“Revitalize & Thrive: Elevating sales and service through demand driven strategies”

A Mid-term report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled “Revitalize & Thrive: Elevating sales and service through demand driven strategies”. I extend my appreciation to “HP Petrol Pump - Mullick Filling Station”, 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 from primary sources and carefully analyzed to assure its reliability.

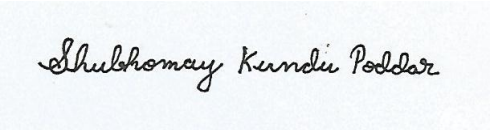
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the principles 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate: (**Digital Signature**)



Name: SHUBHOMAY KUNDU PODDAR

Date: 10.08.2024

1. Executive Summary and Title

This report, titled "Revitalize & Thrive: Elevating Sales and Service through Demand-Driven Strategies," focuses on boosting sales at the petrol pump through data analysis and market research. The sales data of petrol, diesel, and power fuels was collected over a 6-month period (April 1, 2023, to September 30, 2023). Key metadata attributes include sales volumes in litres and daily revenue calculations for each fuel types (i.e. petrol, power and diesel). Descriptive statistics revealed that diesel had the highest average daily sales (6,095.68L) and revenue (₹3,47,773.6), followed by petrol with an average daily sale of 1,907.10L and power with 454.69L. Diesel sales strongly correlated with total daily sales and revenue due to the presence of nearby factories, while the daily sales of petrol and power showed weaker correlations.

Market research conducted on 167 customers revealed that 83% preferred petrol due to its lower cost, while 17% were loyal to power fuel for its superior performance. Despite its higher price, power fuel customers remain loyal, indicating potential for growth in this segment. Recommendations include conducting awareness programs to educate customers on the benefits of power fuel, which could boost its sales and overall revenue. The findings suggest that while diesel drives the bulk of sales, demand driven strategies could significantly enhance the sales of premium fuels like power which in turn increase the total revenue generated.

2. Proof of originality of data

Figure 1: Servicescape of the organization

The proof of originality of data is shared through the following Google drive link. Please click on the following link in order to view the proof of originality of data that has been collected by me. More pictures of the organization, letterhead from the organization and interaction video with the business owner is also shared in this below link.

https://drive.google.com/drive/folders/1F-7fdNa8gP4ZazdP-HjO-MN0IDxyOdcw?usp=sharing

3. Metadata

As my project title states "Revitalize & Thrive: Elevating sales and service through demand driven strategies" I therefore consider helping in elevating sales and service of the business through demand driven strategies. For this reason, I collected the sales data of petrol, diesel and power fuels for the period of 6 months i.e. from 1st April, 2023 to 30th September, 2023 in order to analyze the market demand. The sales data of three fuels which was collected is measured in litres(L). Then the data was preprocessed in excel and various other columns were determined such as weekdays, month, total sales of fuel on daily basis. The price of petrol in this petrol pump is Rs. 106.43/L, the price of power is Rs. 113.57/L and price of diesel is Rs. 93.14/L. From this information, revenue earned (in Rs.) by sales of each fuel type is calculated on daily basis. And lastly, total revenue earned (in Rs.) is calculated by summing up revenues earned by sales of each fuel. The metadata is provided below in details:

Data 1:

Data collected:- Sales data of petrol, diesel and power fuels

Source:- Sales record obtained from the petrol pump(concerned business organization)

Period for which data is collected:- 6 months i.e. from 1st April, 2023 to 30th September, 2023

Data attributes (after preprocessing):-

Variable	Description	Unit
Date	The specific day when sales were recorded, in the format DD-MM-YYYY.	Date (DD-MM-YYYY)

Weekday	The name of the day corresponding to each date (e.g., Monday, Tuesday).	Text (Weekday Name)
Month	The month corresponding to each date (e.g., April, May).	Text (Month Name)
Sales of petrol	The volume of petrol sold on a particular day.	Litres (L)
Sales of power	The volume of power fuel sold on a particular day.	Litres (L)
Sales of diesel	The volume of diesel sold on a particular day.	Litres (L)
Sum of sales of all fuels	The total volume of all fuels (petrol, power, diesel) sold on a particular day.	Litres (L)
Revenue earned by sales of petrol	The total revenue generated from the sale of petrol on a particular day. [106.43* Sales of petrol]	Rupees (₹)
Revenue earned by sales of power	The total revenue generated from the sale of power fuel on a particular day. [113.57* Sales of power]	Rupees (₹)
Revenue earned by sales of diesel	The total revenue generated from the sale of diesel on a particular day. [93.14* Sales of diesel]	Rupees (₹)
Total Revenue earned by sales of all fuels	The total revenue generated from the sale of all fuel types (petrol, power, diesel) on a particular day.	Rupees (₹)

