BUSINESS DATA MANAGEMENT

A Mid-Term Report For The BDM Capstone Project

IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

STORE BUSINESS MANAGEMENT THROUGH DATA ANALYSIS

SUBMITTED BY:

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CONTENTS:

1. Executive Summary:

In India, the retail sector is highly competitive, requiring businesses to engage in proactive planning and strong customer relations to thrive. Rakshit Stores, a medium-sized retail business in Kolkata, is currently facing challenges with profit margins and inventory management. The BDM Capstone Project aims to provide a data-driven solution to enhance business outcomes through analytical techniques such as time-series analysis, regression modeling, and clustering.

These methodologies will help identify sales and inventory patterns, enabling accurate demand forecasting, inventory optimization, and revenue enhancement. By analyzing historical sales data and conducting revenue trend assessments, we intend to formulate actionable strategies that will improve inventory control and boost profitability. Key objectives include effective management of high-revenue items, optimized stock levels for underperforming products, and enhanced demand anticipation based on sales patterns.

The anticipated outcomes of this project include a 10-15% increase in profits and improved inventory practices that minimize wastage and stockouts. Additionally, the findings will support informed business decisions to navigate competitive pressures effectively.

Tasks for Mid-Term Submission:

For the mid-term submission, tasks include providing proof of originality through various media, metadata documentation for data interpretation, descriptive statistics about the metadata, a detailed explanation of the analysis methods, and visual representations of results and findings through graphs and charts. These elements will collectively contribute to a comprehensive understanding of the project's impact on Rakshit Stores.

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.

Declaration Statement

I am working on a Project Title "**STORE BUSINESS MANAGEMENT THROUGH DATA ANALYSIS**". I extend my appreciation to **RAKSHIT STORES**, 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 through 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 information 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 agree that all the recommendations are business-specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.

Signature of Candidate: SUBHADEEP RAKSHIT

Name: **SUBHADEEP RAKSHIT**

Date: **07/10/2024**
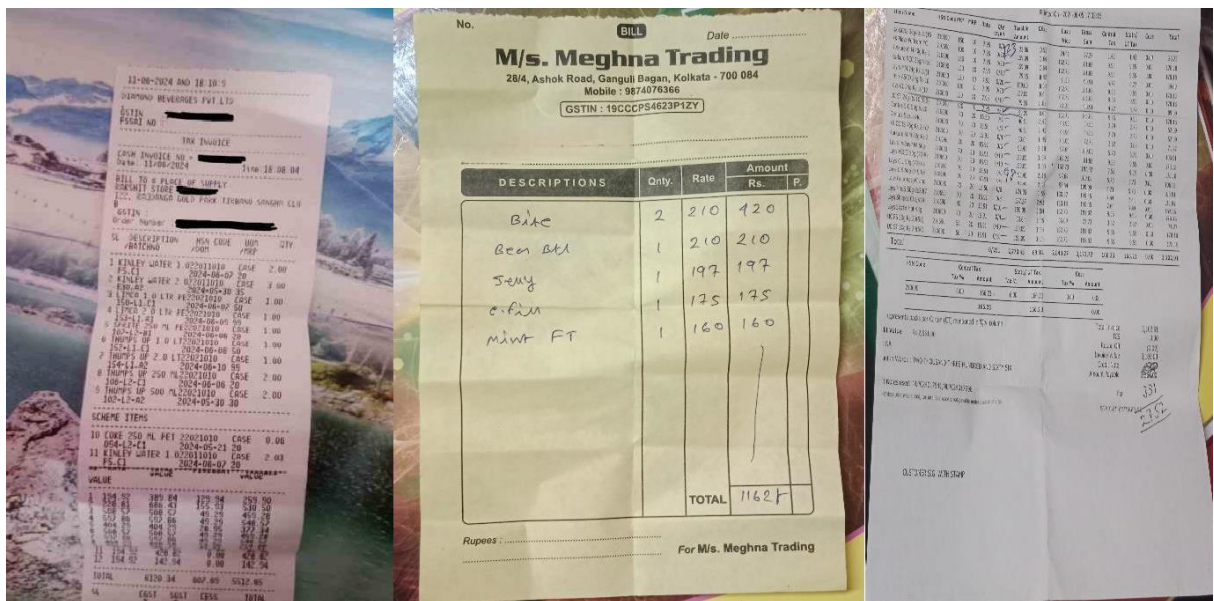
Images:

Image of the Store

Image of Me with One of the Store Owners
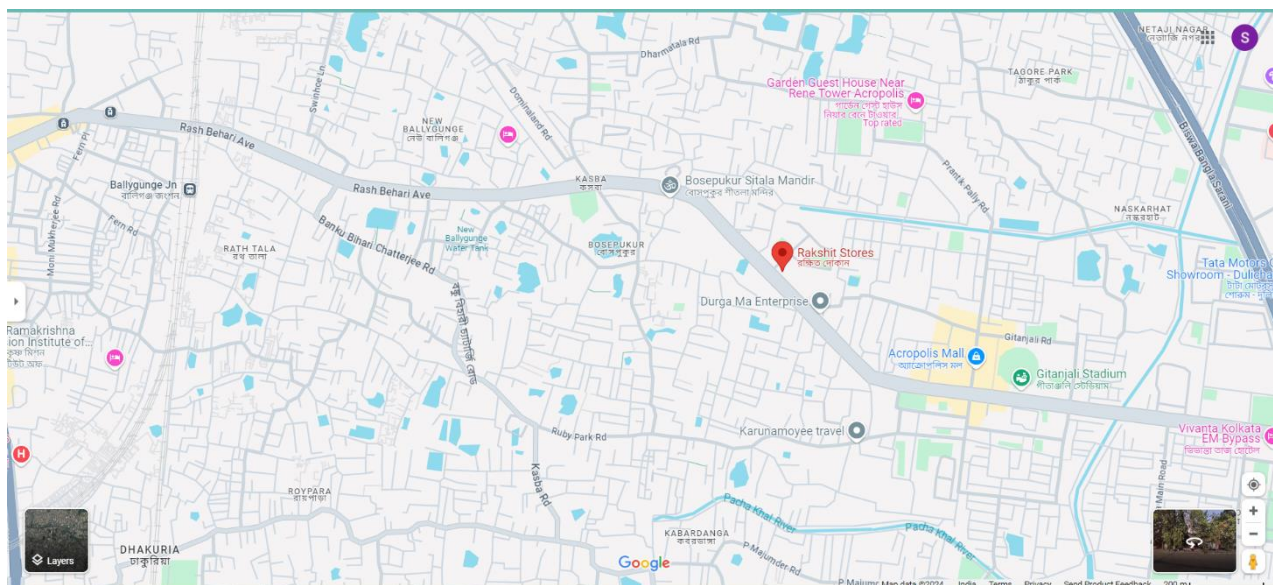

Images of the Snacks in the Store

Images of the Beverages in the Store

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

Google Docs Link for Images:

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

Location of Store on Google Maps

3. Metadata:

VARIABLE	DATA TYPES	DESCRIPTION
Date	Date	Date for particular data
Expenditure	Float	Money spent by the store
Selling Price	Float	B2C selling price
Buying Cost	Float	Cost Price
Revenue	Float	Total sales of the store
Profit	Float	Total profit earned by the store
Quantity	Float	Amount of item vended

Google Sheet Link for the Dataset:

https://docs.google.com/spreadsheets/d/1bk2B5IfhSv17zXSgItBFDbQ2Lbl0BVm3tJgDT4fMMjk/edit?usp=sharing

4. Descriptive Statistics:

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	₹87.00	₹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

Mean	₹183.90	₹283.55	₹143.23	₹160.61	₹49.90	₹358.06	₹1,179.26
Median	₹187.00	₹285.00	₹145.00	₹156.00	₹45.00	₹350.00	₹1,191.00
Variance	1735.423656	2759.122581	1022.580645	1811.378495	429.0903226	2102.795699	13094.39785
Standard Deviation	41.65841639	52.52735079	31.97781489	42.56029246	20.71449547	45.85625038	114.4307557

