BUSINESS DATA MANAGEMENT

A Mid-Term Report For The BDM Capstone Project

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STORE BUSINESS MANAGEMENT THROUGH DATA ANALYSIS

SUBMITTED BY:

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1. Executive Summary:

Store business is very common in India, hence very competitive. From a business perspective it is very crucial to engage in proactive planning, strong customer-relation building and maintain a strategic mindset in order to establish a strong market position and earn profits.

As stated earlier in the project proposal Rakshit Stores, a medium-sized retail business in Kolkata, West Bengal, is facing significant challenges in profit margins and inventory management. The BDM Capstone Project seeks to provide a data-driven solution to address these issues and improve business outcomes. Analytical techniques have been utilized such as **time-series analysis**, **regression modeling**, and **clustering** to identify patterns in sales and inventory. These methods will allow in forecast demand, optimize inventory levels, and improve revenue streams. By examining historical sales data and conducting revenue trend analysis, the aim is to develop actionable strategies that will enhance inventory control and maximize profitability.

The expected results include better management of high-revenue items, optimized stock levels for underperforming products, and the ability to anticipate demand based on sales patterns. Additionally, the findings will assist in formulating business decisions to address competitive pressures and improve overall store performance. Key outcomes will likely include a **10-15% increase in profit** and more efficient inventory practices, reducing wastage and stockouts.

Tasks for Mid-Term Submission:

- To provide proof of originality (letter, images, video, etc.).
- To provide metadata used for data interpretation.
- To provide descriptive statistics about the metadata.
- To provide detailed explanation of analysis process/methods used on metadata.
- To provides results and findings on the metadata (graphs, charts, etc.).

2. Proof of Originality:

Store Details:

Name: Rakshit Stores

Owners: Mr. Samir Rakshit, Mr. Pamir Rakshit, Mr. Pradip Rakshit

Address: 122, Rajdanga Gold Park, Tribarna Sangha Club, Kolkata-700107, West Bengal

About:

Rakshit Stores is a medium-sized shop that specializes in the sale of packeted snacks, beverages, cigarettes, etc. The retail establishment was established in early 1998. Previously owned by Lt. Dwijahari Rakshit, the store is now owned by his three sons whose names are given above. It has been in the business ever since and earned its well-deserved reputation. The store spends on monthly stocks and store maintenance.

