

**BUSINESS DATA MANGEMENT CAPSTONE PROJECT**  
**FINAL REPORT SUBMISSION**

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**CASE STUDY OF AGRAWAL SOAP WORKS &  
KIRANA STORE**

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## **I. EXECUTIVE SUMMARY – CASE STUDY OF AGRAWAL SOAP WORKS AND KIRANA STORE**

The case study of Agrawal Soap Works and Kirana Store in Morena, Madhya Pradesh, aims to analyse the sales data and customer loyalty to help the shopkeepers optimize their inventory management. The study focuses on the sales records collected over a four-week period in February 2024, which includes the date of each customer visit and their purchase details.

The purpose of this case study is to identify the best-selling products and categories so that the shopkeepers can stock them accordingly, ensuring that items are neither overstocked nor out of stock. Additionally, understanding customer loyalty is crucial for the store's success, as loyal customers are more likely to make repeat purchases and contribute to the overall revenue. The analysis of the collected data reveals several key findings. Firstly, the revenue and sales are particularly high for certain products, indicating their popularity among customers. Secondly, customers who visited the store frequently tended to purchase more items, suggesting a correlation between visit frequency and purchase quantity.

The detailed analysis and inferences drawn from the case study are presented in the upcoming sections. The Results and Findings section provides a comprehensive overview of the study's outcomes, offering valuable insights for the shopkeepers to make informed decisions regarding inventory management and customer retention strategies.

By conducting this case study, Agrawal Soap Works and Kirana Store aim to adapt to the changing market dynamics, where online grocery stores and marts have affected overall sales and customer loyalty. The insights gained from the analysis will help the shopkeepers stay competitive and maintain a strong customer base in the face of evolving market trends.

### **I.(a). BACKGROUND OF STORE**

Amit Goyal, the proprietor, founded Agrawal Soap Works and Kirana Store in 2016 with the goal of manufacturing soap. Over time, they increased the range of products they offered to include groceries, dairy products, and Kirana items. By making this tactical change, they were able to serve a larger spectrum of community requirements and establish themselves as a one-stop shop for necessities. The store's transformation from a soap production facility to a full-service retail space illustrates how proactive they have been in satisfying the changing needs of their clientele.

The choice to expand their product line to include groceries, dairy, and Kirana items shows that they have a thorough awareness of the demands of the city's citizens as well as the specifics of the local market.

Agrawal Soap Works and Kirana Store have established themselves as a quick and dependable source for daily requirements by providing a range of vital products under one roof. Their competitive advantage in the neighbourhood retail market is strengthened by this calculated action, which also increases customer loyalty. The company's evolution from a soap manufacturing enterprise to a multi-sector retail outlet highlights its flexibility and response to evolving consumer demands. Agrawal Soap Works and Kirana Store have built a solid reputation as reliable suppliers of a wide range of products by matching their product offers to the needs of the local populace. This has allowed them to forge close bonds with the community they serve.

### **I.(b). PROOF OF ORIGINALITY OF THE DATA**

All the data is provided by Mr. Amit Goyal who is the owner of the shop. Letter from the organisation and photograph of the shop which can be found in below images (figure 1,2) for the validating the authenticity of the data.

#### **Agrawal Soap Works & Kirana Store**

Peepari Pura Road, Sanjay Colony, Morena (M.P), 476001

This letter is to certify that the data provided by Agrawal Soap Works & Kirana Store to Mr. Shakti Soni for the project at IIT Madras, is original and authentic to the best of our knowledge.

  
Amit Goyal  
Agrawal Soap Works &  
Kirana Store, Morena  
(M.P.) 476001



Figure 1 -Letter from the owner



Figure 2.1 – Picture at the shop



Figure 2.2 Shop inventor

## II. DETAILED EXPLANATION OF ANALYSIS PROCESS

I have gathered sales information over a four-week period in February 2024 in an unstructured row format from Agrawal Soap Works and Kirana Store. The original Hindi raw data was translated into English and arranged into a more structured style for Microsoft Excel analysis. The information in the data comes directly from the store's records and includes details on product purchases and client visits. Name, Last Visit, Weekly Visit, Total Frequency, Monetary Value (In Rs.), R Score, F Score, M Score, RFM Score, and Segment are the columns that make up the structured data. As seen in Figure 3, this format enables a more thorough investigation of sales trends and consumer behaviour.

