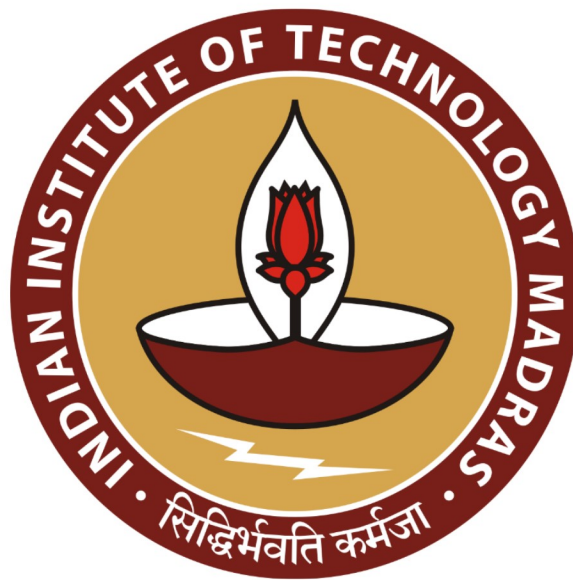# Enhancing Grocery Store Inventory, Customer Retention, and Profitability

Mid-term submission for the BDM capstone Project

Submitted by-

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Executive Summary and Title

Title- Enhancing Grocery Store Inventory, Customer Retention, and Profitability

The project focuses on a grocery business "Deepak General Store" located in Vrindavan Colony Lucknow. With a focus on catering to the daily needs of nearby residents, the store operates in a business-to-consumer (B2C) model.

Over the years, the store has experienced substantial growth and has successfully established a loyal customer base in the local community. Nevertheless, the shop encounters a few challenges, including excessive inventory and lower-than-expected revenue. This project aims to analyze the available data and help the business to increase customer retention, address inventory mismanagement, and ultimately enhance the organization's profitability.

The sales data as well as inventory data of the business is collected for the analysis. We start by looking at the descriptive statistics of the data and then this data will be used to tackle problems mentioned before. Using the sales data we check the retention of customers by analyzing the percentage of repeated customers. The same is used to calculate the total as well as the category-wise revenue and net profit. This helps us understand which categories of products are important for the analysis and can contribute most to the profitability of the shop.

Proof of Originality of the Data

Location- Deepak General Store, Sector 17, Vrindavan Yojna, Lucknow

Here is the link for the shop's location (old shop) on Google Maps.

Picture 1: The old shop

Picture 2: The new Shop (inside view)

Picture 3: The new shop (outside view)

Deepak General Store

NO OBJECTION CERTIFICATE

Date : 20th July 2023

This is to certify that Mr. Yash Srivastava has taken various data from our organization for the analysis in his BDM project. This certificate confirms that we have no objection to sharing the data with him, given that it is only used for academic purposes.

We look forward to seeing the result of the analysis and wish him all the best for the project.

Best Regards,

20/07/2023

Digember Kumar Baranwal.
Deepak General Store.

Picture 4: No Objection Certificate signed by the business owner

Video Interaction Link:
https://drive.google.com/file/d/1mN3WOW0dXPxVwseGrgXlTu53CTfaQLiI/view?usp=sharing

Metadata and Descriptive Statistics

Metadata:
The data of the shop is stored in notebooks. Upon my request, the business owner had been more regular with writing down the sales data in the notebook and I had been taking frequent visits for the same.
Data from May to June has been taken into consideration for the analysis and I have copied the data into my spreadsheet in the desired format.
The business has different types of data described below.

1. Customer Sales data: This sheet has information about the purchase made by the customer at the shop/delivered home. It has 7 columns in it.

| Date	Customer	Item	Quantity	Category	Amount	Delivery

   a. Date- The date in dd/mm/yyyy format on which sale is made.
   b. Customer - This is the unique id of each customer. This id is either the name of the customer or the address(if known) encoded as the Society name, block number, and Flat number of the customer. Example: Someone from Neelgiri Enclave, block-2, Flat number S11 is encoded as 'N-02/S11'
   c. Item- This column is the name of the item purchased by the customer.
   d. Quantity- The quantity of the item purchased by the customer.
   e. Category- The category to which this item falls under.
   f. Amount (in Rupees) - This refers to the amount paid by the customer. If a customer demands some product that is unavailable, -1 is entered in this column.
   g. Delivery- This column has values "YES" and "NO" determining whether the item was home delivered or not.