The data used in this project was directly collected from Rakshit Stores located at 122 Rajdanga Gold Park, Kolkata. The store is a reputable medium-sized retail business established in 1998, now run by the owners, Mr. Samir Rakshit, Mr. Pamir Rakshit, and Mr. Pradip Rakshit. Data collection occurred over a month-long period (July 2024), with all transactions manually recorded in a physical ledger. The recorded data includes product sales, revenue generated, and inventory levels. This data was later digitized, cleaned, and prepared for analysis. Images of the store, the product displays, and interaction with the owners have been provided for verification.
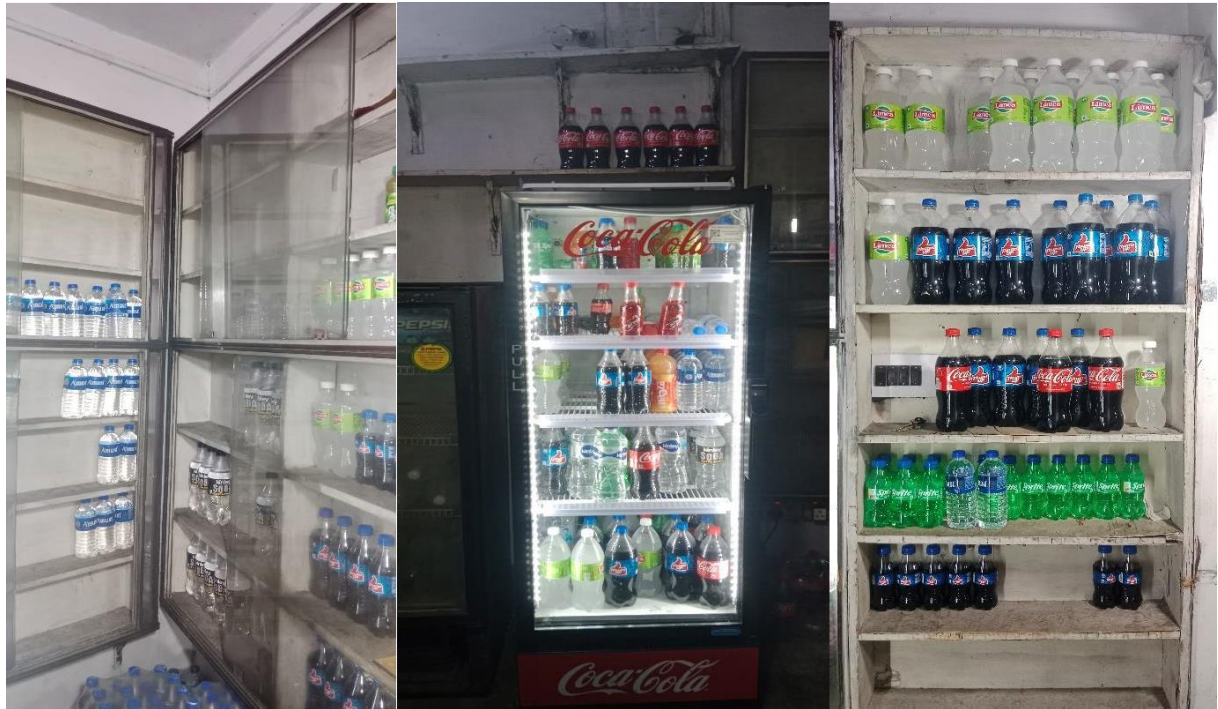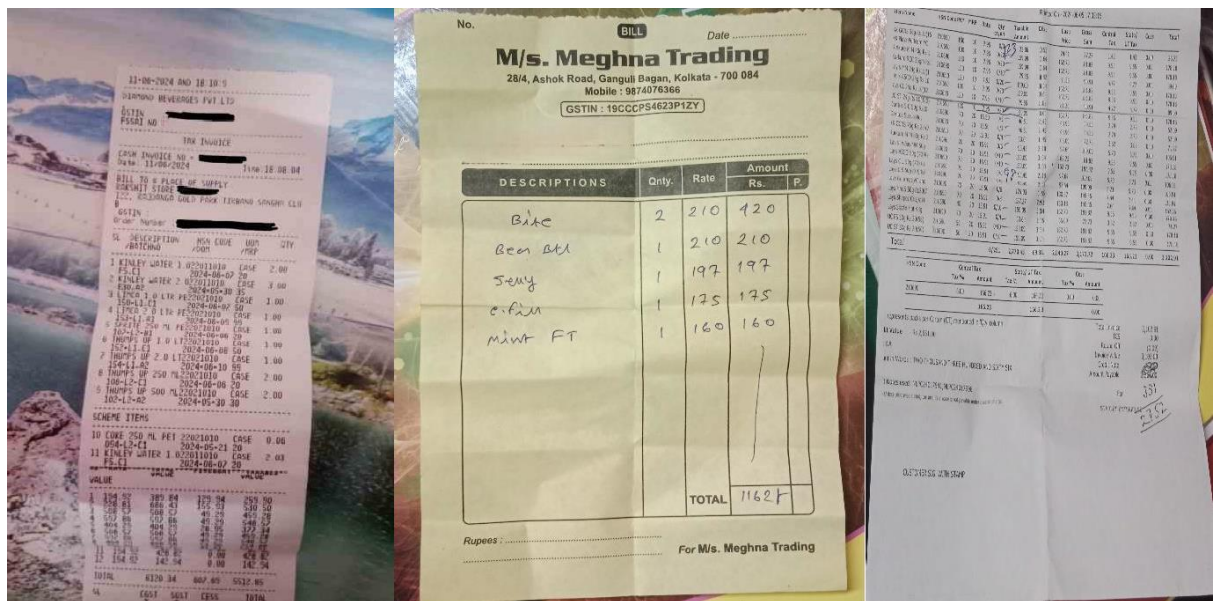
Images:

Image of the Store

Image of Me with One of the Store Owners
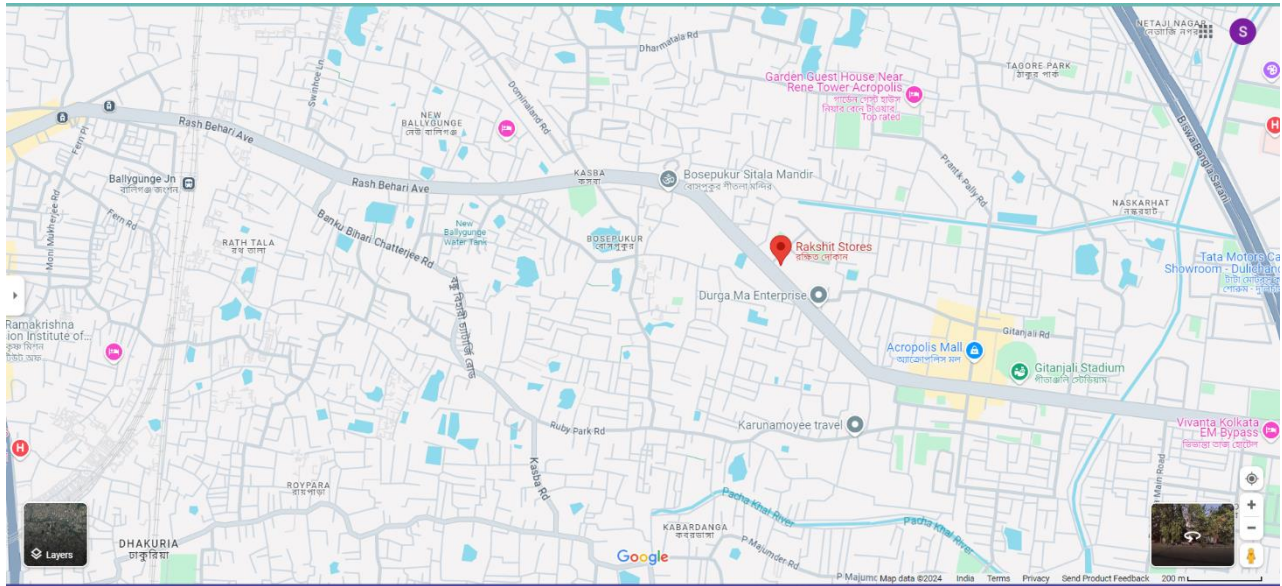

Images of the Snacks in the Store

Images of the Beverages in the Store

Some of the Bills of the Wholesalers from Whom the Store Purchases Products

Google Docs Link for Charts:

https://docs.google.com/document/d/1DzJAtUGbHRiijX7aHh0onLH39kBx72nsPqiCP0qRvwY/edit?usp=sharing

Location of Store on Google Maps

3. Metadata:

The dataset contains detailed information collected from store transactions between 1st July 2024 to 31st July 2024. The columns in the dataset include:

- Product Category (Categorical): Denotes the type of product (e.g., Snacks, Beverages, Cigarettes)

- Selling Price (Numerical): The price at which each product is sold.

- Revenue (Numerical): The total revenue generated from each product which was used to find sales percentage.

- Cumulative Sales (Numerical): The revenue generated by each product added daily. This data was used to find cumulative and sales percentage.

Data was collected from daily sales records at the store. The source for the data is manual logs maintained by the store staff, which were then digitized. The metadata provides a crucial foundation for understanding business operations, enabling an analysis of product-wise revenue generation and demand patterns.

