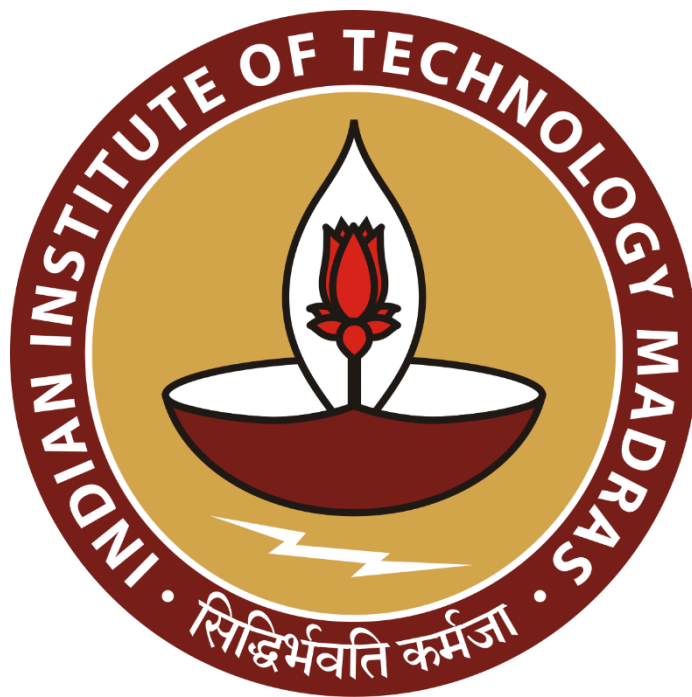# Improving Operations & Suggesting Business Growth Strategy at Shanvi General Store & Dairy Products

A End-Term Submission For the BDM capstone Project

Submitted by

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Contents

Declaration Statement

I am working on a Project titled **"Improving Operations & Suggesting Business Growth Strategy at Shanvi General Store & Dairy Products".** I extend my appreciation to **Shanvi General Store & Dairy Products**, for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.
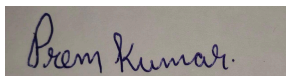
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the principles of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate:

Name: Prem Kumar

Date: 05-12-2023

Executive Summary and Title:

Shanvi General Store & Dairy Products is a small grocery and dairy shop situated in Saketpuri, Patna, India. It caters to both B2B and B2C customers, serving as a vital resource within the local community.

The primary challenge confronting Shanvi General Store pertains to profitability. The store grapples with substantial inventory management issues, particularly in the realm of dairy products. These challenges create financial bottlenecks, hindering the store's ability to meet customer demands efficiently, especially during periods of high demand due to the dense local population. This issue significantly impacts the overall profitability of the business.

To tackle these multifaceted issues, the project will employ various data analytics approaches. These methodologies encompass real-time inventory tracking, demand forecasting, and the implementation of efficient inventory replenishment strategies. By implementing these measures, the project aims to mitigate the financial blockage caused by excessive inventory and better handle surges in customer demand driven by the densely populated area. The envisioned outcome of this project is a more streamlined and profitable operation, positioning the store as a dependable and efficient supplier of grocery and dairy products within Saketpuri, Patna. This transformation will enhance customer satisfaction and strengthen the store's reputation as a trusted local source for daily essentials.

Problem Identification and Clarification

Shanvi General Store & Dairy Products encounters two primary challenges:

a) Inefficient stock management, resulting in capital blockage and hindering adaptability to evolving market dynamics.

b) Lack of clear customer preferences, impacting the ability to identify top-selling products.

Goals Definition

Transformation Objectives for Shanvi General Store & Dairy Products:

1. Addressing inefficient inventory management by leveraging data-driven strategies to analyze stock levels and turnover.

2. Improving supply chain efficiency to reduce lead times and minimize operational errors, streamlining overall operations.

3. Identifying customer preferences and top-selling items through comprehensive analysis of sales data.

Execution of the Plan

To realize these objectives, Shanvi General Store & Dairy Products will execute the plan through:

a) Harnessing data analysis tools like MS Excel and Python for extensive data collection and analysis.

b) Introducing a data-oriented inventory management system rooted in historical sales data.

c) Employing visual aids such as pie charts, sales Pareto charts, and clustered column charts to extract insights into customer preferences and top-selling products.

By embracing this data-driven transformation, Shanvi General Store & Dairy Products aims to overcome challenges and excel in a competitive market.

Results and Outputs:

1. Diversity Analysis:

- Maximum Diversity: Patanjali(43) signifies a broad range of products available.
- Minimum Diversity: Nestle(2) suggests a more constrained selection.

2. Product Mean Examination:

- Highest Mean: Doodh indicates a high level of customer preference.
- Lowest Mean: Washing Bars signifies relatively lower popularity.

3. Observations from Pareto Charts:

- Pareto Principle Misalignment: The product stock amount Pareto charts diverge from the principle, with 70% of sales concentrated on just four items—Doodh, Chocolates, Ice-cream and Mustard oil.

4. Customer Preferences:

- Dominance of Sudha: Customers display a strong inclination towards Sudha company products, evident in higher sales quantities and amounts.
- Less Preferred: Dove and Happilo Products receive lower customer favorability.
- Impact of Patanjali's Variety: Despite offering a wide variety, Patanjali contributes less to sales compared to Sudha.

Detailed Explanation of Analysis Process/Method

To ensure a thorough and efficient analysis process, it is essential to break it down into well-defined steps that keep the analysis on track and yield effective outcomes for the organization. The following steps outline a professional approach to conducting a successful analysis:

Step 1: Data Collection

Step 2: Data Cleaning

Step 3: Descriptive Statistics

Step 4: Data Visualization

Step 5: Sales Analysis

Step 6: Customer Preference

Step 7: Data Interpretation

Step 8: Recommendations

Step 9: Report Presentation

Data Collection:

In the initial phase, the focus lies in gathering essential data from the shop's sales records and inventory systems. This data might encompass sales amounts, inventory logs, and stock records.