Table 1: Data attributes along with its respective descriptions and units

Data 2: (Described only in analysis method-Market research and in results under figure4)

Data collected:- Survey data on customer buying power/petrol (for market research)

Source:- Collected by me and the business organization collectively

Period for which data is collected:- On 25th July from 11:00 a.m. to 10p.m (the period of time when sales of fuel is high in a day)

Data attributes:- 2 variables for keeping count of people buying power and people buying petrol.

4. Descriptive Statistic

Sales data:

The sales data of petrol, diesel and power fuels was collected for the period of 6 months i.e. from 1st April, 2023 to 30th September, 2023 in order to analyze the market demand. So there are total 183 entries for this period. Hence, the sample size for which the descriptive statistics of the collected sales data is calculated is 183.

Mean of Sales of petrol(in litres (L)):- 1,907.10L

Minimum sales of petrol(in litres(L)):- 180L

Maximum sales of petrol:- 3,750L

Standard deviation in sales of petrol(in litres(L)):- 701.71L

Mean of revenue earned daily by sales of petrol(in Rs.):-Rs. 2,02,973.06

Minimum revenue earned by sales of petrol(in Rs.):-Rs. 19,157.44

Maximum revenue earned by sales of petrol(in Rs.):-Rs. 3,99,112.50

Mean of Sales of power(in litres (L)):- 454.69L

Minimum sales of power(in litres(L)):- 0L

Maximum sales of power:- 1,810L

Standard deviation in sales of power(in litres(L)):- 376.48L

Mean of revenue earned daily by sales of power(in Rs.):-Rs. 51,640.21

Minimum revenue earned by sales of power(in Rs.):-Rs. 0

Maximum revenue earned by sales of power(in Rs.):-Rs. 2,05,561.7

Mean of Sales of diesel(in litres (L)):- 6,095.68L

Minimum sales of diesel(in litres(L)):- 1,440L

Maximum sales of diesel:-13,360 L

Standard deviation in sales of diesel(in litres(L)):- 2,205.11L

Mean of revenue earned daily by sales of diesel(in Rs.):-Rs. 3,47,773.6

Minimum revenue earned by sales of diesel(in Rs.):-Rs. 19,559.40

Maximum revenue earned by sales of diesel(in Rs.):-Rs. 10,51,551.0

The above details are mentioned in table form in the given below figure:

	Sales of petrol (in L)	Sales of power (in L)	Sales of diesel (in L)	Sum of sales of all fuels (in L)	Revenue earned by selling of petrol (Rs. 106.43/L)	Revenue earned by selling of power (Rs. 113.57/L)	Revenue earned by selling of diesel (Rs. 93.14/L)	Total revenue earned by sales of fuels
count	183.000000	183.000000	183.000000	183.000000	183.000000	183.000000	1.830000e+02	1.830000e+02
mean	1907.103825	454.699454	3733.879781	6095.683060	202973.060109	51640.216940	3.477736e+05	6.023868e+05
std	701.719885	376.485763	1695.242122	2205.111307	74684.047349	42757.488151	1.578949e+05	2.138623e+05
min	180.000000	0.000000	210.000000	1440.000000	19157.400000	0.000000	1.955940e+04	1.449975e+05
25%	1540.000000	220.000000	2865.000000	5175.000000	163902.200000	24985.400000	2.668461e+05	5.121871e+05
50%	1990.000000	310.000000	3520.000000	5810.000000	211795.700000	35206.700000	3.278528e+05	5.811015e+05
75%	2265.000000	580.000000	4495.000000	6835.000000	241063.950000	65870.600000	4.186643e+05	6.759777e+05
max	3750.000000	1810.000000	11290.000000	13360.000000	399112.500000	205561.700000	1.051551e+06	1.302574e+06

