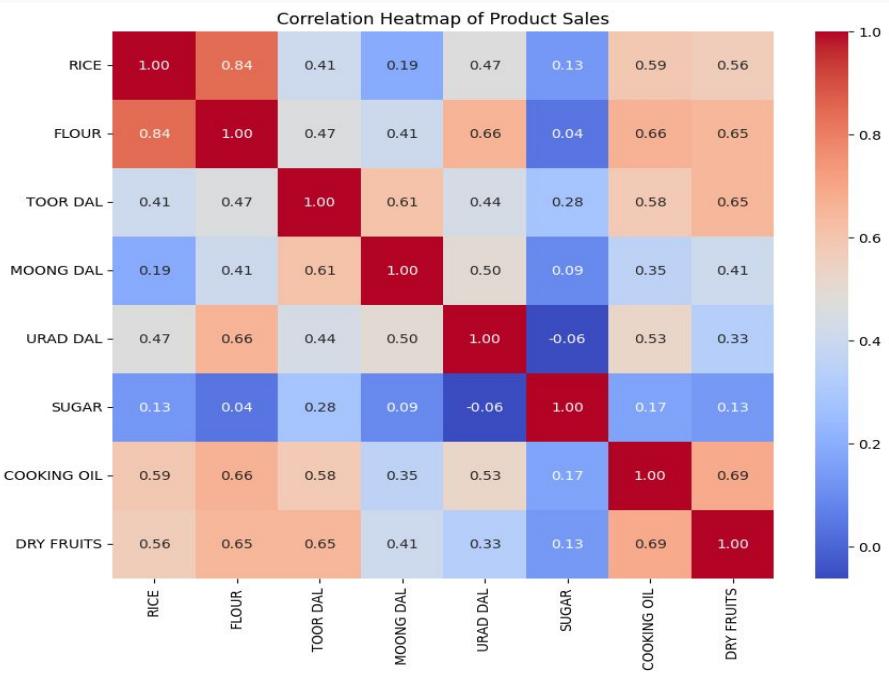


Fig. 2(Correlation Heatmap)

About the analysis

- Rice and Flour showed a very strong positive correlation (0.84), meaning customers frequently purchase them together.
- Cooking Oil is often bought along with Flour, Dry Fruits, and Rice, as indicated by their moderate to strong correlations (0.59–0.69).
- Sugar displayed weak or negative correlations with most products, indicating it is usually bought alone.

Interpretations and Findings

- Bundling or promotional offers on highly correlated items like Rice and Cooking Oil could increase total sales.
- Independent purchases of Sugar suggest it needs a unique marketing or placement strategy.
- Correlation analysis helps reveal hidden customer buying patterns, enabling smarter inventory management and targeted promotions.

REVENUE AND PROFIT ANALYSIS

Profit and Revenue in %

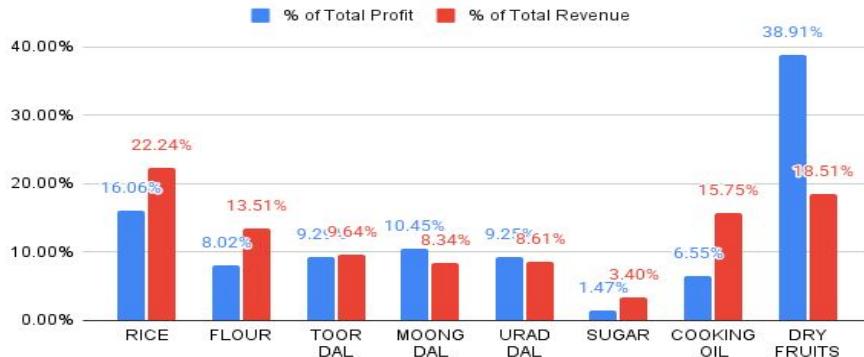


Fig. 3(Profit vs. Revenue)

- Rice drives the highest revenue (22.24%) but offers a lower profit share (16.06%), showing it is a volume-driven staple with thin margins.
- Dry Fruits contribute only 18.51% of revenue but a massive 38.91% of profit, making them the highest-margin product. Cooking Oil contributes well to revenue (15.75%) but only 6.55% profit, indicating margin inefficiency.
- Increase focus on high-margin Dry Fruits with better placement and promotions, while optimizing pricing and procurement for Rice & Cooking Oil to improve overall profitability.

