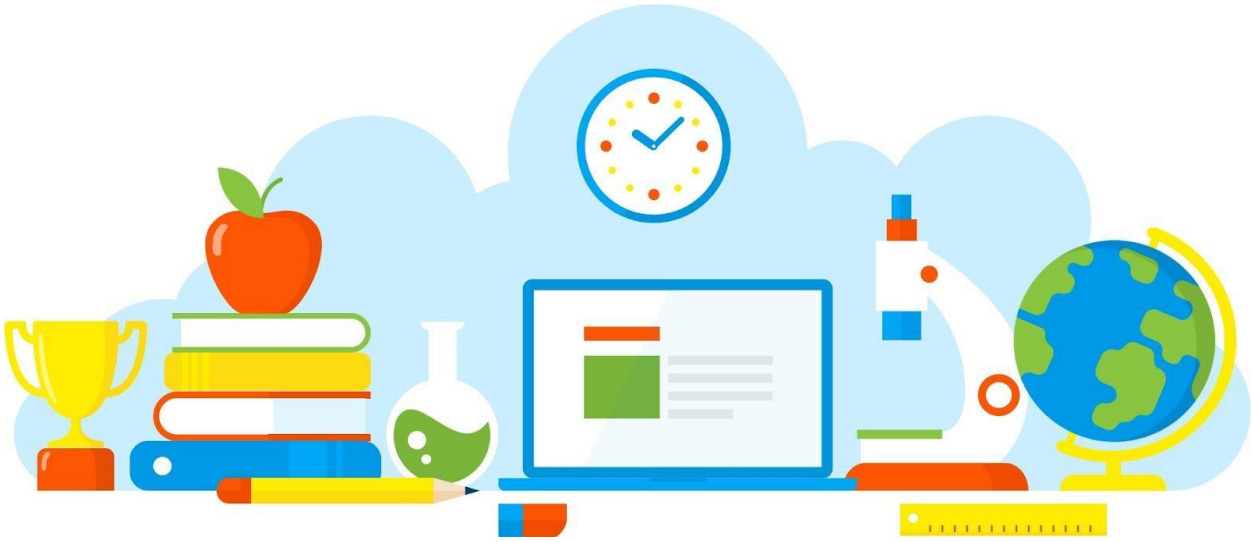

BUSINESS DATA MANAGEMENT

A Mid-Term Report For The BDM Capstone Project

IIT MADRAS
Indian Institute of Technology Madras

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:

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: **07/11/2024**

BDM Project Declaration Statement

EXECUTIVE SUMMARY:

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. They buy their products from wholesalers and then sell it according to the selling price in their areas of business. The prime areas of their business include the Rajdanga, Golpark and Prantik Pally. Since the store is situated on the main road these areas are easily accessible for the store and customers do come for their shopping of various snacks and beverages.

The store deals with all kinds of packeted snacks, beverages including water bottles, cigarettes, chocolates, etc. They store their extra products in the godown of their shops located inside the shop premises so that they don't have to move around for extra supplies in case of emergencies. During non-festive days or during weekdays it is hard to sell products like snacks and beverages whereas easier on festive days and weekends it is easier to sell them. Although products like water bottles and cigarettes are a constant sale throughout which sometimes causes the store owners some number of hardships to keep track of the quantity of the products which leads to loss or expiration and damage of products.

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, etc. 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.

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:

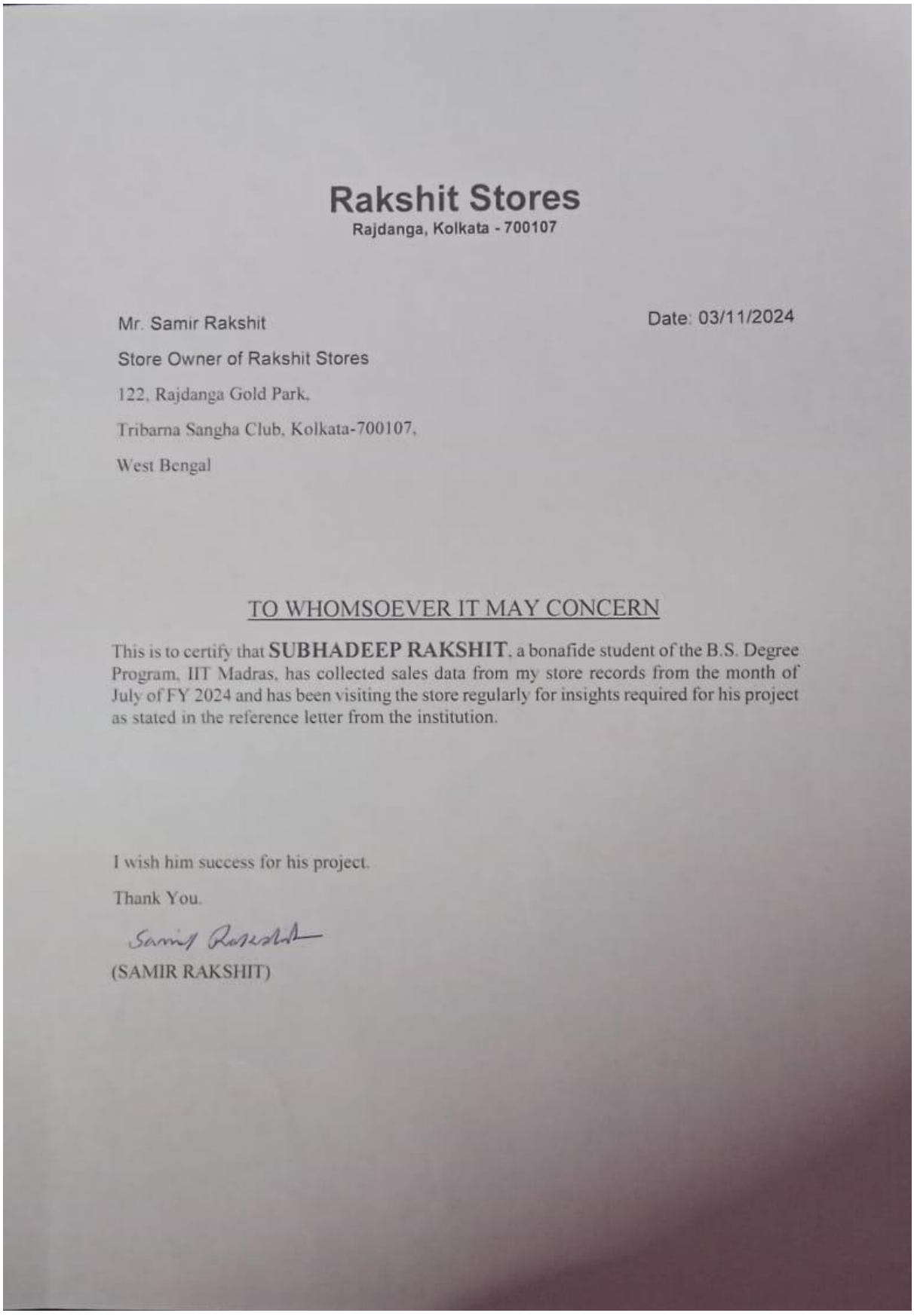
Rakshit Stores is a medium-sized shop that specializes in the sale of packeted snacks, beverages, cigarettes, etc. The retail establishment was established in early 1998. Previously owned by Lt. Dwijahari Rakshit, the store is now owned by his three sons whose names are given above. It has been in the 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. A letter from the store duly signed by one of the owners is also provided for verification.

Link to all the images:

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

Letter from the store owner:



Rakshit Stores
Rajdanga, Kolkata - 700107

Mr. Samir Rakshit
Store Owner of Rakshit Stores
122, Rajdanga Gold Park,
Tribarna Sangha Club, Kolkata-700107,
West Bengal

Date: 03/11/2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **SUBHADEEP RAKSHIT**, a bonafide student of the B.S. Degree Program, IIT Madras, has collected sales data from my store records from the month of July of FY 2024 and has been visiting the store regularly for insights required for his project as stated in the reference letter from the institution.

I wish him success for his project.

Thank You.