The Stock Data entails Monthly Stock Data categorized by company, featuring 5 columns: company name, number of items and variety (such as Sudha offering different types of dairy products in various ranges), monthly stock amount, monthly sales amount, and company-wise profit. The companies are diverse and associated with Dairy products. 'No_items_variety' signifies the total variety count of items for each specific company. 'Month_stock_amt' represents the overall capital amount in stock for each company. 'Month_sale_amt' showcases the total sales amount for each company, while 'profit' details the gained profit on a company-wise basis, considered as gross profit.

SHANVI GENERAL STORE & DAIRY PRODUCTS, SAKETPURI, PATNA				
COMPANY WISE MONTHLY STOCK AND SALES AMOUNT				
COMPANY	NO_ITEMS_VARIE	MONTH_STOCK_AMT	MONTH_SALE_AMT	PROFIT
SUDHA	10	227000	212750	34040
AMUL	4	132000	124356	19896.96
BRITANIA	40	64345	60346	9655.36
PARLE	32	57869	55436	8869.76
CADBURY	24	43650	40456	6472.96
COCA-COLA	16	12435	10975	1756
PATANJALI	43	76456	49765	7962.4
AASHIRWAD	26	14653	13098	2095.68

The data pertains to the monthly stock of base products, encompassing variations, and comprises four columns: item name, quantity, rate, and amount. The item name denotes the product's name, quantity represents the quantity of the item in stock, rate indicates the purchase rate, and amount is calculated as the product of rate multiplied by quantity.

BASE PRODUCT(INCLUDING VARIETY) MONTHLY STOCK

ITEM_NAME	QUANTITY	RATE	AMOUNT
DOODH	4500	48	216000
LASSI	1400	10	14000
ICE-CREAME	3000	15	45000
BISCUIT	1200	9	10800
CHOCOLATE	2200	23.5	51700
COLD-DRINKS	650	45	29250
SOAP	800	24	19200
SAMPOO	600	20	12000
SOYABEAN OIL	200	130	26000
AATA	600	28	16800

The overall monthly sales dataset consists of three columns: months, duration, and amount. The 'months' column indicates the specific month of sales, 'duration' represents the timespan covered within that month, and 'amount' displays the sales amount for each month.

overall monthly sales		
Months	Duaration	SALES_AMOUNT
August	1/8/2023-31/06/23	705324
September	1/9/2023-30/09/23	732500
October	1/10/2023-31/06/23	843695

Data Cleaning:

After collection, the data underwent thorough cleaning. This involved addressing missing or incorrect entries, resolving duplicates, and ensuring data consistency to facilitate accurate analysis.

Descriptive Statistics

Once the DataFrame is created in Python, utilizing the df.describe() function provides the relevant statistics corresponding to the dataset.

->Descriptive Statistics of **Sales and stock by Amount of each company:**

```
df.describe()
```

	NO_ITEMS_VARIETY	MONTH_STOCK_AMT	MONTH_SALE_AMT	PROFIT
count	16.000000	16.000000	16.000000	16.000000
mean	18.562500	48701.375000	44082.750000	7053.240000
std	14.170245	59227.691386	55218.769147	8835.003063
min	2.000000	2080.000000	1834.000000	293.440000
25%	4.000000	5094.750000	4849.500000	775.920000
50%	19.000000	39658.000000	37375.000000	5980.000000
75%	27.500000	59488.000000	51182.750000	8189.240000
max	43.000000	227000.000000	212750.000000	34040.000000

Sales and Stock Overview:

- The average monthly stock amount stands at ₹800,711.00, representing the typical inventory level.
- Monthly sales average around ₹760,506.33, signifying the recurring revenue.
- Profit averages at ₹7,053.24, showcasing the net gain.
- The average number of items in the variety is 18.56, indicating the diversity of products available.

Company Variety Analysis:

- Patanjali stands out with an impressive variety score of 43, highlighting a diverse range of products they offer.
- Nestle holds the lowest variety score of 2, suggesting a more restricted range of products available.

> Descriptive Statistics of the base product (including variety) monthly stock:

```python
import numpy as np
import pandas as pd
df=pd.read_excel('/content/BDM Project Data (1).xlsx',sheet_name='Sheet3')
df.describe()
```

	DOODH	LASSI	ICE-CREAME	BISCUIT	CHOCOLATE	COLD-DRINKS	SOAP	SAMPOO	SOYABEAN OIL	AATA	...	CASHEW
count	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	...	3.000000
mean	73516.000000	5136.666667	16005.000000	4003.000000	17974.500000	9981.666667	6674.666667	4206.666667	8776.666667	5809.333333	...	1785.666667
std	123414.840145	7707.271458	25154.722718	5916.420117	29227.406672	16689.607794	10854.193905	6755.452119	14915.885268	9522.492391	...	2963.885344
min	48.000000	10.000000	15.000000	9.000000	23.500000	45.000000	24.000000	20.000000	130.000000	28.000000	...	56.000000
25%	2274.000000	705.000000	1507.500000	604.500000	1111.750000	347.500000	412.000000	310.000000	165.000000	314.000000	...	74.500000
50%	4500.000000	1400.000000	3000.000000	1200.000000	2200.000000	650.000000	800.000000	600.000000	200.000000	600.000000	...	93.000000
75%	110250.000000	7700.000000	24000.000000	6000.000000	26950.000000	14950.000000	10000.000000	6300.000000	13100.000000	8700.000000	...	2650.500000
max	216000.000000	14000.000000	45000.000000	10800.000000	51700.000000	29250.000000	19200.000000	12000.000000	26000.000000	16800.000000	...	5208.000000

8 rows × 25 columns

- Doodh, with the highest mean, signifies its popularity and dominance in stock.
- Washin Bars, having the lowest mean, implies comparatively lower popularity among other products.