I hope to learn a lot about the store's inventory control, customer loyalty, and sales success by transforming the unstructured data into a structured manner. In order to effectively satisfy demand, the analysis will concentrate on determining the best-selling products, comprehending consumer preferences, and managing inventory levels. The case study will be built around this organized data, which will allow for a detailed analysis of the store's operations and the provision of practical suggestions for enhancement. Because of Microsoft Excel's extensive availability, ease of use, and strong analytical skills, it has been chosen as the main tool for data analysis. To find patterns, trends, and correlations in the sales data, Excel's features—such as pivot tables, charts, and formulas—will be utilized. The management of the store will benefit from this study by having a clear insight of their consumer base, sales performance, and areas for improvement. This will help them make decisions and develop business growth strategies.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Name	LAST Purchase Date	WEEK 1	WEEK 2	WEEK 3	WEEK 4	Total Frequency	Monetary Value (IN Rs.)	R SCORE	F SCORE	M SCORE	RFM SCORE	SEGMENT				
2	ANIL	29/Feb/24	1	2	1	2	6	1580	4	4	3	443	Loyal				
3	RAMESH	27/Feb/24	2	1	0	1	4	1940	4	3	3	433	Loyal				
4	PRIYA	19/Feb/24	1	1	1	0	3	1830	3	2	3	323	Potential				
5	SURESH	27/Feb/24	0	1	1	1	3	1065	4	2	2	422	Loyal				
6	DEEPAK	18/Feb/24	0	2	1	0	3	1310	3	2	2	322	Potential				
7	MEENA	29/Feb/24	1	2	2	1	6	3420	4	4	4	444	Loyal				
8	BABU	28/Feb/24	1	0	1	1	3	900	4	2	2	422	Loyal				
9	SANJAY	29/Feb/24	1	1	1	2	5	5225	4	4	4	444	Loyal				
10	AJAY	16/Feb/24	1	0	1	0	2	725	3	1	2	312	Potential				
11	SUNITA	22/Feb/24	0	0	0	1	1	310	4	1	1	411	Loyal				
12	MANISH	10/Feb/24	2	1	0	0	3	975	2	2	2	222	Regular				
13	KRISHNA	29/Feb/24	1	0	1	3	5	3069	4	4	4	444	Loyal				
14	KAVITA	18/Feb/24	1	1	1	0	3	930	3	2	2	322	Potential				
15	ANITA	21/Feb/24	2	1	1	0	4	1303	3	3	2	332	Potential				
16	JYOTI	14/Feb/24	0	1	0	0	1	290	2	1	1	211	Regular				
17	ROHIT	22/Feb/24	2	1	1	1	5	2730	4	4	4	444	Loyal				
18	VIVEK	16/Feb/24	1	0	2	0	3	1350	3	2	2	322	Potential				
19	SHALINI	26/Feb/24	1	1	0	1	3	755	4	2	2	422	Loyal				
20	RITU	26/Feb/24	2	2	0	1	5	1505	4	4	3	443	Loyal				
21	ARIJUN	24/Feb/24	1	1	2	1	5	1915	4	4	3	443	Loyal				
22	POOJA	29/Feb/24	1	0	0	2	3	1060	4	2	2	422	Loyal				
23	RAJESH	25/Feb/24	2	0	2	1	5	2521	4	4	4	444	Loyal				
24	NISHA	27/Feb/24	2	0	1	2	5	3605	4	4	4	444	Loyal				
25	NEHA	19/Feb/24	1	1	2	0	4	1005	3	3	2	332	Potential				

Figure 3



We used RFM score to form segments of customer, we calculated R, F, M scores individually, R score is calculated based on the recency based on the week of last arrival, and the recent the customer the higher the score is assigned. If customer last came in week 4 then R score is 4, if customer last came in week 3 then R score is 3, if customer last came in week 2 then R score is 2, if customer last came in week 1 then R score is 1.

For calculation of F score if the total frequency of customer is 6 or 5 then score assigned is 4, if the total frequency of customer is 4 then score is 3 and if the total frequency of customer is 3 then score is 2 if the total frequency of customer is less than or equal to 2 then score is 1.

For calculation of M score we calculated the 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> percentile then if the monetary value of customer is between 0<sup>th</sup> to 25<sup>th</sup> percentile then M score is 1, if the monetary value of customer is between 25<sup>th</sup> to 50<sup>th</sup> percentile then M score is 2, if the monetary value is between 50<sup>th</sup> to 75<sup>th</sup> percentile then M score is 3, if the monetary value is between 75<sup>th</sup> to max value then score is 4.

To form segments if the value of RFM score is between 111 to 143 then Segment is At Risk, if the value of RFM score is between 144 to 243 then Segment is Regular, if the value of RFM score is between 244 to 343 then Segment is Potential, if the value of RFM score is between 344 to 444 then Segment is Loyal.

The products purchased by the customers as shown in the figure 4.

NAME	Product	Quantity (KG/PCS/PKT)	Category	MONETARY VALUE
ANIL	Rice	10	R	700
	Utensil Soap	2	L	20
MAGGIE	MAGGIE	5	SB	70
	MOONG DAL	2	D	220
	CHUNI	5	A	100
	BREAD	1	SB	50
	ARHAR DAL	2	D	320
	MACRONI	1	SB	60
	CHEESE	2	DP	40
	WASHING POWDER	5	L	300
	TOOTHPASTE	2	O	110
	MAIDA	2	F	80
	MATCHSTICK	1	O	40
	MAKHANA	1	SB	150
	TURMERIC	1	S	50
	JEERA	1	S	60
	AJWAIN	1	S	50
	Total			1580

Figure 4



The category and week number representation in figure 5.