Samir Rakshit

(SAMIR RAKSHIT)

METADATA:

VARIABLES	DATA TYPES	DESCRIPTION
Date	Date	Date for particular data. This variable helps in learning which day had how much number of sales and the revenue generated.
Total Sales	Float	B2C selling price. This variable helps in learning the prices at which the products were sold.
Expenditure	Float	Money spent by the organization. This variable helps in learning the total amount spend by the organization and deriving the profits.
Revenue	Float	Total sales of the organization in a given period of time. This variable helps in understanding the total revenue generated from product sales which will help in deriving the profits.
Profit	Float	Total profit generated by the store. This variable helps in understanding how much profit is being generated from the revenue and from which products
Quantity	Float	Number of items vended. This variable helps in understanding the number of items sold/bought to manage the storage of the products.

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. This was done for the whole month of July 2024. 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 google sheet provided contains three sheets/sections. The first sheet (Collected Data) contains all the data collected during the month of July 2024. Each day the date and revenue of the products are provided. The revenue provided is calculated as an estimate for the ones that had missing data to avoid discrepancies. Finally, a total sales column is provided to calculate the total sales on each day which helps us in calculating the total revenue and thus helps in calculating the other required variables such mean, median, etc.

The second sheet (Calculated Data) contains cumulative sales, cumulative percentage and sales percentage. The third sheet (METADATA) contains data on expenditure, total sales(revenue), profit and quantity.

The significance of the calculated variables are:

- **Mean**: Represents the average sales value, providing a benchmark for typical sales performance and helping to assess overall business health.
- **Median**: The middle sales value, useful for understanding the sales performance when there are extreme highs or lows that could skew the average.
- **Variance**: Measures the variability in total sales, helping to understand how consistent or fluctuating sales are across different periods or products.
- **Standard Deviation**: The average deviation of sales from the mean, indicating how much daily or periodic sales differ from the typical performance, thus showing stability or volatility in sales.
- **Cumulative Sales**: Tracks the running total of sales over time, providing insights into the store's growth trajectory and helping to assess whether sales are meeting targets.
- **Cumulative Percentage**: Shows the proportion of total sales accumulated over time, helping to identify trends, such as when most of the sales happen (e.g., end of the month, during a sale).
- **Sales Percentage**: The contribution of each period or product to total sales, helping to identify which periods or products are driving sales and which are underperforming.
- **Min (Minimum)**: Indicates the lowest sales value, helping to identify the worst-performing periods or products in the store.
- **Max (Maximum)**: Represents the highest sales value, helping to highlight

peak performance periods or top-selling products.

- **Range**: The difference between the maximum and minimum sales, showing the extent of variability in sales performance and identifying the overall fluctuation in sales over time.

Link to the dataset:

https://docs.google.com/spreadsheets/d/1bk2B5IfhSv17zXSgItBFDbQ2LbI0BVm3tJgDT4fMMjk/edit?usp=sharing%20

DESCRIPTIVE STATISTICS:

STATS	RANGE	MIN	MAX	MEAN	MEDIAN	STD.DEV.	VARIANCE
REVENUE	₹11,100.00	₹0.00	₹11,100.00	₹5,222.43	₹4,979.00	3,850.46	14,826,071.62
EXPENDITURE	₹6,200.00	₹1,000.00	₹7,200.00	₹4,185.00	₹4,250.00	2,256.07	5,089,841.67
PROFIT	₹6,850.00	-₹2,000.00	₹4,850.00	₹1,037.43	₹729.00	2,037.45	4,151,193.29
QUANTITY	70.00	0.00	70.00	32.14	20.00	27.36	748.81

DETAILED EXPLANATION OF ANALYSIS PROCESS/METHOD:

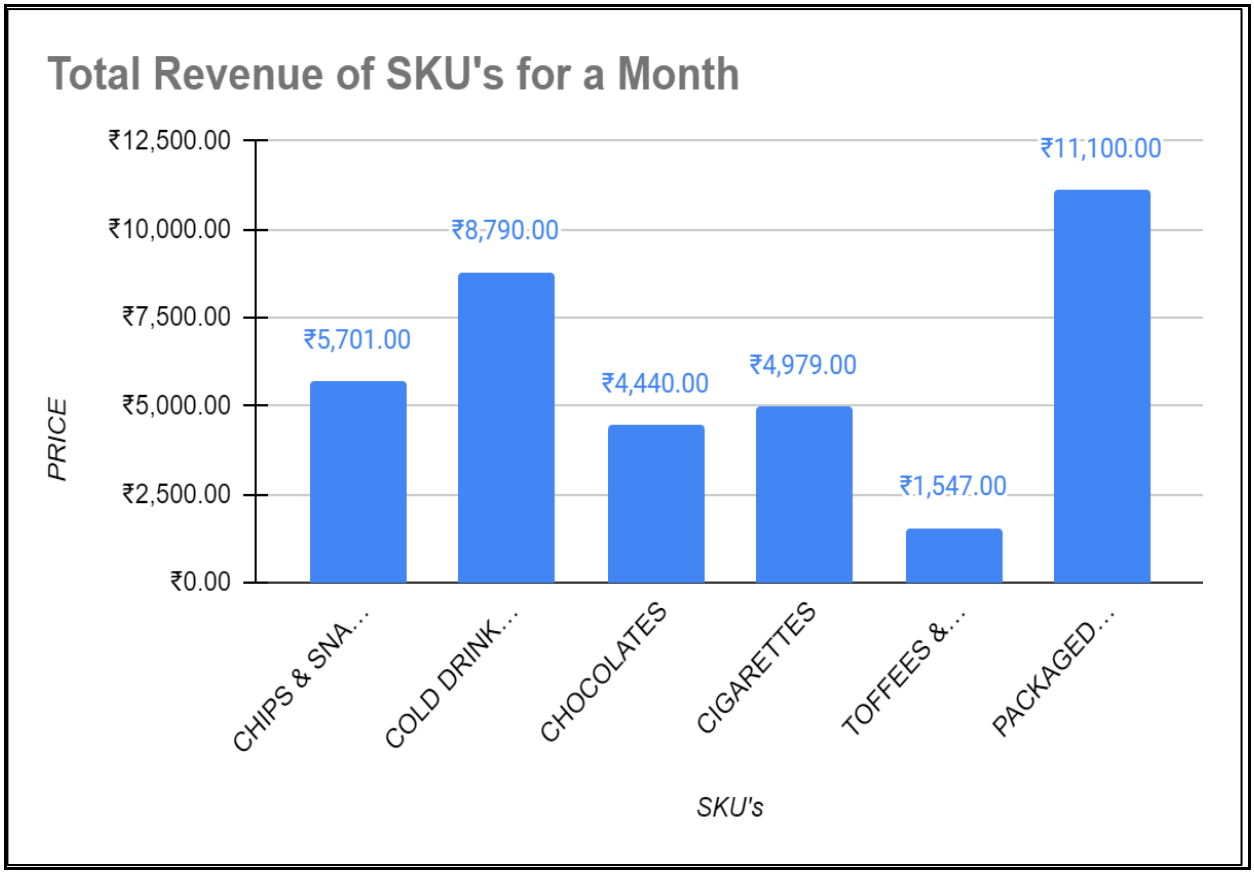
The recorded data contained daily sales which helped in calculating the other variables/metrics present in the other sheets. These metrics help in tackling store challenges such as:

1. **Profitability:**
   By analyzing **sales trends**, **cumulative sales**, **sales percentages**, and **variance**, we can identify which products and periods generate the most revenue, enabling the store to focus on high-margin items and avoid overstocking slow-moving products.
   Understanding the **mean**, **median**, and **sales percentages** allows the store to **predict demand** and optimize pricing strategies, promotions, and markdowns to enhance profits.
2. **Inventory and Stock Management:**
   Measures like **mean**, **variance**, **standard deviation**, and **range** help identify products with **consistent demand** versus those with **fluctuating demand**, aiding in accurate forecasting and **stock replenishment**.
   Min and **max** sales help identify low and high-demand periods/products, allowing the store to manage stock levels effectively, avoiding stockouts or excess inventory.

3. **Storage Management:**
   Cumulative sales and **sales percentages** help determine which products contribute the most to sales, enabling the store to prioritize **storage space** for best-sellers while reducing the space allocated to low-performing items.
   By analyzing **maximum** and **minimum** sales values, the store can adjust the storage space allocated to seasonal or promotional products, ensuring optimal storage utilization.