| DATE	CHIPS & SNACKS	COLD DRINKS & BEVERAGES	CHOCOLATES	CIGARETTES	TOFFEES & CANDIES	PACKAGED WATER	TOTAL SALES
01/07/2024	₹250.00	₹212.00	₹120.00	₹172.00	₹45.00	₹420.00	₹1,219.00
02/07/2024	₹155.00	₹245.00	₹150.00	₹120.00	₹35.00	₹350.00	₹1,055.00
03/07/2024	₹175.00	₹200.00	₹155.00	₹210.00	₹33.00	₹310.00	₹1,083.00
04/07/2024	₹210.00	₹275.00	₹185.00	₹220.00	₹55.00	₹400.00	₹1,345.00
05/07/2024	₹100.00	₹255.00	₹175.00	₹210.00	₹69.00	₹310.00	₹1,119.00
06/07/2024	₹285.00	₹285.00	₹155.00	₹112.00	₹42.00	₹350.00	₹1,229.00
07/07/2024	₹185.00	₹362.00	₹145.00	₹156.00	₹44.00	₹330.00	₹1,222.00
08/07/2024	₹185.00	₹300.00	₹210.00	₹160.00	₹23.00	₹430.00	₹1,308.00
09/07/2024	₹200.00	₹420.00	₹190.00	₹182.00	₹66.00	₹300.00	₹1,358.00
10/07/2024	₹190.00	₹377.00	₹185.00	₹188.00	₹71.00	₹310.00	₹1,321.00
11/07/2024	₹125.00	₹332.00	₹150.00	₹172.00	₹43.00	₹320.00	₹1,142.00
12/07/2024	₹122.00	₹311.00	₹120.00	₹140.00	₹67.00	₹360.00	₹1,140.00
13/07/2024	₹136.00	₹270.00	₹110.00	₹212.00	₹88.00	₹340.00	₹1,156.00
14/07/2024	₹215.00	₹225.00	₹120.00	₹222.00	₹49.00	₹360.00	₹1,191.00
15/07/2024	₹220.00	₹276.00	₹195.00	₹166.00	₹56.00	₹370.00	₹1,283.00
16/07/2024	₹245.00	₹312.00	₹170.00	₹182.00	₹43.00	₹330.00	₹1,282.00
17/07/2024	₹180.00	₹335.00	₹175.00	₹136.00	₹23.00	₹400.00	₹1,249.00
18/07/2024	₹166.00	₹312.00	₹175.00	₹242.00	₹27.00	₹420.00	₹1,342.00
19/07/2024	₹187.00	₹300.00	₹115.00	₹230.00	₹21.00	₹410.00	₹1,263.00
20/07/2024	₹200.00	₹288.00	₹95.00	₹112.00	₹36.00	₹450.00	₹1,181.00
21/07/2024	₹188.00	₹253.00	₹110.00	₹135.00	₹32.00	₹400.00	₹1,118.00
22/07/2024	₹195.00	₹352.00	₹155.00	₹122.00	₹28.00	₹390.00	₹1,242.00
23/07/2024	₹160.00	₹252.00	₹130.00	₹213.00	₹59.00	₹330.00	₹1,144.00
24/07/2024	₹166.00	₹212.00	₹150.00	₹105.00	₹79.00	₹350.00	₹1,062.00
25/07/2024	₹218.00	₹233.00	₹115.00	₹122.00	₹92.00	₹320.00	₹1,100.00
26/07/2024	₹220.00	₹253.00	₹120.00	₹142.00	₹55.00	₹290.00	₹1,080.00
27/07/2024	₹135.00	₹211.00	₹115.00	₹115.00	₹37.00	₹280.00	₹893.00
28/07/2024	₹110.00	₹240.00	₹95.00	₹132.00	₹25.00	₹320.00	₹922.00
29/07/2024	₹176.00	₹290.00	₹110.00	₹108.00	₹46.00	₹350.00	₹1,080.00
30/07/2024	₹214.00	₹310.00	₹125.00	₹120.00	₹61.00	₹380.00	₹1,210.00
31/07/2024	₹188.00	₹292.00	₹120.00	₹121.00	₹77.00	₹420.00	₹1,218.00
TOTAL	₹5,701.00	₹8,790.00	₹4,440.00	₹4,979.00	₹1,547.00	₹11,100.00	₹36,557.00

Image of Data

4. <u>Descriptive Statistics:</u>

To provide a thorough understanding of the dataset, a series of statistical calculations was performed:

- Mean: The average daily revenue generated by the store was found to be ₹1,179.26.

- Median: The middle value in daily sales data, reflecting the central trend of revenue without being skewed by outliers. Median of the average daily revenue was found to be ₹1,191.00.

- Variance: A high variance of revenue among different product categories suggests a significant disparity in demand, especially for Packaged Water and Cold Drinks. The variance in average daily revenue was found to be 13094.39785.

- Standard Deviation: This helps measure how much the revenue fluctuates across days. The standard deviation for the average daily revenue was found to be 114.4307557.