->Descriptive Statistics of **purchase and sales rate of each product:**

```python
import numpy as np
import pandas as pd
df=pd.read_excel('/content/BDM Project Data (1).xlsx',sheet_name='Sheet7')
df.describe()
```

	Purchase_Rate	Sales_Rate
count	25.000000	25.000000
mean	68.820000	78.970000
std	79.799342	91.152811
min	9.000000	12.000000
25%	15.000000	18.000000
50%	33.000000	37.000000
75%	95.000000	105.000000
max	290.000000	320.000000

Upon analyzing the statistics, it's evident that the products 'Biscuit' and 'Washing Bars' exhibit the minimum purchase rate valued at Rs 9, while 'Dates' boasts the maximum purchase rate of Rs 290. Similarly, concerning the product sale rates, 'Biscuit' and 'Washing Bars' have the lowest rates at Rs 10, whereas 'Dates' commands the highest rate at Rs 320.

->Descriptive Statistics of Sales by Amount of three month (Augst, September, October):

```
df.describe()
```

	SALES_AMOUNT	GROSS_PROFIT	NET_PROFIT
count	3.000000	3.000000	3.000000
mean	760506.333333	190126.583333	91260.760000
std	73313.705679	18328.426420	8797.644681
min	705324.000000	176331.000000	84638.880000
25%	718912.000000	179728.000000	86269.440000
50%	732500.000000	183125.000000	87900.000000
75%	788097.500000	197024.375000	94571.700000
max	843695.000000	210923.750000	101243.400000

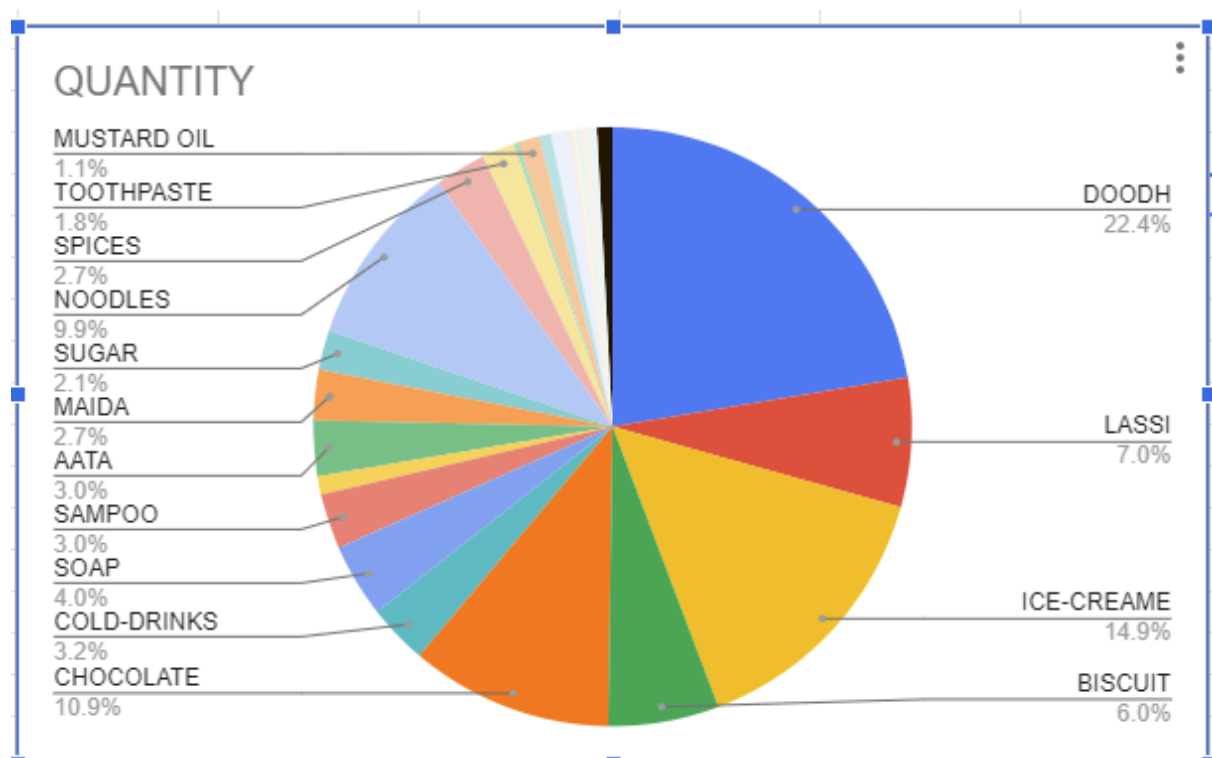**Three-Month Sales Overview (August, September, October):**

- The average monthly sales amount stands at ₹760,506.33, representing the typical revenue for this period.
- The gross profit averages around ₹190,126.58, reflecting the overall profit before expenses.
- The net profit averages at ₹91,260.76, showcasing the profit after expenses.
- The highest sales amount was recorded in October, reaching ₹843,695.

Data Visualization:

The data will be presented visually using appropriate charts, graphs, and tables. These visual representations aim to offer a more easily understandable format for the data. Tools such as clustered columns, Pareto charts, and pie charts will be utilized to aid in visualization.