CATEGORY	TOTAL SALES	CUMULATIVE SALES	CUMULATIVE PERCENTAGE	SALES PERCENTAGE
PACKAGED WATER	₹11,100.00	₹11,100.00	30.36	30.36
COLD DRINKS & BEVERAGES	₹8,790.00	₹19,890.00	54.41	24.04
CHIPS & SNACKS	₹5,701.00	₹25,591.00	70.00	15.59
CIGARETTES	₹4,979.00	₹30,570.00	83.62	13.62
CHOCOLATES	₹4,440.00	₹35,010.00	95.77	12.15
TOFFEES & CANDIES	₹1,547.00	₹36,557.00	100.00	4.23

5. Detailed Explanation of Analysis Process/Method:

Raw data was collected by me from frequent visits to the store and jotting down the raw data manually in sheets as the store did not keep any form of register to store their data. All they had were bills from the wholesalers. So, this method of collection of raw data had to be done. Then the data was manually entered into an excel sheet for further analysis. Missing values and other such discrepancies were removed manually during the process of entering the data.

The recorded data contained:

• Daily revenue collected for the whole month of July 2024.

• The approximate average selling and cost prices of the category as price could vary within the category for different products.

• The cumulative sales for each category to take in account the prices of different products within the category.

• The other expenditures for the store and the number of items sold in each category.

The given data was used to derive deeper structured and inferable data.

- Revenue generated each day was calculated using the average sales in each category.

- The expenditure to buy the products from various wholesalers using the average cost price in each category.

- Using the above tables, profit earned per day was calculated.

- The total sales, profit per day from each category, cumulative sales, cumulative percentage, sales percentage has also been calculated using the daily sales list and cumulative sales tables.

- Subsequent graphs were drawn using these derived data.