Notable patterns include a steady increase in demand for beverages during weekends and decreased demand for snacks during weekdays. Anomalies, such as a spike in cigarette sales, were observed during festivals. These patterns are crucial for improving inventory control and predicting demand surges.
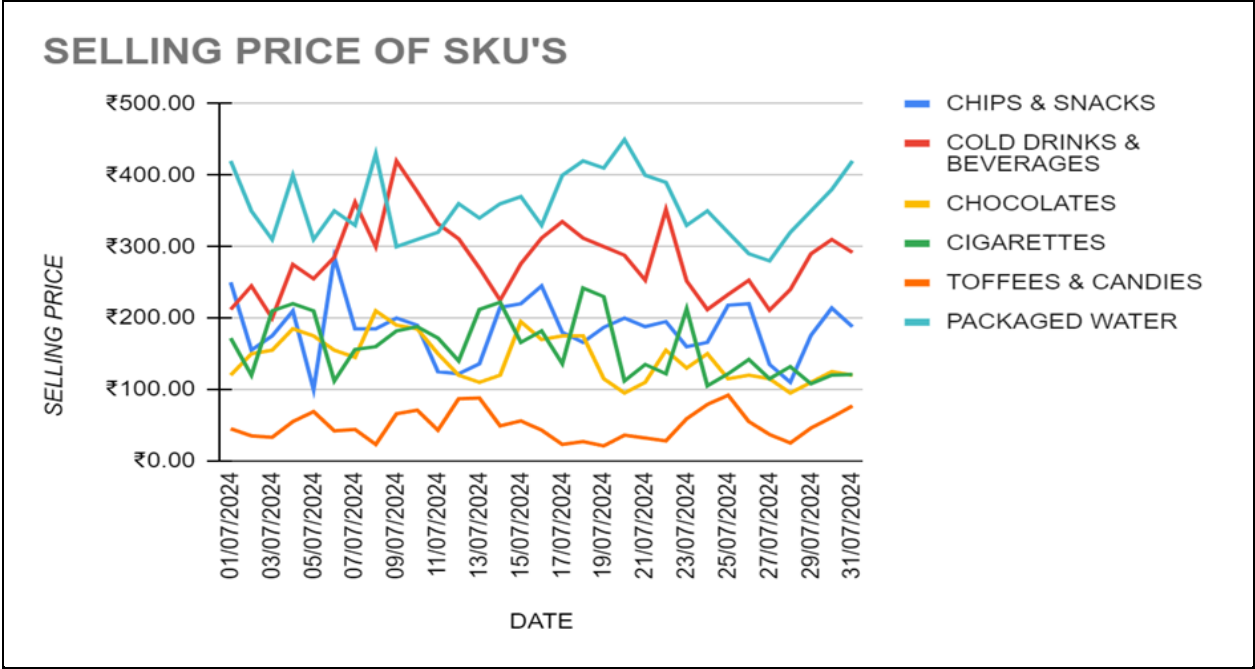
Total Revenue:
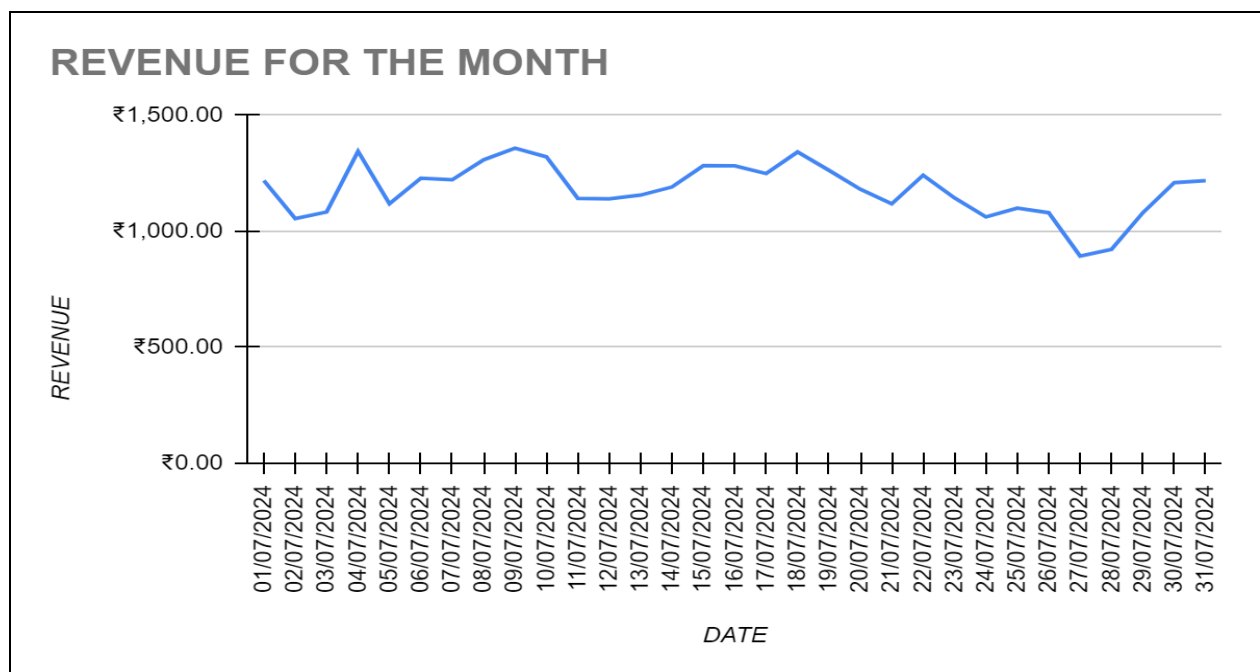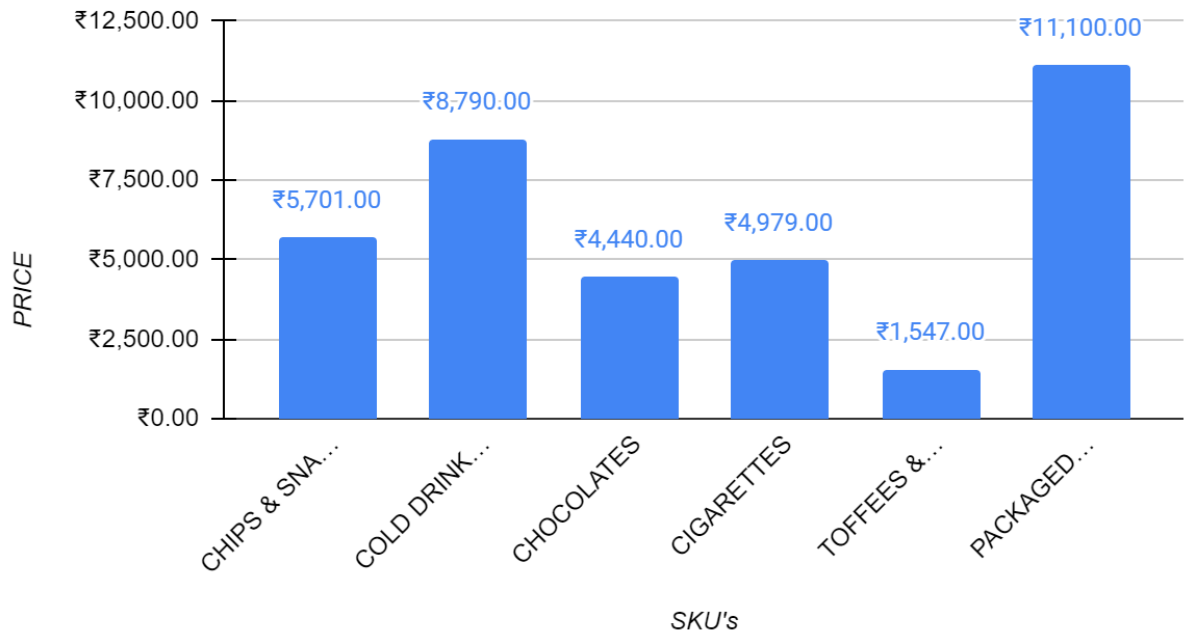

