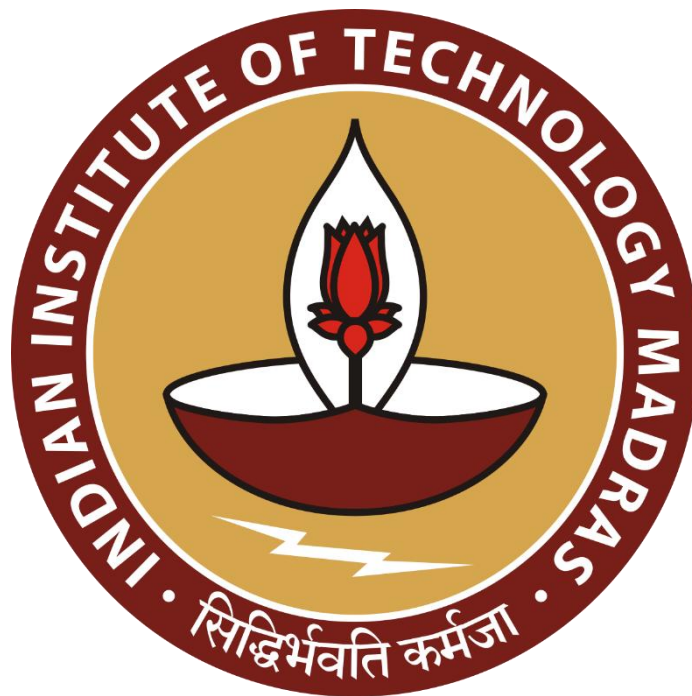# Battery Store Success Engine:

Analytics and Insights for Retail Growth

A Midterm report for the BDM capstone Project

Submitted by

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Contents

Executive Summary

The project focuses on a small shop located at Bhikharipur Chunar Road, Chitaipur Chauraha, Varanasi, Uttar Pradesh 221005, operating in the B2C sector. The shop specializes in providing high-quality batteries at affordable prices to end consumers. Its product range includes automotive batteries for cars, motorcycles, and commercial vehicles, along with home energy solutions like backup power batteries and solar storage systems.
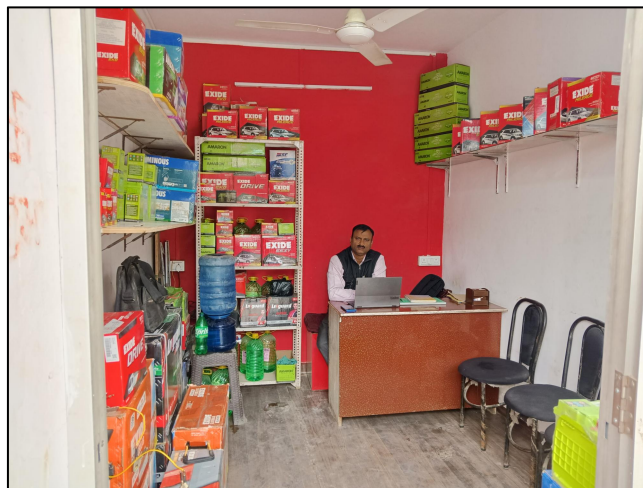
However, the shop faces challenges such as low profitability due to excess inventory, which results in high storage costs and tied-up capital. Additionally, the lack of data-driven pricing and marketing strategies limits its ability to stay competitive and hampers growth.

This project aims to address these challenges by utilizing analytical techniques to gain actionable insights. Customer behavior, sales patterns, and demand trends will be analyzed to inform better decision-making. Tools such as Pareto analysis, market basket analysis, and histograms will be used to uncover valuable insights. Advanced visualizations will be created using platforms like Google Collab to optimize inventory management, while Microsoft Excel will be employed for simpler tasks.

The ultimate goal is to improve inventory control, reduce capital blockage, and enhance profitability, helping the business achieve sustainable growth and maintain a competitive edge in the market.

Proof of originality

Owner at the Shop

Location of the Shop

Bill Provided by Shop

Permission Letter

Stocks in the Shop

Video Link: [Interaction video with owner](#)

Data Link: [BDM Project Data](#)

Metadata and Descriptive Statistics

Metadata :

The Excel file contains the following sheets with their metadata :

Daily Sales DATA	Weekly Sales Data	Monthly Sales Data	Revenue DATA	Calculations

es DATA	Weekly Sales Data	Monthly Sales Data	Revenue DATA	Calculations	**Visuals**

1) 'Daily Sales DATA' :

	A	B	C	D
	Name of the Item	Selling Rate	01/07/2024	02/07/2024
	Exide Automotive Battery		1	0
	ML40LBH	₹ 4,900.00	1	

Columns includes "Name of the Item", "Selling Rate", and Multiple date columns ranging from 1st JULY 2024 to 31st October 2024.