MONTHLY_STOCK_AMOUNT

|	1/8/2023-31/06/23	1/9/2023-30/09/23	1/10/2023-31/06/23
	August	September	October
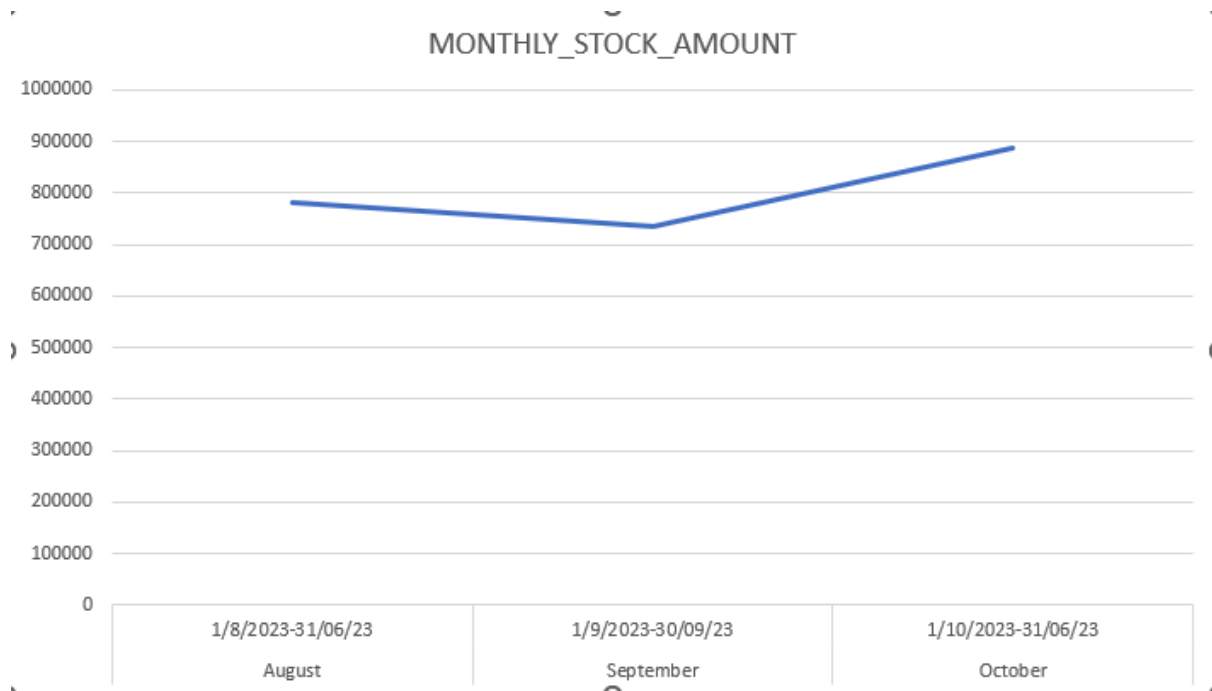
The Monthly Combined Stock Chart exhibits the stock quantities of different items across months. This visualization aids in recognizing trends and inventory imbalances, facilitating informed decisions regarding inventory management and sales strategies. The Y-axis denotes Stock Quantity, while the X-axis represents months.

QUANTITY

MUSTARD OIL 1.1%
TOOTHPASTE 1.8%
SPICES 2.7%
NOODLES 9.9%
SUGAR 2.1%
MAIDA 2.7%
AATA 3.0%
SAMPOO 3.0%
SOAP 4.0%
COLD-DRINKS 3.2%
CHOCOLATE 10.9%
DOODH 22.4%
LASSI 7.0%
ICE-CREAME 14.9%
BISCUIT 6.0%

The Stock Amount Pie Chart visually displays how the total stock values are distributed among various items. It emphasizes each product's contribution to the overall inventory value, aiding in effective prioritization and resource allocation strategies.