Total Revenue Trend for a Month
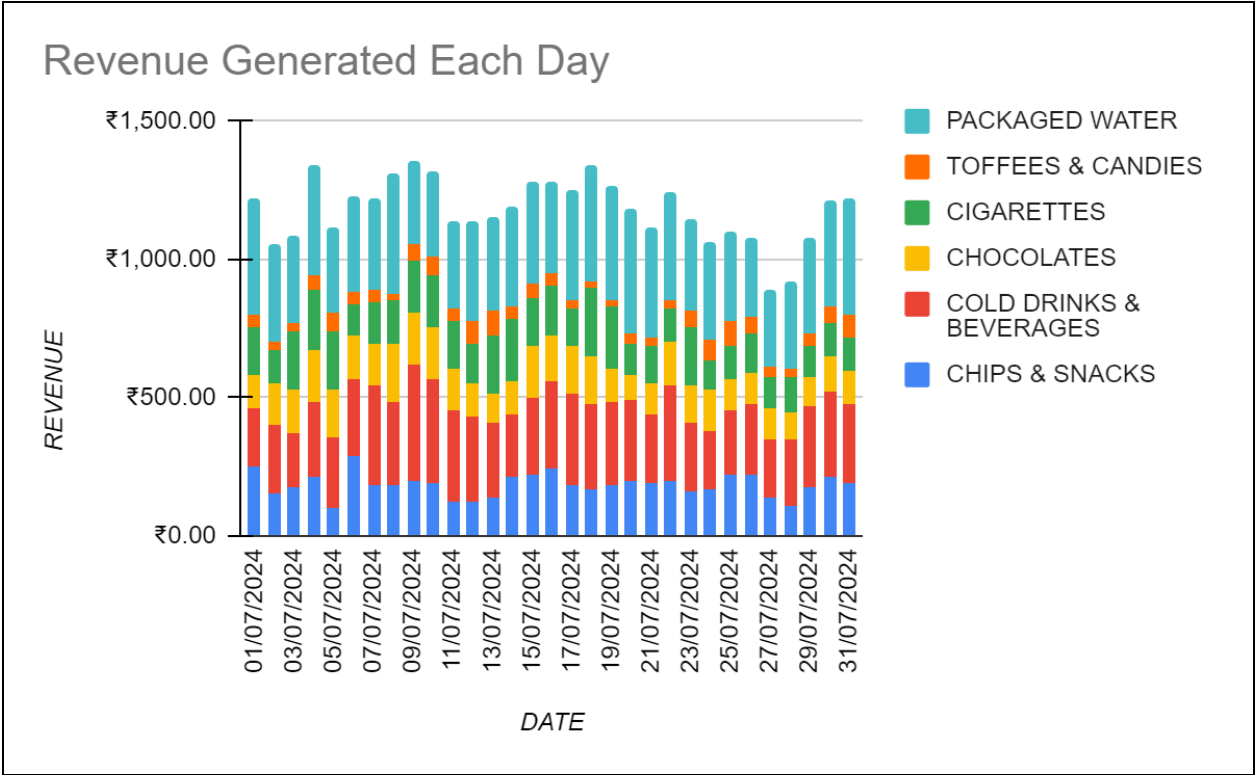
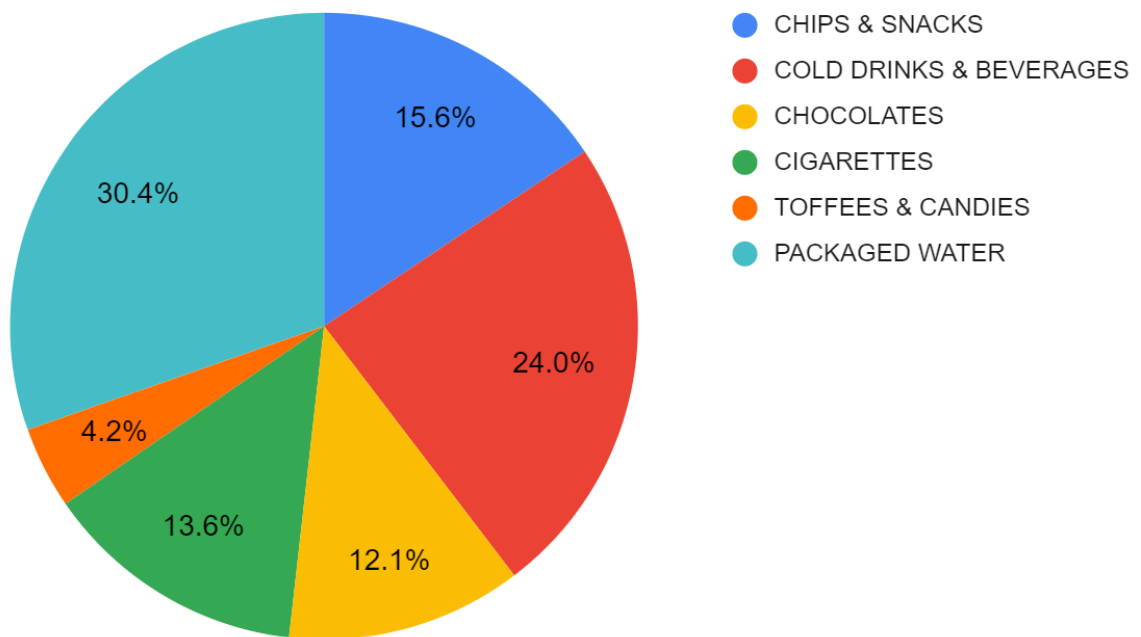Revenue Generated Each Day Category wise