2. Inventory data: This is a time-series data referring to the inventory stock present at the shop. The products are refilled every Wednesday.

Date	Dairy and bread	Snacks	Personal Care Products	Cleaning Products	DGS namkeen	Ice-cream /beverages	Cereals	Cooking Oil	Pulses	Other food Items	Sugar	Newspaper	Water Can

   All the products sold at the shop are categorized in the above categories. Their quantity left at the end of each day is noted in the rows.

3. Another data is provided by the shop owner, giving the idea of the fixed costs, such as the salary of workers, rent, electricity bill, and fuel. Owner has to pay 6 workers who are salaried. This excludes 2 of his brothers though.
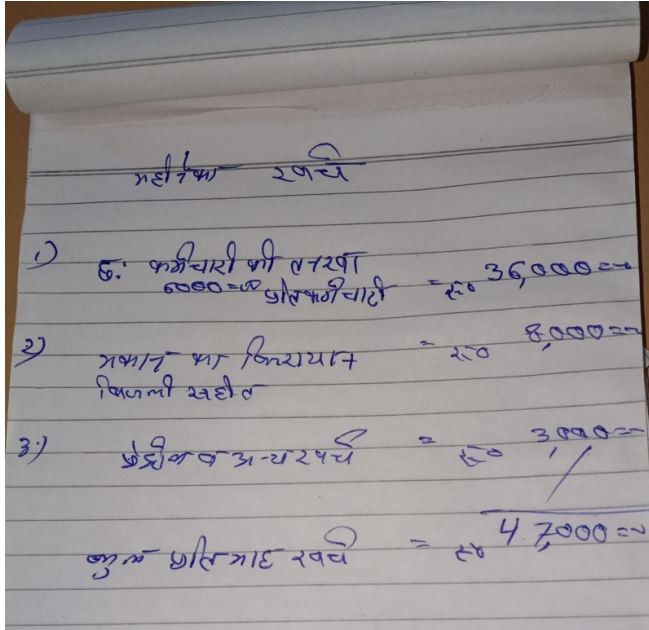
Picture 5: Rough data collected during a meeting with owner

Rent and electricity	₹18,000.00
Salary per worker	₹6,000.00
Number of workers	6
Petrol	₹2,000.00

The business owner spends a lot amount of ₹47000 on the fixed costs every month.

4. Pricing data: This is another table about the inventory that determines the Purchase Price, Selling price, category, and lifetime of the products.

Item	Category	Selling Price	Purchase Price	Profit	Lifetime

Descriptive Statistics:

Below are the descriptive statistical properties of the data.

Sales data:

Total no. of Sales	15655
Mean sale per day	256

Max bill amount	1550
Min bill amount	1
Most sales by a customer	126

Inventory Data:

Number of items	410
Number of categories	13
Mean cost of an item	39.5
Median cost of an item	35
Min cost of an item	1
Max cost of an item	950
Standard deviation for cost	18

Detailed Explanation of Analysis Process/Method

Data of 60 days was collected for the analysis. First, the data was entered into the spreadsheet in the format desired for the analysis. Then basic cleaning and preprocessing was done to the data. This included removing the null values (mostly in the 'Customer' column) and checking for inconsistencies in the data.

After that in order to have a better understanding of the data, all the descriptive statistical properties were calculated. This included the Mean, Median, Max, Min, and standard deviation values in daily revenue, sales as well as profit.

As discussed in the project proposal, ABC analysis technique can be used to manage the inventory. Using the Customer sales data, 2 other tables are created that determine the revenue earned and quantities sold for each category for each day. A chart is then created to show the revenue of each category and which category of products has the maximum revenue. This helps us get a better understanding of which products are contributing the most to revenue generated by the shop. Also, a trend line of total revenue earned for each day is made in order to show the fluctuations in the daily revenue made by the shop.

Similarly, using the sales data we calculate the total net profit made by each category on a daily basis. And then we make a chart to show which category makes the most profit for the shop and hence are important for the financial growth of the shop.