Row includes the different categories of items with different models available in the market like the Exide Automotive Battery comes with model number 'ML40BH'.

Number of Rows : 78

Number of Columns : 126

2) 'Weekly Sales DATA' :

	A	B	C	D
	Week	Exide Automotive Battery	ML40LBH	ML38B20l
	1 (1/7/24 - 7/7/24)	3	1	2
	2 (8/7/24 - 14/7/24)	1	0	1

Columns includes different types of items like "Exide Automotive Battery".

Rows depicts the 18 weeks data with range of week (start date - end date).

In this 18th week has only 4 days from (28/10/2024 - 31/10/2024) as data collected till 31st October 2024.

Number of Rows : 19

Number of Columns : 78

3) 'Monthly Sales Data' :

A	B	C	D
Months	Exide Automotive Battery	ML40LBH	ML38B20L
July	7	2	4

Columns includes different types of items like "Exide Automotive Battery".

Rows depicts the 4 months data with range from July to October.

Number of Rows : 5

Number of Columns : 78

4) 'Revenue Data' :

A	B	C	D
Name of the Item	Selling Rate	Buying Rate	TOTAL QUANTITY SOLD
Exide Automotive Battery			15
ML40LBH	₹ 4,900.00	₹ 4,487.00	2

Columns includes "Name of the item", " Selling Rate", "Buying Rate" etc.

Row includes the different categories of items with different models available in the market like the Exide Automotive Battery comes with model number 'ML40BH'.

Number of Rows : 77

Number of Columns : 6

5) 'Calculations' :

This sheet includes various calculation tables like pivot tables, pareto calculation table, etc. related to sales data and revenue data .

6) 'Visuals' :

This sheet includes various graphs and charts like pie chart, pareto chart, bar graph etc. of analysis done of the sales data and revenue data.

Descriptive Statistics :

● I have gathered data spanning from July 1st, 2024, to October 31st, 2024 (a period of 4 months), and manually entered it into Excel.

● The data represents the daily sales of specific items at the shop.

Descriptive Statistics			
Name of the Item	TOTAL	Max	Revenue Generated
Exide Automotive Battery	15	1	₹ 6,808.00
Exide Motorcycle Battery	62	4	₹ 8,309.00
Exide Inverter	6	1	₹ 3,400.00
Exide Inverter Battery	43	6	₹ 47,000.00
Amaron Automotive Battery	17	3	₹ 7,281.00
Amaron Motorcycle Battery	35	4	₹ 3,990.00
Amaron Inverter Battery	5	1	₹ 1,800.00
Luminous Inverter	7	1	₹ 1,800.00
Luminous Inverter Batttery	6	1	₹ 4,200.00
Battery Trolley	17	1	₹ 2,958.00
Livguard Automotive Battery	3	1	₹ 1,600.00
Livguard Inverter	2	1	₹ 1,350.00
Livguard Inverter Battery	6	2	₹ 4,400.00
Battery Water(1 gallen)	71	5	₹ 1,136.00
Microtek Inverter	7	1	₹ 4,050.00
Sukam Inverter	4	1	₹ 1,550.00
TOTAL QUANTITY	306	11	₹ 101,632.00

Table : 1

With the help of following table (Table 1) we can conclude following points :

1. The descriptive statistics table presents the total quantity sold for each item category over the collected data period.

2. The table also highlights the item categories with the highest quantity sold in a single day during this period.

3. Additionally, it provides insights into the revenue generated by each item category within the given time frame.

4. The analysis further showcases the overall quantity sold over four months.

5. It also highlights the maximum quantity sold on a single day within these four months.

6. Lastly, it presents the total revenue generated during the four-month period.

Week	TOTAL QUANTITY
1 (1/7/24 - 7/7/24)	20
2 (8/7/24 - 14/7/24)	23
3 (15/7/24 - 21/7/24)	24
4 (22/7/24 - 28/7/24)	13
5 (29/7/24 - 4/8/24)	24
6 (5/8/24 - 11/8/24)	13
7 (12/8/24 - 18/8/24)	10
8 (19/8/24 - 25/8/24)	23
9 (26/8/24 - 1/9/24)	18
10 (2/9/24 - 8/9/24)	15
11 (9/9/24 - 15/9/24)	15
12 (16/9/24 - 22/9/24)	21
13 (23/9/24 - 29/9/24)	23
14 (30/9/24 - 6/10/24)	13
15 (7/10/24 - 13/10/24)	12
16 (14/10/24 - 20/10/24)	18
17 (21/10/24 - 27/10/24)	14

Table : 2

With the help of following table (Table 2) we can see the flow of stocks week wise.