Individual Categories:

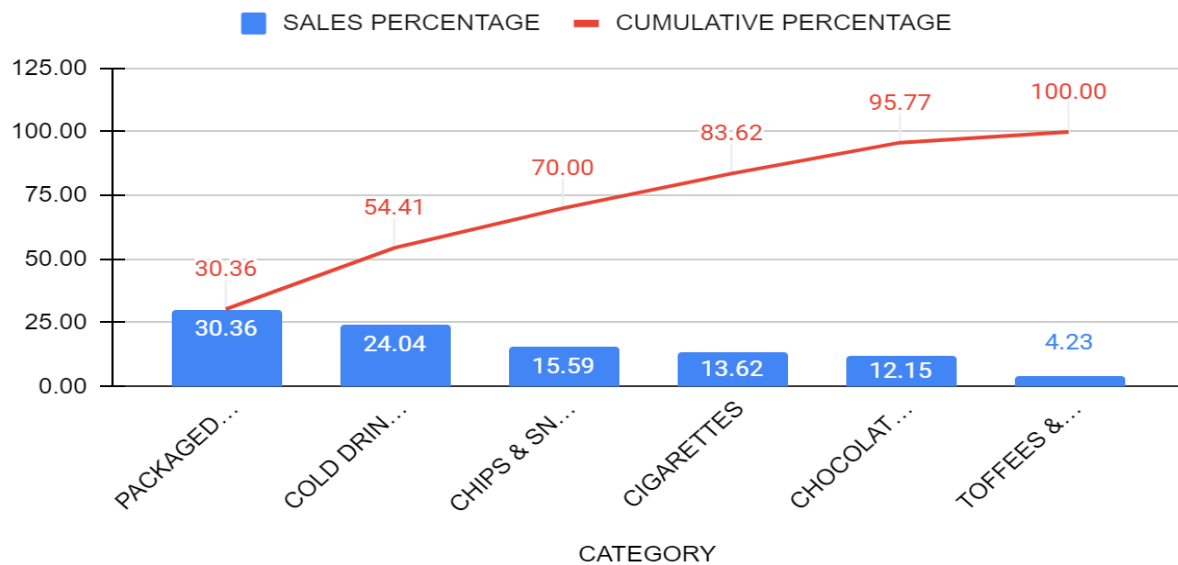Selling Price of SKU'S for a Month

Total Revenue of SKU'S for a Month

Revenue Proportion of SKU'S for a Month

Pareto Chart of Total Revenue

5. Detailed Explanation of Analysis Process/Method:

The data was first cleaned and preprocessed to remove inconsistencies and errors. Several key analytical methods were applied:

- Time-Series Analysis: To understand sales trends and forecast future demand.

- Clustering: Used to group products based on their sales performance, helping identify high-revenue and low-revenue items.

- Regression Analysis: Employed to analyze the relationship between different product categories and overall revenue, offering insights into price optimization.

Tools like Google Sheets was used for data manipulation, visualization, initial data entry and graph plotting. The choice of methods was aimed at understanding revenue drivers and optimizing inventory management strategies.

Explanation of the Charts:

1. The trend line graph shows the trend for revenue generated over the month of July. It was simply created in the google spreadsheet using the total sales data.

2. The stacked bar chart shows the revenue generated over the month of July by each category. It was simply created in the google spreadsheet using the collected data.

3. The line chart shows the comparison between the revenue generated by each category over the month of July. It was also created using the collected data in the google spreadsheet.

4. The column chart and the pie chart show the total revenue generated by each category separately over the month of July. It was created in the google spreadsheet by calculating the total revenue of each category over the month of July.

5. The pareto chart compares the cumulative sales percentage and the total sales percentage. This shows the cumulative contribution of each category/SKU in the revenue generated. This helps in identifying the significant contributors to the overall revenue. It was created in the google spreadsheet by calculating the sales percentage, cumulative sales and the cumulative sales percentage.

All the charts visually represent how each variable changes with time. These will further help in making informed decisions and optimize business strategies for improved performance and profitability.

6. Results and Findings:

From the analysis, following results were deduced:

- Packaged Water accounted for 31% of total revenue, making it the most significant contributor.

- Cold Drinks and Beverages followed closely, indicating the need for better inventory control and marketing efforts to maximize their sales potential.

- The Pareto Chart revealed that 80% of the revenue comes from four categories: Packaged Water, Cold Drinks, Snacks, and Cigarettes. This suggests that these categories should receive the most attention in terms of stock management and promotional efforts.

Confidence intervals were calculated for key metrics, showing that with 95% confidence, daily revenue will fall between ₹1,358.00 and ₹893.00 if current trends continue. Significance tests confirmed that certain categories (e.g., cigarettes) have a statistically significant impact on overall profitability.

These findings will help the store owners make informed decisions about which products to prioritize in terms of stock and marketing efforts. By focusing on these high-performing categories, we anticipate a 10% improvement in monthly revenue.

Conclusive Summary:

This report has demonstrated that Packaged Water and Cold Drinks are the primary revenue drivers for Rakshit Stores, contributing over 50% of total sales. The findings suggest that optimizing inventory and focusing on these categories will lead to better profitability. Additionally, the analysis highlights the need for collecting more data over a longer period to identify seasonal trends and fully understand the demand fluctuations. Moving forward, the store can use the insights generated from this analysis to enhance profitability and manage inventory more effectively.

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