Pareto chart COMPANY WISE MONTHLY STOCK

Chart Title
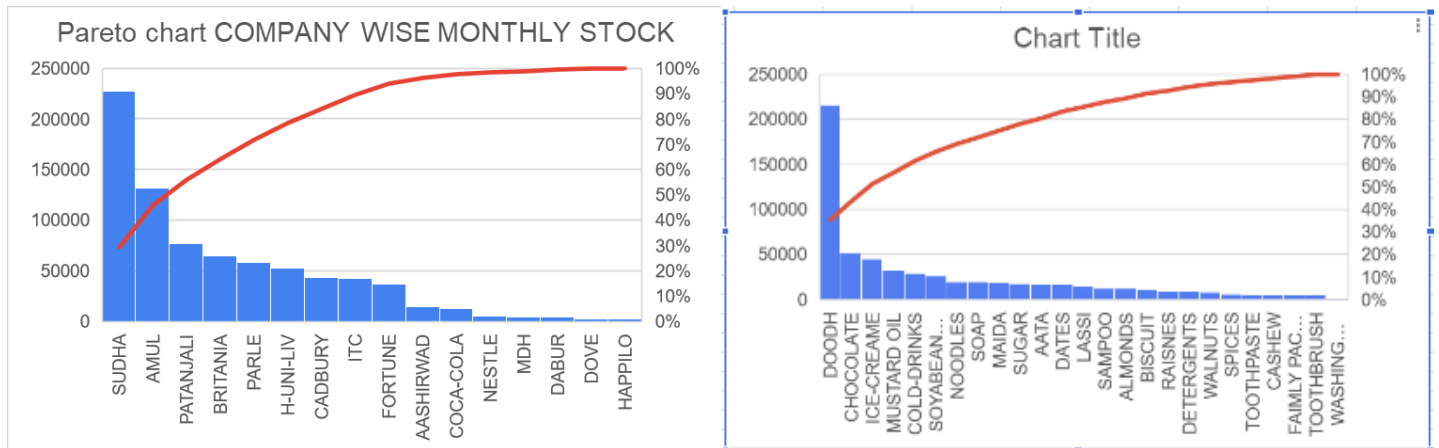
The Stock Pareto Chart arranges products in descending order based on their stock quantities. This arrangement helps in identifying the most significant items and their respective companies that contribute the most to inventory levels. It enables the implementation of focused inventory management strategies.
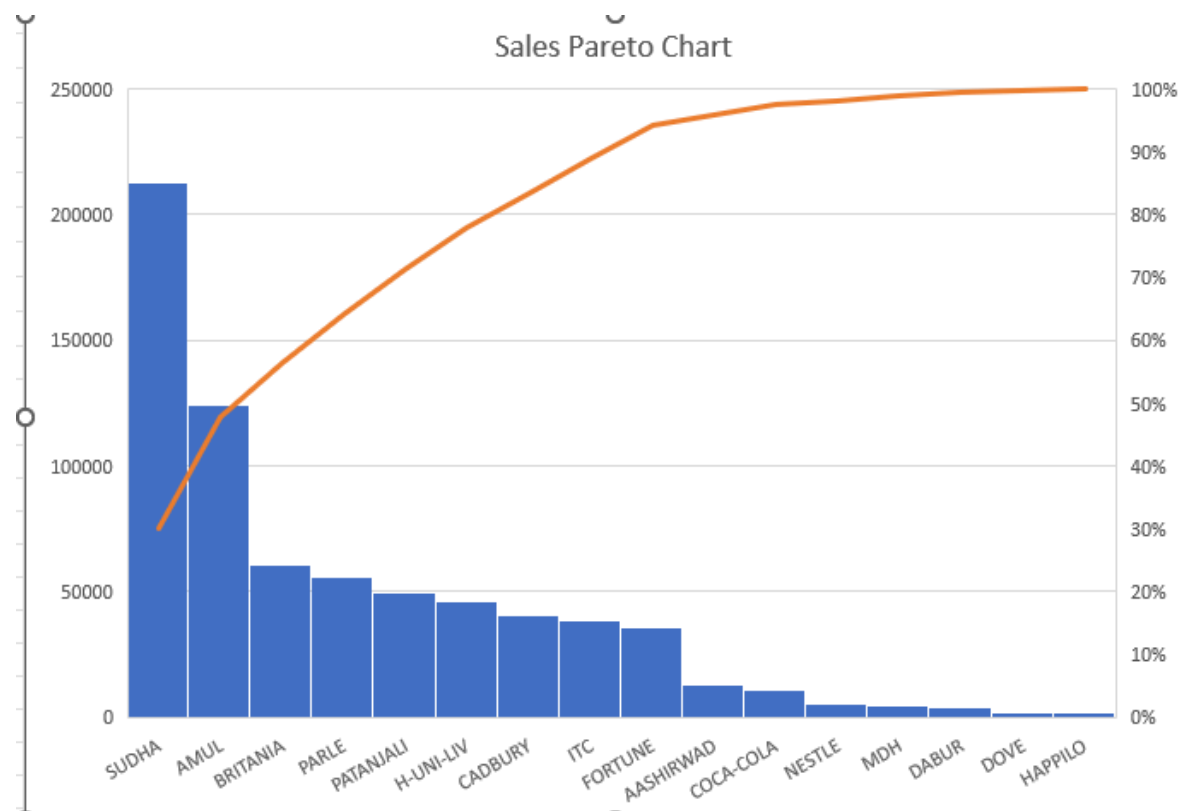
Sales Pareto Chart

The Sales Quantity Pareto Chart organizes products in descending order based on their sales quantities. This organization helps identify the crucial items, company-wise, that drive the majority of sales. It supports targeted efforts to enhance sales performance.

Sales Analysis:

The sales data will undergo thorough analysis to reveal patterns, trends, and potential relationships. This analysis will include evaluating the sales performance of each item, identifying both the top-selling and less popular products.

Customer Preferences:

The sales data will provide insights into customer preferences, encompassing the identification of preferred Dairy & General store items. It aims to understand variations in customer choices and recognize specific preferences, such as preferences for particular companies.

Data Interpretation: The insights derived from analyzing the Shanvi General Store & Dairy Products data will be meticulously interpreted to draw meaningful conclusions. These conclusions will serve as a vital connection to the identified challenges and objectives, aiding informed decision-making for the business. Recommendations will be formulated based on the analysis, aiming to address the challenges effectively. These recommendations may involve optimizing inventory levels for popular items, aligning the product mix with customer preferences, rectifying stock imbalances, and improving overall stocking strategies. The objective is to implement changes that positively impact efficiency and profitability.

Report Presentation: The comprehensive report will encompass the complete analysis process, detailing the methodologies utilized, key findings, and actionable recommendations. The report will be meticulously structured, incorporating visual aids like charts and tables to effectively convey insights. This presentation aims not only to offer a clear understanding of the current situation but also to steer future strategies for **Shanvi General Store & Dairy Products**.