Insights



Fig. 4(Insights from the Data)

- The store generated ₹3,45,278 total revenue, out of which ₹3,16,558 went into variable costs, leaving only a small margin.
- Gross Profit was ₹28,720, showing that operational efficiency is crucial to sustaining profitability.
- After accounting for fixed costs of ₹5,500, the Net Profit stood at ₹23,220, highlighting the need to improve margins further.

INVENTORY ANALYSIS

TOTAL DAILY INVENTORY vs. Total Sold Quantity

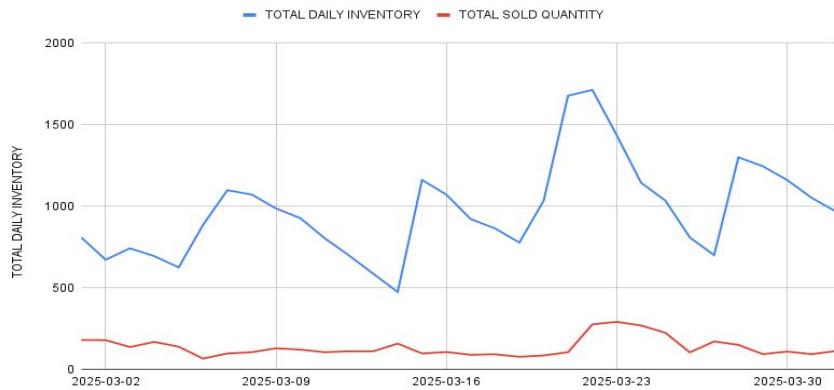


Fig. 5(Daily Inventory vs Sold Quantity)

- The daily inventory levels are consistently much higher than the sold quantity, showing overstocking issues.
- There are noticeable spikes in inventory (e.g., around March 10, March 20, March 23, March 27) but sales remain relatively flat, meaning stock is not moving as expected.
- The gap between inventory and sales indicates poor alignment between supply and demand, which ties up capital in unsold goods.

Inventory Fluctuation

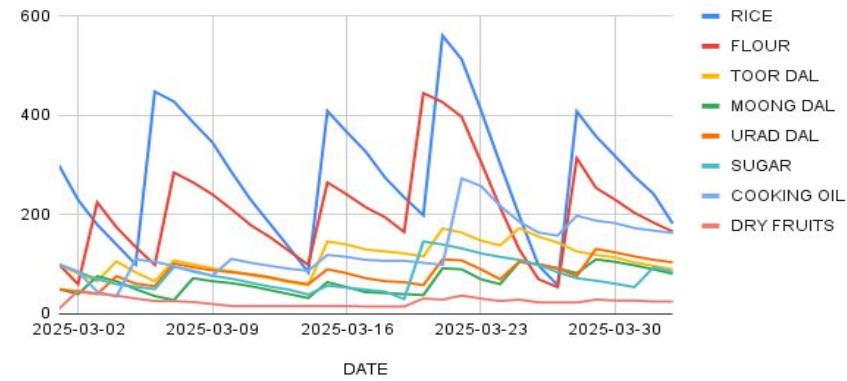


Fig. 6(Inventory Fluctuation)

- Rice and Flour show the highest fluctuations, indicating frequent restocking and overstocking compared to other items.
- Dry Fruits maintain very low inventory levels throughout, which matches their high profitability but also risks frequent stockouts.
- Staples like Toor Dal, Moong Dal, Urad Dal, and Sugar remain relatively stable, suggesting moderate but consistent demand.

KEY RECOMMENDATIONS

- 👉 **Introduce digital inventory tracking** – Use a simple POS or app-based system to avoid stockouts and overstock.
- 👉 **Focus on Dry Fruits** – Since they generate 38.9% of profit from just 18.5% revenue, allocate more space and visibility.
- 👉 **Reduce low-performing items like Sugar** – Cut inventory to save shelf space and reinvest in high-margin goods.
- 👉 **Bundle complementary products** – Example: Rice + Cooking Oil combo, based on strong purchasing correlation.
- 👉 **Negotiate better supplier deals** – Especially for Rice and Cooking Oil where margins are low.
- 👉 **Regular profit monitoring** – Monthly ABC + Profitability reviews to adjust strategy.
- 👉 **Adopt demand forecasting** – Use sales history and correlation data for smarter stock planning.
- 👉 **Launch digital ordering (WhatsApp/E-commerce)** – Capture 15–20% more sales by tech integration.