Customer Retention:
- One of the main objectives of collecting the Customer sales data was to check the Customer Retention at the shop
- There were a few null values in the 'Customer' column of the data and discarding them from the analysis of customer retention was the only possible option.
- Conditional formatting was done on this customer data and duplicates were found in the 'Customer id' column by which percentage of repeated customers had been observed.
- Another observation found by filtering the 'Delivery' column was that 38% of the orders were home delivered and the rest 62% were in the shop.

Results and Findings

Based on the analysis done on data, the following observations are made,
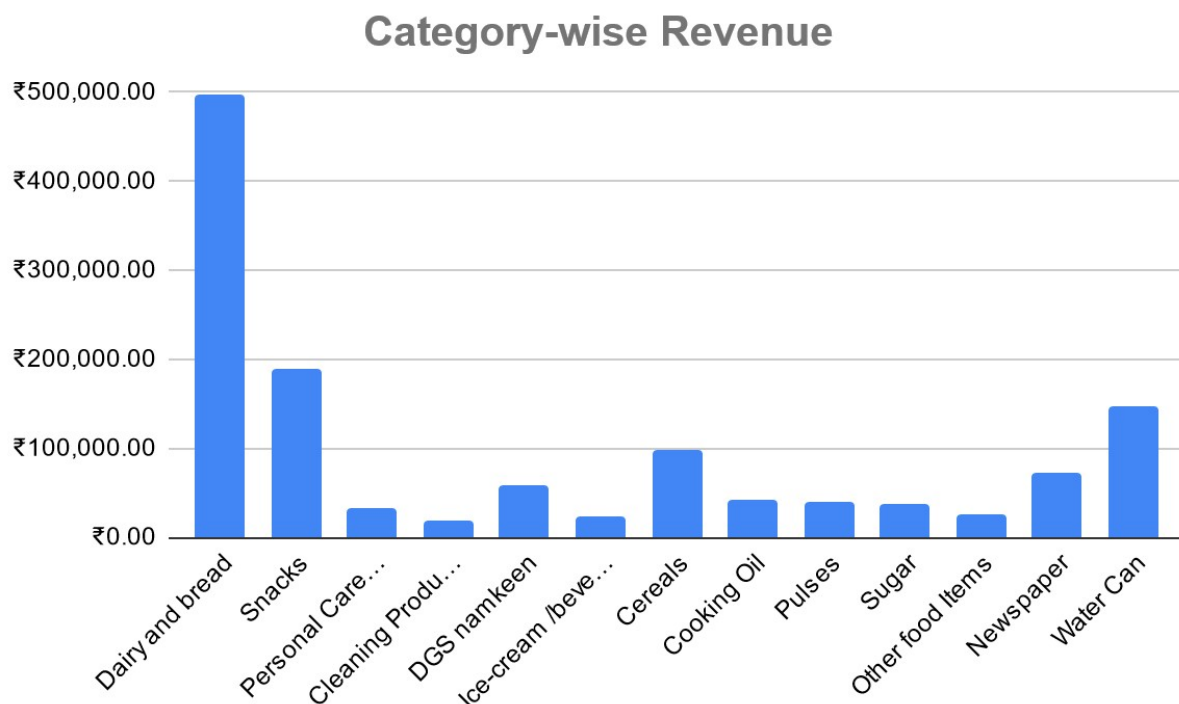
The graph above shows the revenue earned by each category of products.

- The **Bread and Dairy** category has earned the highest revenue (₹497,577.00) for the business whereas **Cleaning Products** has earned the lowest revenue (₹19,093.00)
- **Water Can** has generated the most profit in 2 months. Though Bread and Dairy has the highest revenue, due to a relatively lower profit margin it is not the highest profit earner for the shop.
- **Snacks** is the category with the highest number of SKUs sold.