Figure 2: Description of the sales data

There is no such strong correlation observed between the attributes of sales of petrol, diesel and power and hence are weakly related to each other. Therefore the daily sales of petrol, diesel and power are not related to each other. There was a strong correlation observed between daily sales of diesel with daily sum of sales and daily total revenue earned. This is because diesel contribute maximum to the sales volume and revenue earned followed by petrol and then power. The correlation table is given in below figure:

	Sales of petrol (in L)	Sales of power (in L)	Sales of diesel (in L)	Sum of sales of all fuels (in L)	Revenue earned by selling of petrol (Rs. 106.43/L)	Revenue earned by selling of power (Rs. 113.57/L)	Revenue earned by selling of diesel (Rs. 93.14/L)	Total revenue earned by sales of fuels
Sales of petrol (in L)	1.000000	-0.244347	0.463088	0.632518	1.000000	-0.244347	0.463088	0.642262
Sales of power (in L)	-0.244347	1.000000	0.299153	0.322959	-0.244347	1.000000	0.299153	0.335466
Sales of diesel (in L)	0.463088	0.299153	1.000000	0.967220	0.463088	0.299153	1.000000	0.959828
Sum of sales of all fuels (in L)	0.632518	0.322959	0.967220	1.000000	0.632518	0.322959	0.967220	0.999554
Revenue earned by selling of petrol (Rs. 106.43/L)	1.000000	-0.244347	0.463088	0.632518	1.000000	-0.244347	0.463088	0.642262
Revenue earned by selling of power (Rs. 113.57/L)	-0.244347	1.000000	0.299153	0.322959	-0.244347	1.000000	0.299153	0.335466
Revenue earned by selling of diesel (Rs. 93.14/L)	0.463088	0.299153	1.000000	0.967220	0.463088	0.299153	1.000000	0.959828
Total revenue earned by sales of fuels	0.642262	0.335466	0.959828	0.999554	0.642262	0.335466	0.959828	1.000000

Figure 3: Correlation between attributes of the sales data

5. Detailed Explanation of Analysis process/method

i) Analysis of sales data:

a) Data Collection

The project titled "Revitalize & Thrive: Elevating Sales and Service through Demand-Driven Strategies" aims to analyse and enhance the sales performance of a petrol pump through strategic data-driven decisions. The sales data for petrol, power, and diesel fuels was collected over a 6-month period, from April 1, 2023, to September 30, 2023. The owner of the organization agreed to share this valuable data, which was initially recorded daily in a physical record book at the petrol pump.

To facilitate the analysis, I manually transcribed the daily sales data from the record book into an Excel file. This digitized format allowed for easier handling, manipulation, and analysis of the data, providing a solid foundation for further investigation into sales trends and patterns.

b) Data Selection, Preprocessing, and Cleaning

After the initial data collection, it was essential to preprocess and clean the data to ensure accuracy and reliability in the analysis. The data collected included the date, sales of petrol, sales of power, and sales of diesel, recorded daily.

Additional Columns Determined:

- Weekdays and Month: These columns were derived from the date information, helping to analyze sales trends across different days of the week and months.
- Total Sales of Fuel: This column was calculated as the sum of the daily sales of petrol, power, and diesel.
- Revenue Calculation for each fuel type and total revenue earned: Using the provided prices:- ₹106.43/L for petrol, ₹113.57/L for power, and ₹93.14/L for diesel, I calculated the daily revenue earned from each fuel type. The total daily revenue was then obtained by summing up the revenues from all three fuel types.

c) ***Data Analysis***

With the cleaned and organized data, various analyses were conducted to derive insights that could inform demand-driven strategies for the petrol pump. After examining sales data to identify trends and patterns in the consumption of fuels especially power fuel helped me to understand peak sales periods and trends with respect to sales of petrol. Moreover weekday analysis of total sales of fuels will help us to know which weekdays are important from sales point of view. The business organization need to ensure that enough workers are available on those days by offering them attractive incentives. Thus it implements demand driven strategies to manage workforce and hence cheap labors will be retained without having increased much of their monthly wages. Performing other analysis on the sales data can unveil more trends and patterns.

ii) Market research by help of surveys:

Market research was conducted on sales of petrol and power fuels on 25th July from 11:00 a.m. to 10p.m (the period of time when sales of fuel is high in a day) which helped me determine customer's point of view. In total 167 customers were surveyed who opted for power/petrol fuel. From total 167 customers, 138 customers opted for petrol fuel and 29 customers opted for power fuel. To the customers who opted for petrol were asked why they don't prefer power provided its better quality. On reply to that, every customer told the same that due to high fuel prices, they are not ready to pay extra Rs. 7/L to buy power and are satisfied with petrol fuels. To the customers who opted for power were asked why they prefer power over petrol. On reply to that, every customer told the same that due to high quality of power fuel, the mileage given by vehicle is much better and hence experience better performance. They were also asked whether they would revert to use petrol again in future or not. On reply to that, they told that they would never do so if price difference between petrol and power doesn't differ much. This helped me assert the fact that power fuel customers are loyal and hence there is a scope for increasing sales of power fuels by targeting new customers.

6. Results and Findings

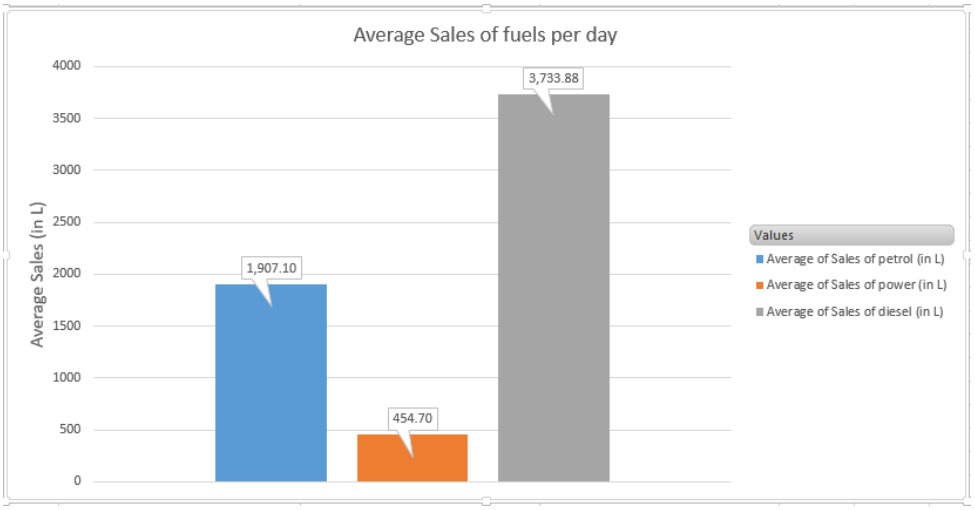


Figure 4: Average sales of fuels on daily basis

The above bar chart in Figure 4 shows the comparison between the average daily sales of petrol, power and diesel fuels in litres. Here we see that the power fuel is the least sold fuel and diesel fuel being the highest sold fuel. The average daily sales of diesel fuel is highest due to the obvious fact that there are 3 factories located nearby thus heavy vehicles creates the demand. For lighter vehicles and motorcycles, customers prefer petrol over power due its lower price than power. We can also observe that the average daily sales of petrol is about 4.2(near about 4) times the average daily sales of power and additionally the average daily sales of diesel is about 1.9(near about 2) times the average daily sales of petrol.

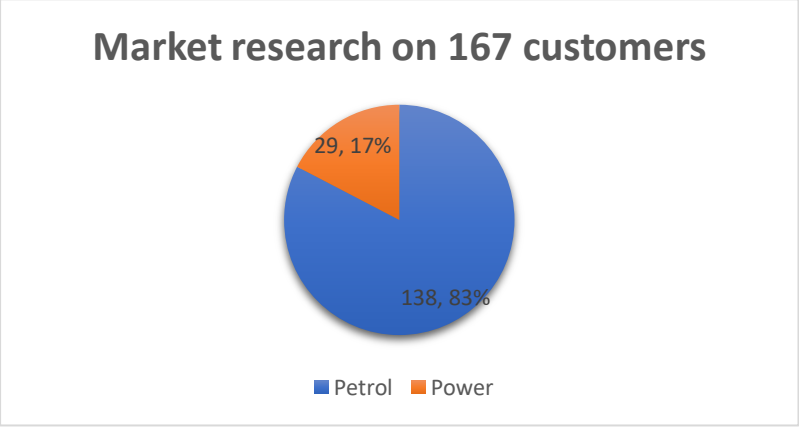


Figure 5: Market research results done on 167 customers who came to buy petrol/power fuels