6. Results and Findings:
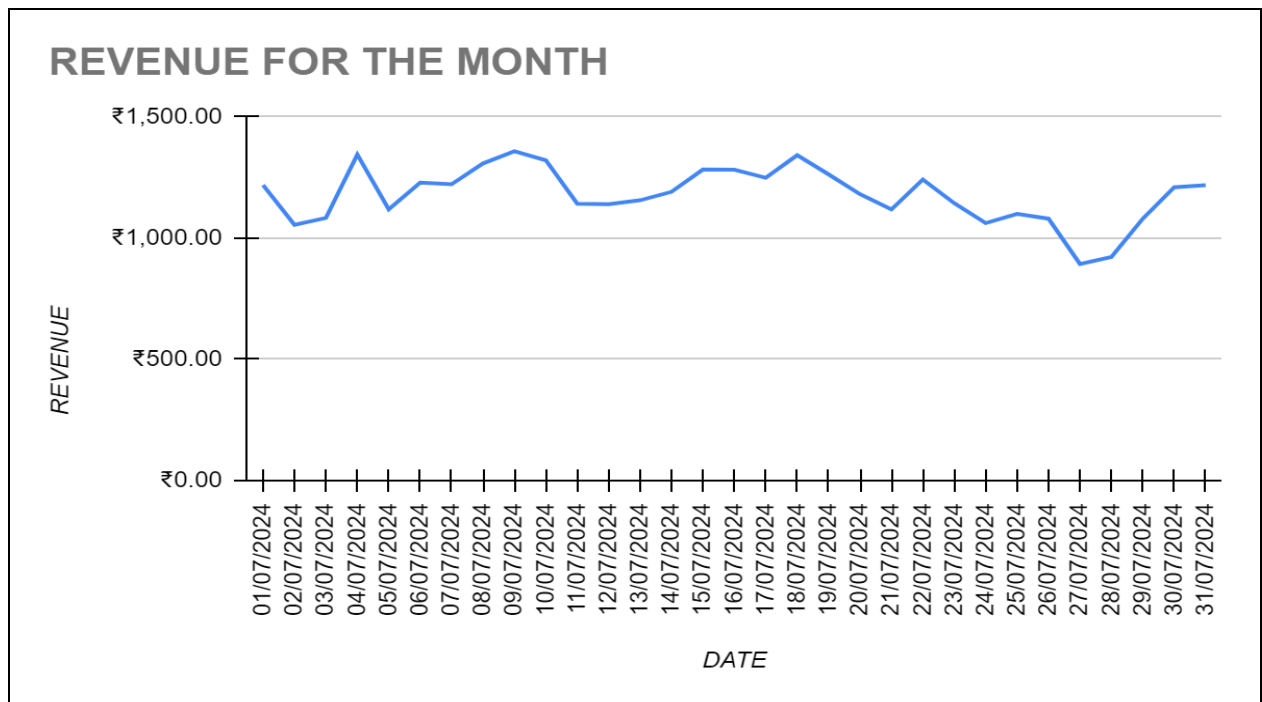
Total Revenue Trend for a Month

Revenue generated per day was plotted in a trend line chart. We can easily conclude that the maximum revenue is generated on weekends and during holidays while during work days and weekdays minimum revenue is generated. Moreover, during the end of weekdays an average revenue is generated.
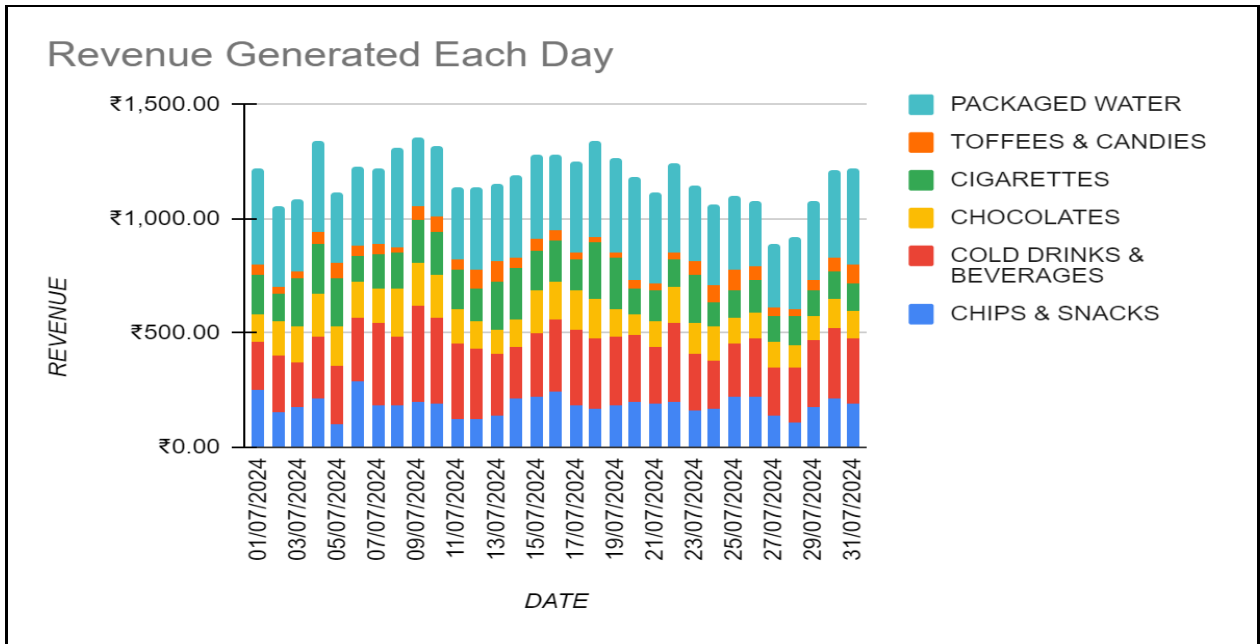
Revenue Generated Each Day Category wise