Category-wise Profit earned

Weekly Average Revenue Trend
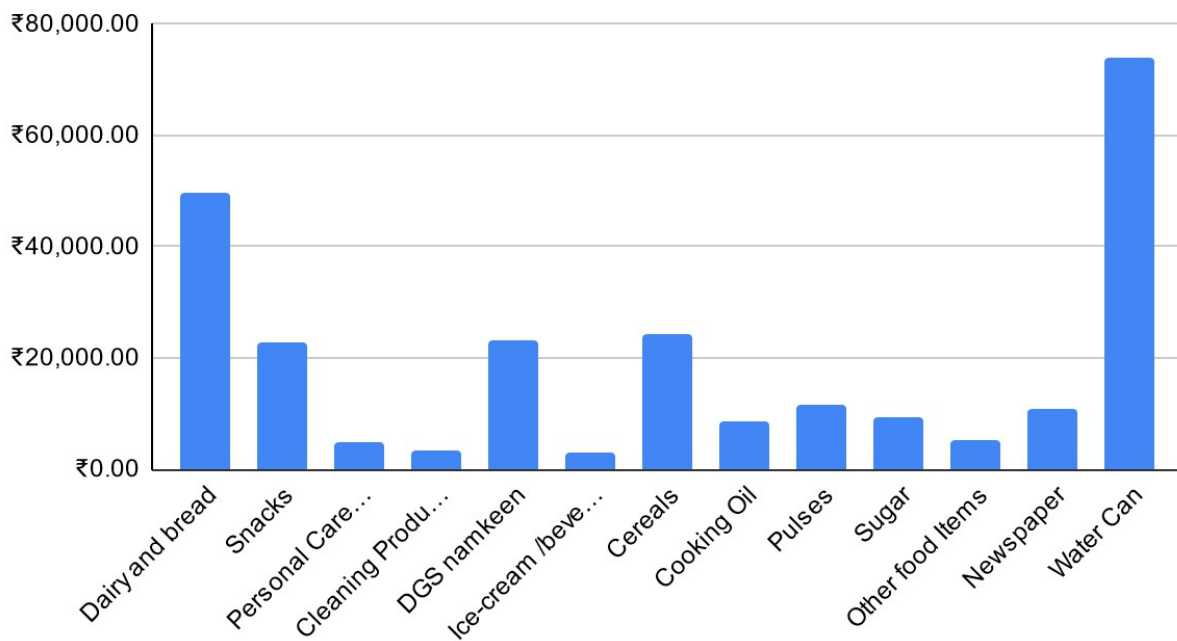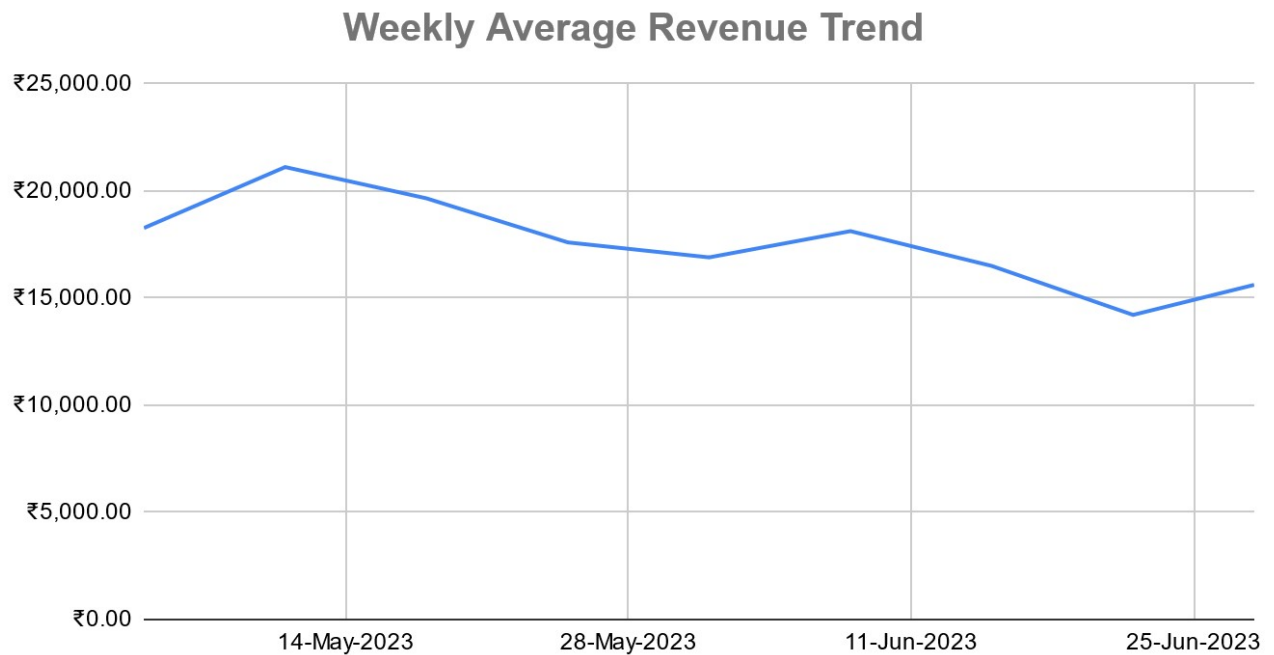
It can be seen from the Weekly average revenue trend line, that there is not a significant change in revenue over the period of two months. However, the little decrease in revenue in the month of June can be explained by the occurrence of heavy rainfall on few days.
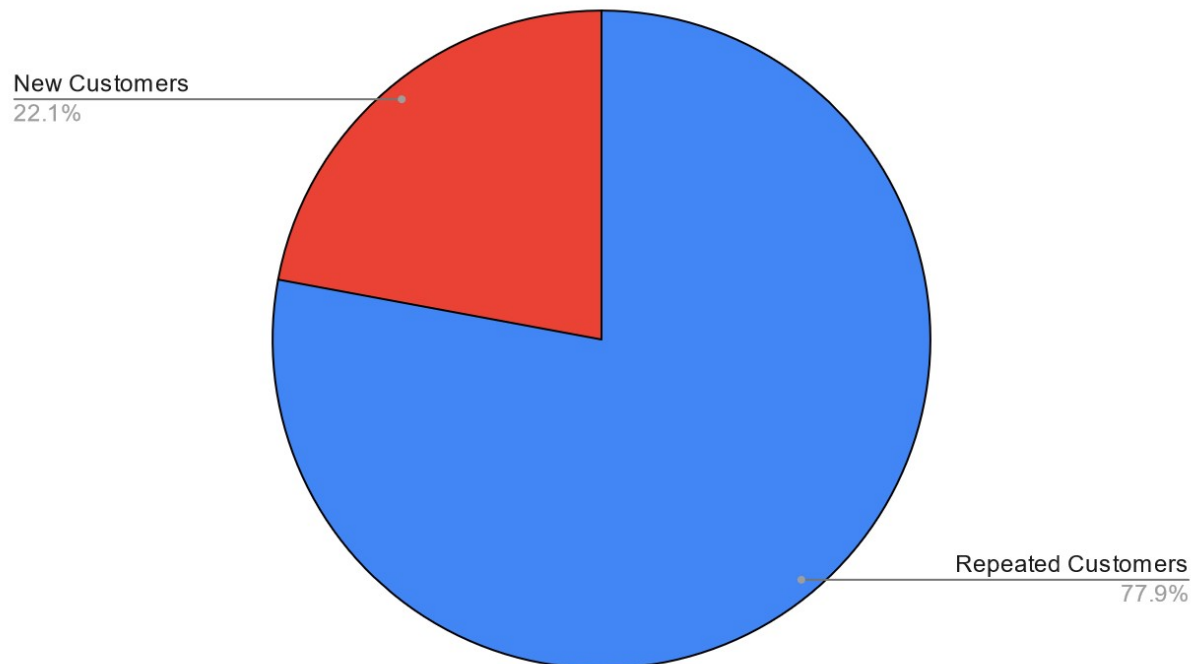
Pie Chart showing the percentage of repeated customers and new customers

It is found that out of 720 different customers who visited DGS, 561 customers are repeated ones (visited the shop at least 2 times) and the rest 159 customers have visited the shop only once. This still has a big room of improvement for two reasons. Firstly as discussed earlier, few customers name/address was unknown so their data was discarded from the analysis of Customer retention. These customers were primarily the ones who are not regular customers of the shop. Secondly, for a shop surrounded entirely by housing societies and very few passers-by this number can definitely be improved.