As discussed earlier, a market research was conducted on customers of petrol/power fuels on 25th July from 11:00 a.m. to 10p.m (the period of time when sales of fuel is high in a day). Total of 167 customers opted to buy petrol/power fuels. The above pie chart in Figure 5 shows that out of total 167 customers, 138 customers opted for petrol fuel and 29 customers

opted for power fuel. So about 17% customers prefer power fuels which is highly in correspondence with the average daily sales of power which is about 19% of the total petrol and power fuels sold.

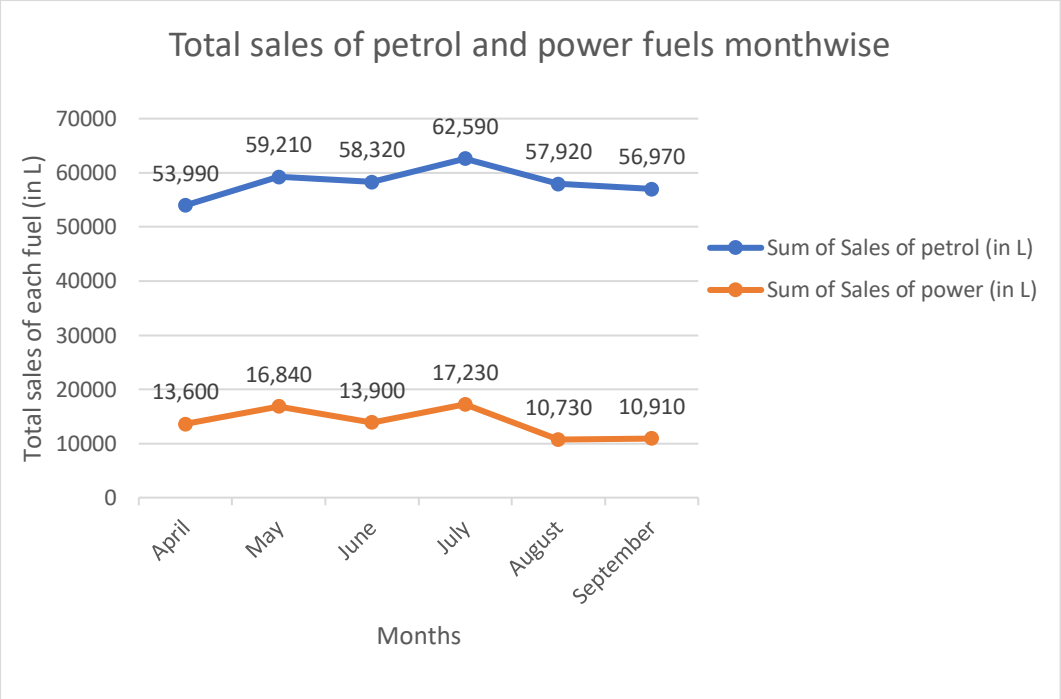


Figure 6: Trend of total sales of petrol and power on monthly basis

The above line chart in Figure 6 shows the trend of total sales of petrol and power on monthly basis. We observe that there is not too much deviation of changes in sales of power fuels with respect to sales of petrol fuels. Briefly, it means that when sales of petrol is increasing, correspondingly sales of power is also increasing and vice versa. Though there is no correlation between daily sales of petrol and power but there is a moderate correlation between total sales of power and petrol month wise with correlation coefficient value near 0.6. If price of the fuel had been the dominant factor which can affect sales of power then the sales of power would have decreased over months but it is not so in this case. This also asserts the fact that power fuel customers are loyal which was stated earlier while conducting market research. Keeping in mind of these facts, the business organization need to focus more on spreading awareness program among customers related to power fuel and its essence of its quality in order to increase its sale and thus maximize revenue. Normal petrol has an octane rating within the range of 85 to 87. Power petrol's octane rating is within the range of 91 to 94. Power petrol octane number is higher, which helps to reduce engine-knocking and detonation. This leads to better combustion. High octane petrol also helps the engine to work at full capacity and leads to better fuel efficiency.