Revenue generated each day, category wise, was also plotted on a stacked bar chart. From this chart as well, we can observe the same inference observed in the trend line chart. Additionally, from this chart we can observe that the category packaged water is the most sold category and toffees and candies are the least sold category.
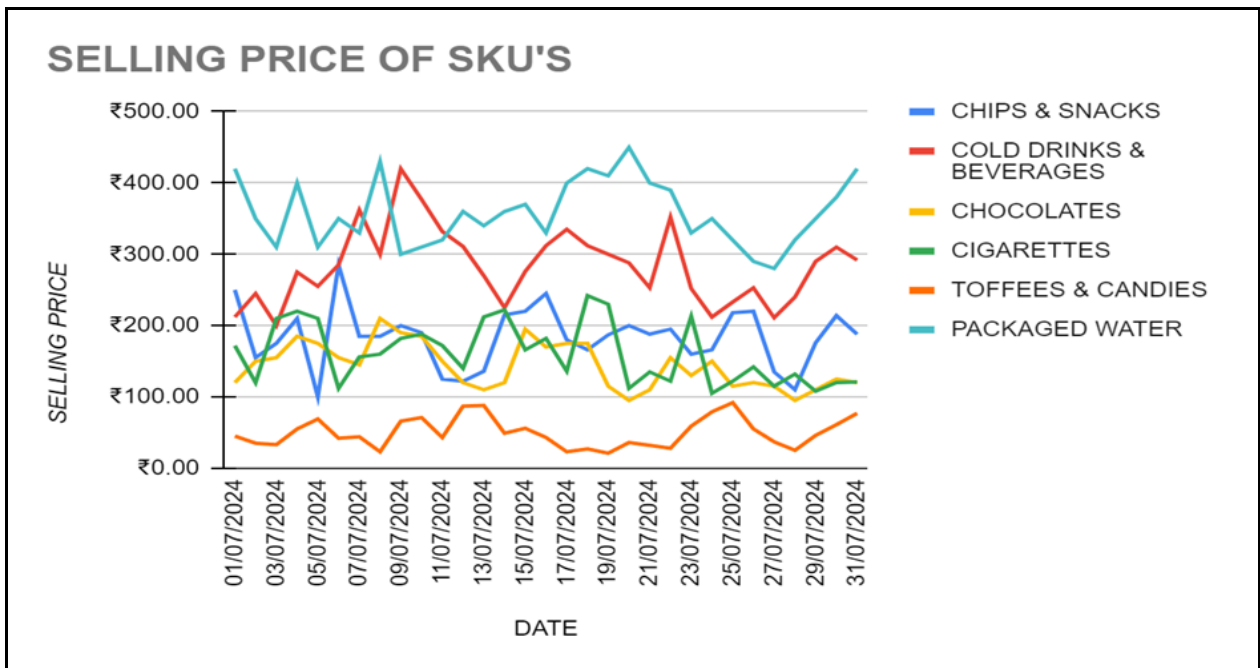
Selling Price of SKU'S for a Month