Results and Findings

➢ **Analysis of monthly Sales Amount and profit margin**
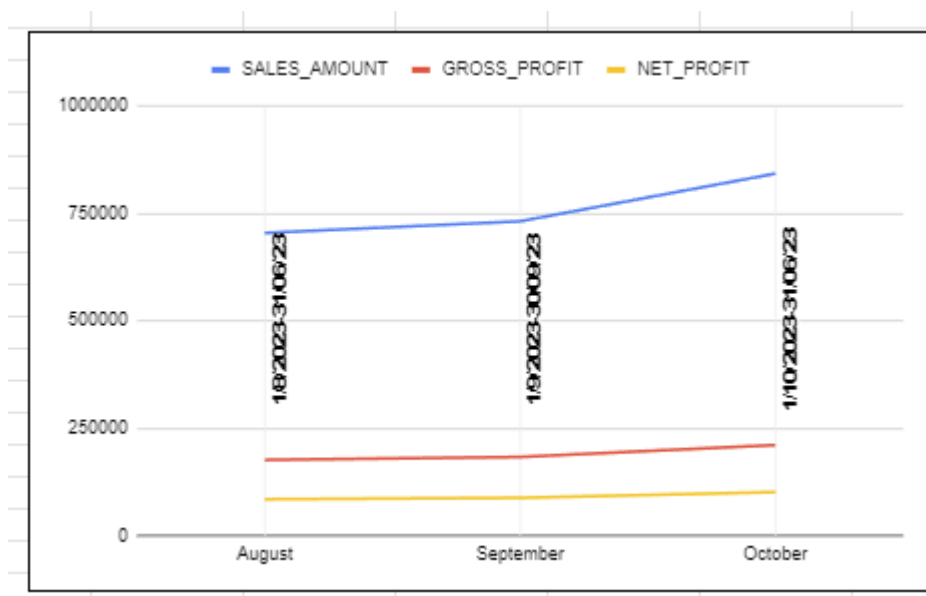
Based on the provided chart depicting monthly sales and profit trends, it's evident that sales figures fluctuate, while profits remain relatively stable. For instance, September's sales amount was 732,500, whereas October's sales increased to 843,695. However, September's profit was 183,125, and October's profit rose to 210,923.75.

Findings:

➢ Customer preferences for purchasing Dairy & General store items vary by month.

➢ September and October stand out favorably based on the available data.

➢ In September, sales for Dairy & General store products surged due to the commencement of Indian festival holidays.

Analysis of Stock and Sales amount to identify Customer Preference and Top-Selling company product.
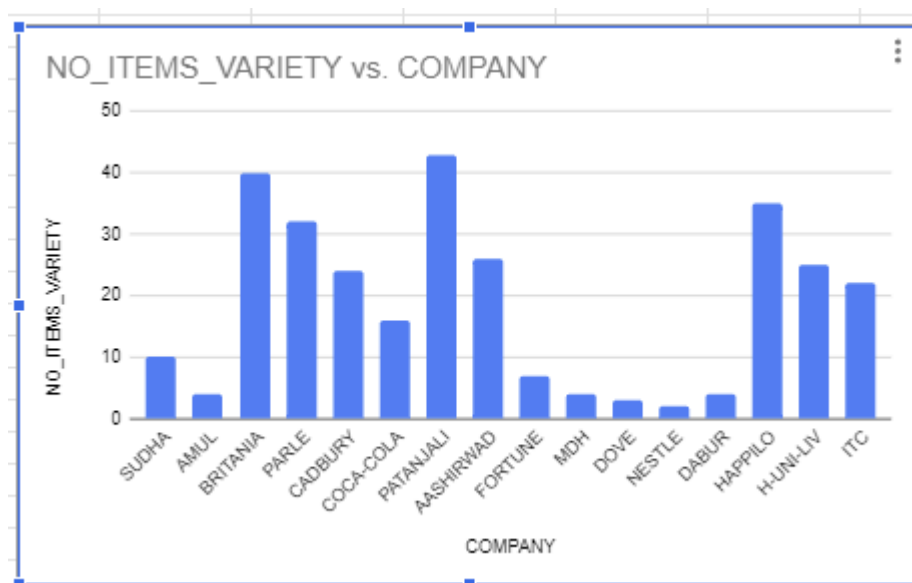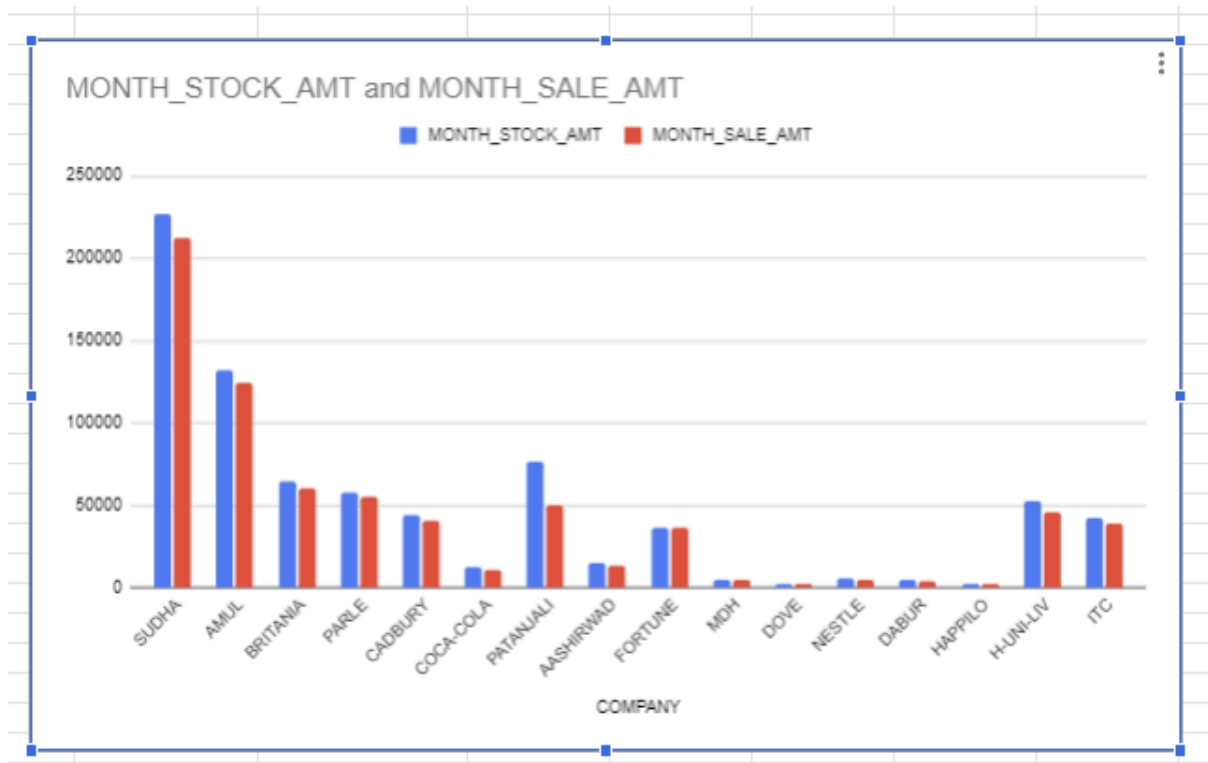
Findings:

The sales quantity chart indicates an uneven distribution among different particulars. Sudha company's products dominate both sales and stock, followed by Amul and Britannia, which comprise the second-largest share in both categories. Patanjali offers the widest variety of products, while Nestle and Amul offer the least variety. However, although Patanjali offers a diverse range, its contribution to sales is just under half of Sudha's sales.

Analysis of Stock quantity and amount
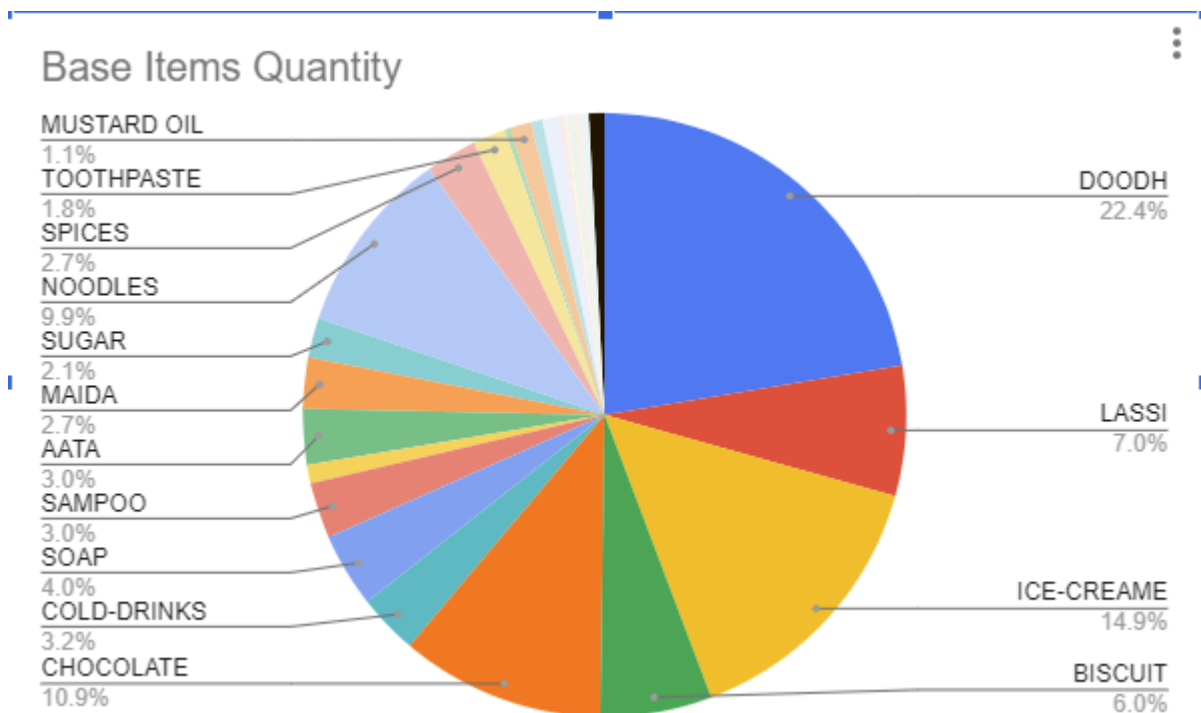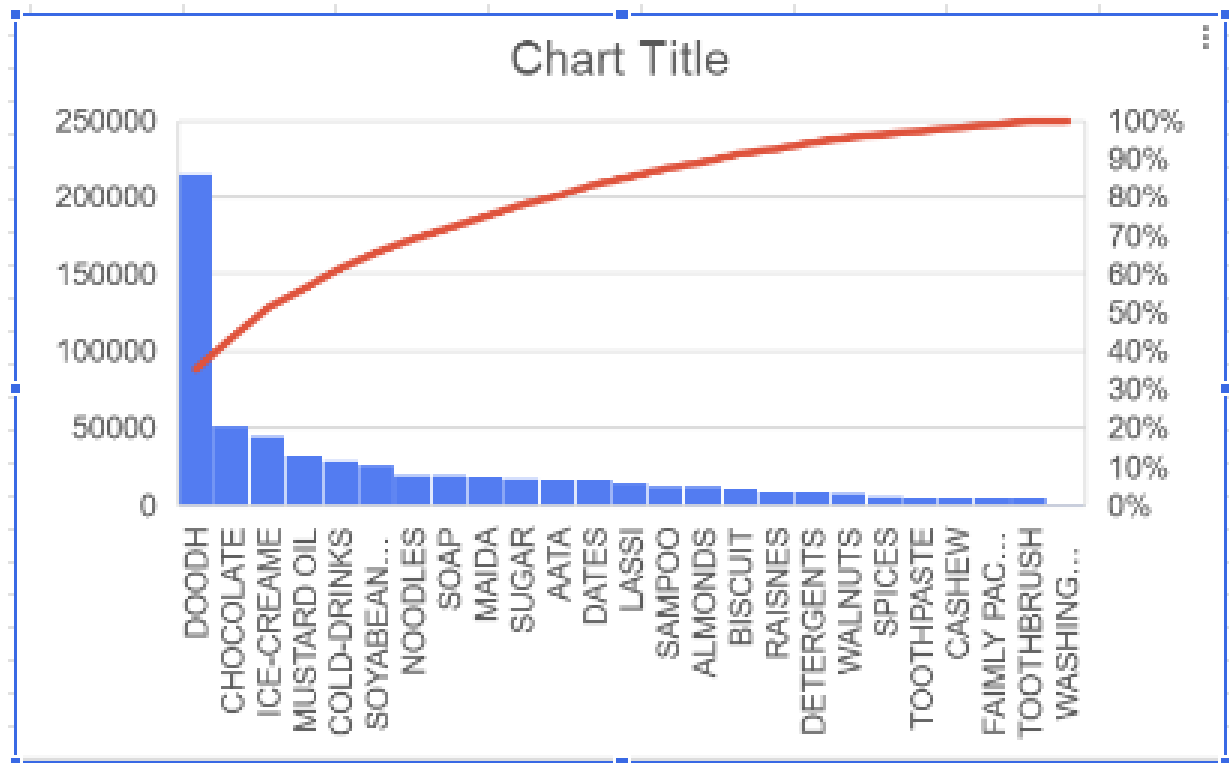
Finding:

Around 70% of the items sold originate from only four products: Doodh, Chocolates, Ice-cream, and Mustard oil, according to the stock Pareto chart.

Notably, Doodh and Ice-Cream have approximately the same stock quantity, but there's a substantial difference in their stock values.

Despite Aata, Shampoo, and Cold-Drink contributing approximately 3% each to stock, collectively making up 10%, their combined contribution is still lower than the stock quantity of Ice-Cream, which holds a 14% contribution to the total stock.

Interpretation of Results and Recommendations:

Sales Trends:

- Monthly sales exhibit fluctuations, with October marking the highest at ₹843,695.
- Consistently stable profit margins indicate steady profitability.

Insights into Customer Preferences:

- Festival influences impact buying patterns, notably higher sales during September and October.
- September's sales surge is attributed to the onset of Indian Festival holidays, influencing Dairy Products demand.

Top-Selling Products and Companies:

- Sudha dominates both sales and stock, followed by Amul and Britannia.
- Patanjali offers a diverse variety but contributes less to sales compared to Sudha.
- Doodh, Chocolates, Ice-cream, and Mustard oil collectively drive 70% of total sales.

Stock Analysis:

- Patanjali presents the widest variety, while Nestle and Dove offer minimal variety.
- Sudha and Amul significantly contribute to both sales and stock.
- Pareto charts highlight key products and companies influencing inventory levels.

Customer Preference Patterns:

- Sudha's diverse product range holds a substantial share in customer preferences.
- Amul and Britannia products closely follow in popularity.
- September and October emerge as favored months for Dairy & General Product purchases, aligning with Festivals.

Inventory Management Optimization:

1. Stock Quantity Alignment:

- Adjust procurement quantities based on historical sales data to maintain an optimal stock-to-sales ratio.

2. Stock Amount Rationalization:

- Review and adjust stock levels for items with high stock amounts but low sales to optimize overall profitability.

3. Implementing an ABC Analysis:

- Categorize products based on their contribution to sales and profitability.
- Efficiently allocate resources, prioritizing high-value items and optimizing stock levels.

4. Regular Inventory Reviews:

- Conduct frequent reviews of inventory data to adapt to changing demand patterns.
- Ensure a healthy inventory turnover rate and prevent overstocking or stockouts.

5. Dynamic Stocking Strategy:

- Adjust stock levels based on customer preferences and sales trends.
- Anticipate peak demand periods, ensuring popular items are readily available.

6. Discounting or Promotions:

- Offer time-limited discounts or promotions for items with excess stock to clear surplus inventory.

7. Integrating Technology:

- Explore inventory management software for real-time data analytics.
- Leverage technology for informed decisions on restocking, sales promotions, and overall inventory optimization.

Recommendations for Logistic Issues at Shristi Stationary:

Supply Chain Optimization:

Foster close collaboration with suppliers to streamline the supply chain.

Implement Just-In-Time (JIT) inventory management to minimize excess stock and reduce holding costs.

Reduce Lead Times:

Work with suppliers to minimize lead times for product deliveries. Explore alternative suppliers or logistics partners with faster delivery capabilities.

Employee Training and Efficiency:

- Provide training programs for warehouse and logistics staff to enhance efficiency.
- Cultivate a culture of continuous improvement and innovation within the logistics team.

Improving Report Presentation and Legibility:

1. Use clear, non-technical language for easy comprehension.

2. Organize content with headings, subheadings, and bullet points.

3. Ensure proper formatting, spacing, and consistent font styles for readability.

4. Include labeled visual aids like tables and charts to support analysis.

5. Maintain a professional and consistent writing style; proofread for errors.

6. Begin with an executive summary summarizing key points for quick reference.

7. Clearly define technical terms for reader understanding.

8. Follow a logical flow from introduction to analysis, conclusions, and recommendations.

9. Explain analysis steps with rationale for reader clarity.

10. Summarize key results separately, highlighting critical insights.

11. Present clear and precise recommendations for Shanvi General Store & Dairy Products.

12. Conclude with a summary reinforcing main points and recommendations.