Detailed Explanation of Analysis Process/ Method

Pre-Data Cleaning

- Data was manually entered into Excel sheets from receipts and handwritten records.
- A new row was added to the sheet for each newly added item.
- Customers' personal information, such as names, was removed for privacy reasons.

Data Cleaning

- Item categories with only one or two sales throughout the 4 months were excluded.

Analysis Process

- Customized pivot tables to display relevant insights for an in-depth analysis.
- With the help of Excel, various formulas were used to obtain the summary statistics of the data, which significantly aided the analysis process.
- To enhance clarity and ease of understanding, pictorial representations were utilized.
- A pie chart was created to illustrate the share of each item in total sales, while another pie chart was generated to analyze the most sold products in terms of their contribution to revenue.
- Line charts were particularly useful for observing trends across different days of the week, whereas column charts effectively depicted changes over time and facilitated comparisons among items.
- Descriptive statistics were calculated using Excel formulas such as MAX and SUM. These formulas were applied to each item, providing comprehensive descriptive statistics for the entire dataset.

Pareto chart Analysis :

1) In Fig : 1 the blue bars (left Y-axis) represent weekly sales quantity for each product, arranged in descending order. Battery Water (1 gallon) leads with 71 units, followed by Exide Motorcycle Battery (62 units) and Exide Inverter Battery (43 units). Lower-selling products, like Livguard Inverter, have minimal sales.

The red line (right Y-axis) shows cumulative sales percentage, illustrating the 80/20 rule, where 80% of sales come from the top 4-5 products.
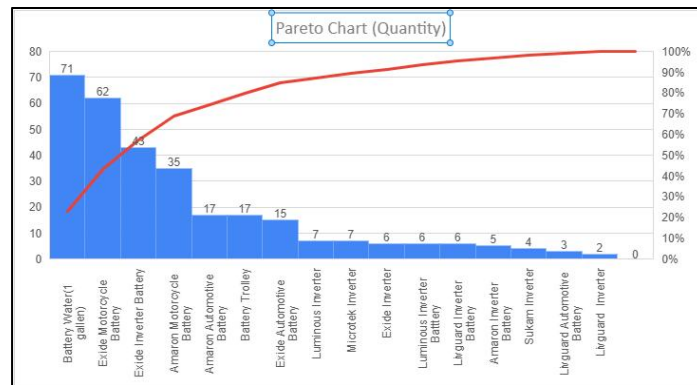
Fig : 1

Insights & Recommendations:

- Focus on the top-selling products (left side of the chart) as they drive most of the revenue.
- Optimize stock levels for these high-demand items to avoid stockouts.
- Reduce excess inventory for low-selling products (right side of the chart) to prevent overstocking.
- Consider promotions or discounts for slow-moving items to improve turnover.

2) In Fig : 2 , the Pareto chart illustrates profit contribution per product, with blue bars representing individual product profits in descending order. The Exide Inverter Battery is the most profitable, generating ₹47,000, while lower-profit items like Battery Water contribute only ₹1,136. The red line indicates cumulative profit, showing that the top 3-4 products account for nearly 80% of total profit, aligning with the Pareto Principle (80/20 Rule), while low-profit items contribute minimally.
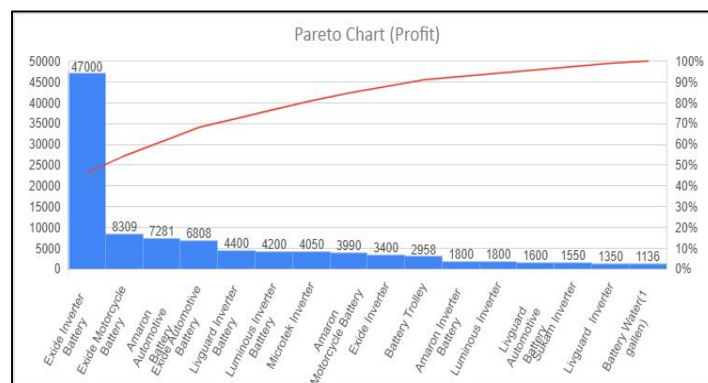

Fig:2

Insights & Recommendations:

- Prioritize stocking and promoting high-profit products like Exide Inverter Battery and Exide Motorcycle Battery.
- Optimize pricing and marketing for mid-tier profitable products to improve margins.
- Consider phasing out or minimizing stock of low-profit products to free up inventory space.
- Analyze cost vs. revenue for slow-moving, low-profit items to decide whether they are worth keeping.