Revenue generated by each SKU was plotted on a timeline chart. This chart shows that packaged water generates the most revenue. Cold drinks and beverages spiked only on one day which might have been a holiday, weekend or a bulk order. The least revenue again generated was from toffees and candies. This shows that some amount of storage management is required for gaining optimal profit on the revenue.
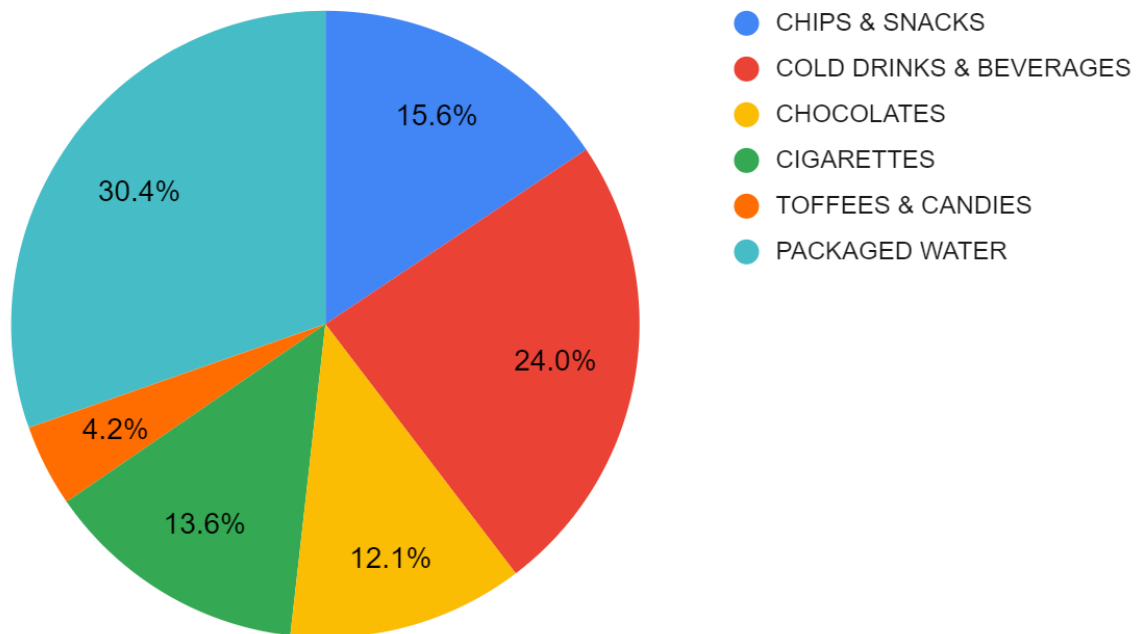
Total Revenue of SKU's for a Month
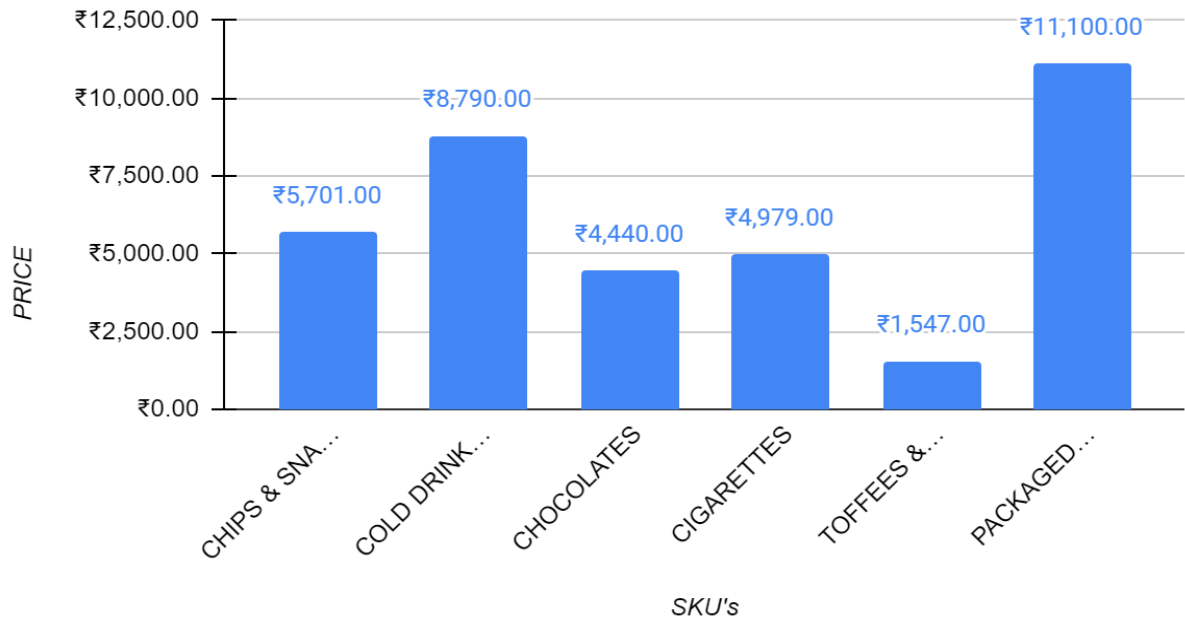
Total Revenue of SKU'S for a Month

Total revenue generated from SKU'S was also plotted on a bar chart which again shows that most revenue generated is from the packaged water category. The least revenue generated is seen to be from toffees and candies in this chart as well.