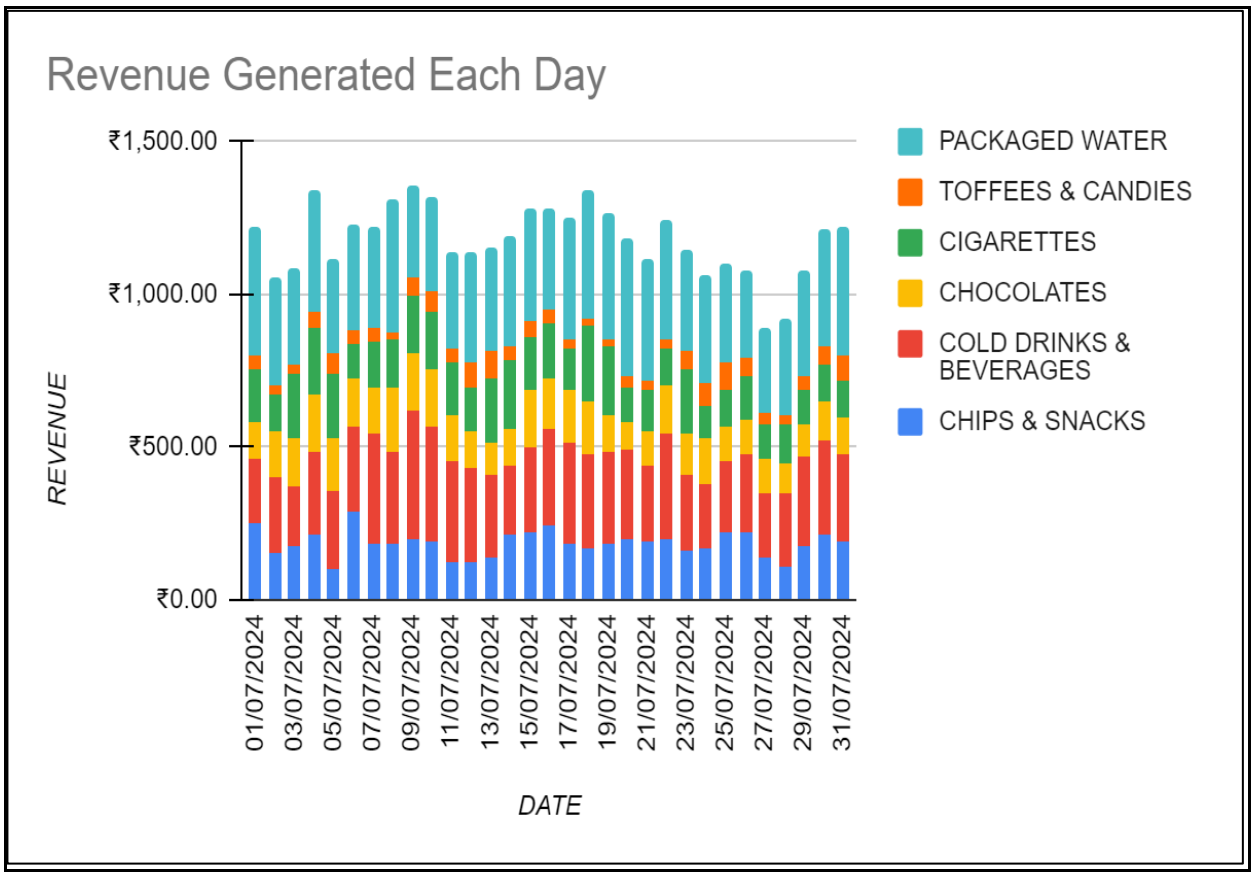
Using these collected and calculated data, chart 1(bar chart), chart 2(stacked bar chart), chart 3(pie chart) were plotted. These offer clear, actionable insights into revenue trends, product performance, and category contributions, enabling better forecasting, inventory management, and strategic decision-making. By simplifying complex data into understandable visuals, store managers can optimize stock levels, improve profitability, and quickly respond to sales patterns, making this approach more efficient and reliable than relying on raw data or intuition alone. Thus, using these metrics and graphs would be a better choice than other charts or methods

RESULTS AND FINDINGS:



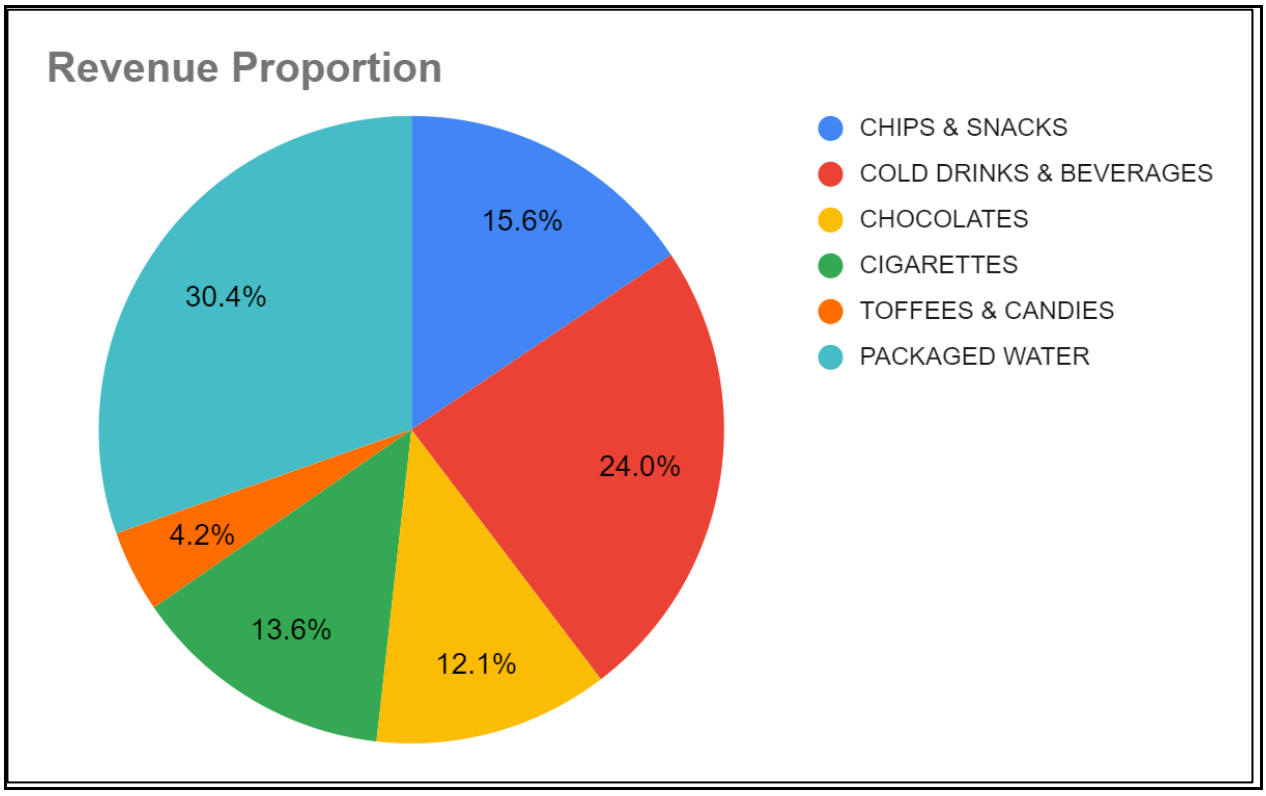
1. Total Revenue of SKU'S for a Month

Revenue generated by each SKU was plotted on a bar chart. This chart shows that packaged water generates the most revenue. Cold drinks and beverages generated most after that which shows that proper storage management of these products can improve their revenue. The least revenue generated was from toffees and candies. Proper storage management of various products can help in gaining optimal profits. The chart helps in identification of sales trends and helps spot underperforming or high-demand products, aiding inventory optimization and demand forecasting.



2. Revenue Generated Each Day Category wise

Revenue generated each day, category wise, was plotted on a stacked bar 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. 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. Thus, the chart helps in highlighting the performance of different product categories, enabling targeted stock allocation and strategic category-focused sales planning.



3. Revenue Proportion of SKU'S for a Month

The revenue proportion of each category was plotted on a pie chart. 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 5-15% revenue each. This suggests that storage management is required for these categories to increase profits as revenue generated by few categories is really low whereas for others it's very high. Thus, the chart reveals the revenue contribution of each product, allowing the store to prioritize high-revenue products and optimize product mix for profitability.

Link to all the charts:

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

END