Results and Findings

Insights Drawn from the Data Analysis:

1) Identifying the Brand with the Highest Demand:

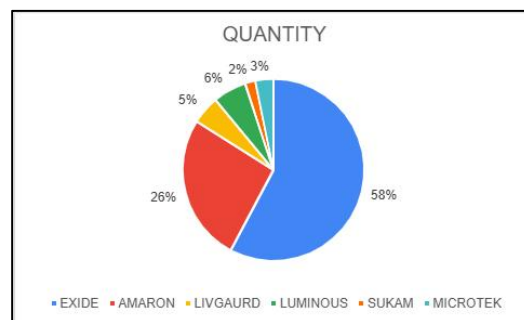| BRANDS	QUANTITY
EXIDE	126
AMARON	57
LIVGAURD	11
LUMINOUS	13
SUKAM	4
MICROTEK	7

Table : 3   **Fig : 3**

- Data visualization provides deeper insights into brand demand trends.
- This is a Pie chart (Fig : 3) representing the brands with their highest demand .
- According to the chart the brand named 'EXIDE' have highest demand.

2) Analyzing Stock Flow Trends:

Months	TOTAL QUANTITY
July	87
August	81
September	76
October	62

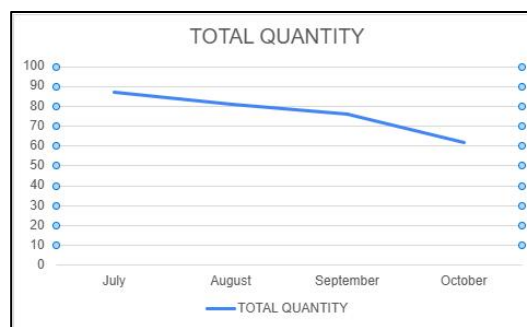**Table : 4**   **Fig : 4**

- Visualizing the data helps determine whether demand is increasing or decreasing over time.
- This is a Line graph (Fig :4) representing the monthly stock outflow.
- This decline may express that seasonality demands has decreased due to less requirement of high power supply in winters.
- From the above line graph we can draw the inference that there has been a decline in the sales of the stock over the past 4 months, thus from the point of view of the shopkeeper we can predict that the shopkeeper would keep lesser amounts of the stocks.

3) Identifying the Highest Profit-Generating Category:

Name of the Item	Profit Generated
Exide Automotive Battery	₹ 6,808.00
Exide Motorcycle Battery	₹ 8,309.00
Exide Inverter	₹ 3,400.00
Exide Inverter Battery	₹ 47,000.00
Amaron Automotive Battery	₹ 7,281.00
Amaron Motorcycle Battery	₹ 3,990.00
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Livguard Automotive Battery	₹ 1,600.00
Livguard Inverter	₹ 1,350.00
Livguard Inverter Battery	₹ 4,400.00
Battery Water(1 gallen)	₹ 1,136.00
Microtek Inverter	₹ 4,050.00
Sukam Inverter	₹ 1,550.00
TOTAL QUANTITY	₹ 101,632.00

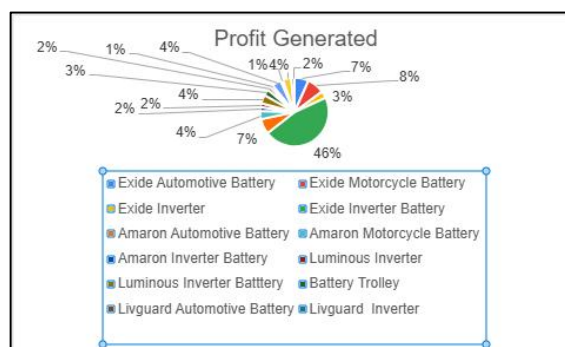**Table : 5**   **Fig : 5**

- Data visualization reveals that the Exide Inverter Battery generates significantly higher profits compared to other categories.
- Based on this insight, the shop owner may consider prioritizing the stocking of this category to maximize profits.