Revenue Proportion

Revenue Proportion of SKU'S for a Month

The revenue proportion of each category was plotted on a pie chart. Again, from here we can see that packaged water has generated the most revenue and is sold no matter whether it is a weekday, weekend or a holiday. The least revenue generated is from toffees and candies. The category of cold drinks also seems to be selling well depending on the day. The other categories offer average revenue which could change depending on the storage management done.
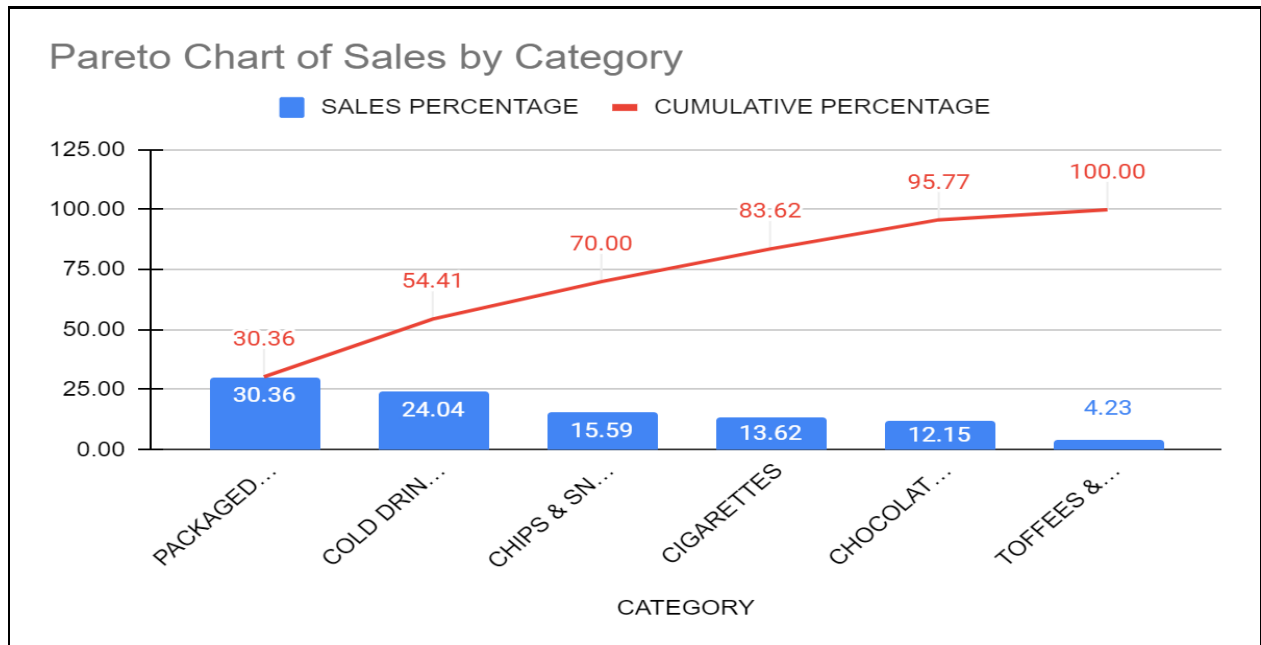
Pareto Chart of Total Revenue

A pareto chart was plotted to compare the cumulative sales percentage and the total sales percentage of each category. The chart shows that although most revenue generated is from packaged water but the cumulative 70% revenue is generated is from three categories out of the six (packaged water, cold drinks & beverages, chips & snacks) whereas the other categories generate only 5-10% revenue each. This suggests that storage management is required for these categories to increase profits.

Google Docs Link for Charts:

https://docs.google.com/document/d/17Ie6KY-ljrr3KcKHtcJ1oH1qYzHod8VCIblPco4tO9Y/edit?usp=sharing

END