Category	Acronym
ANIMAL FOOD (A)	A
EDIBLE OIL (E)	E
DAL & PULSES (D)	D
FLOUR (F)	F
SPICES (S)	S
LAUNDRY (L)	L
SNACKS & BEVERAGES (SB)	SB
OTHER ITEMS	O
DRY FRUITS (DF)	DF
DAIRY PRODUCT (DP)	DP
RICE (R)	R
WEEK 1	
WEEK 2	
WEEK 3	
WEEK 4	

Figure 5

The major case study object is Perform a general analysis from the customers data to find out the maximum sales of product & the category also to find out the segment of customer i.e., Loyal, Potential, Regular and at Risk. The data is provided by the owner of those customers who purchase more than 4-5 items, some customers purchased 1-2 items, so they did not note their name or record the data. As shown in figure 6,

29	PRIYA	AATA	20	F	640
30		ARHAR DAL	2	D	320
31		MAKHANA	1	SB	150
32		MOOONG FALI	1	SB	120
33		SALT	3	S	75
34		WASHING POWDER	4	L	400
35		MAGGIE	5	SB	70
36		MACRONI	1	SB	55

Figure 6

Examined store data to determine sales. Even though the original data provided is unstructured, making it impossible to examine; thus, add certain calculations such as the RFM Score and Total RFM Score to make it properly formatted.

For the case study analysis some columns have been derived from the entered data or some columns have been removed as and when required to do the analysis in an efficient manner. The usage of Excel's features is recommended for plotting patterns, graphs, charts , and drawing insightful conclusions from the data. The data can be viewed by using the following link.

[https://docs.google.com/spreadsheets/d/1NCqBmKfHDHeBRe93991SvPWIIYZ\\_xhXod/edit?usp=sharing&ouid=112033896608494394350&rtpof=true&sd=true](https://docs.google.com/spreadsheets/d/1NCqBmKfHDHeBRe93991SvPWIIYZ_xhXod/edit?usp=sharing&ouid=112033896608494394350&rtpof=true&sd=true)

### III. RESULTS AND FINDINGS

#### III.(a) Customer visits the shop on a weekly basis.

In the week-wise frequency graph of customer visits to the shop, Anil Meena comes more frequently to the shop in the month of February. The shop owner said that they didn't remember which customer visited their shop frequently.

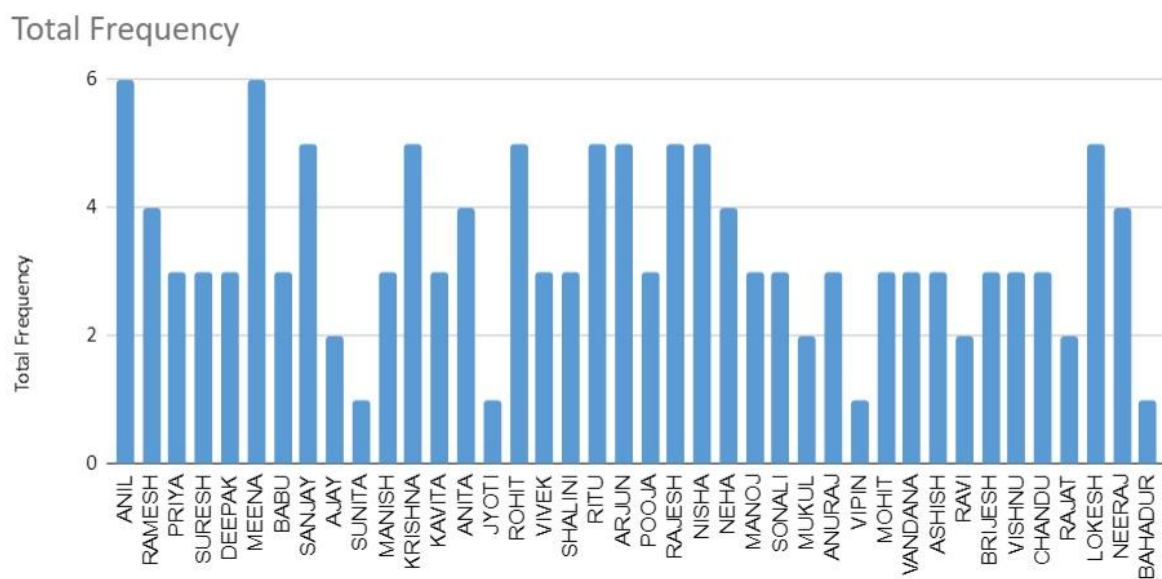


Figure 7

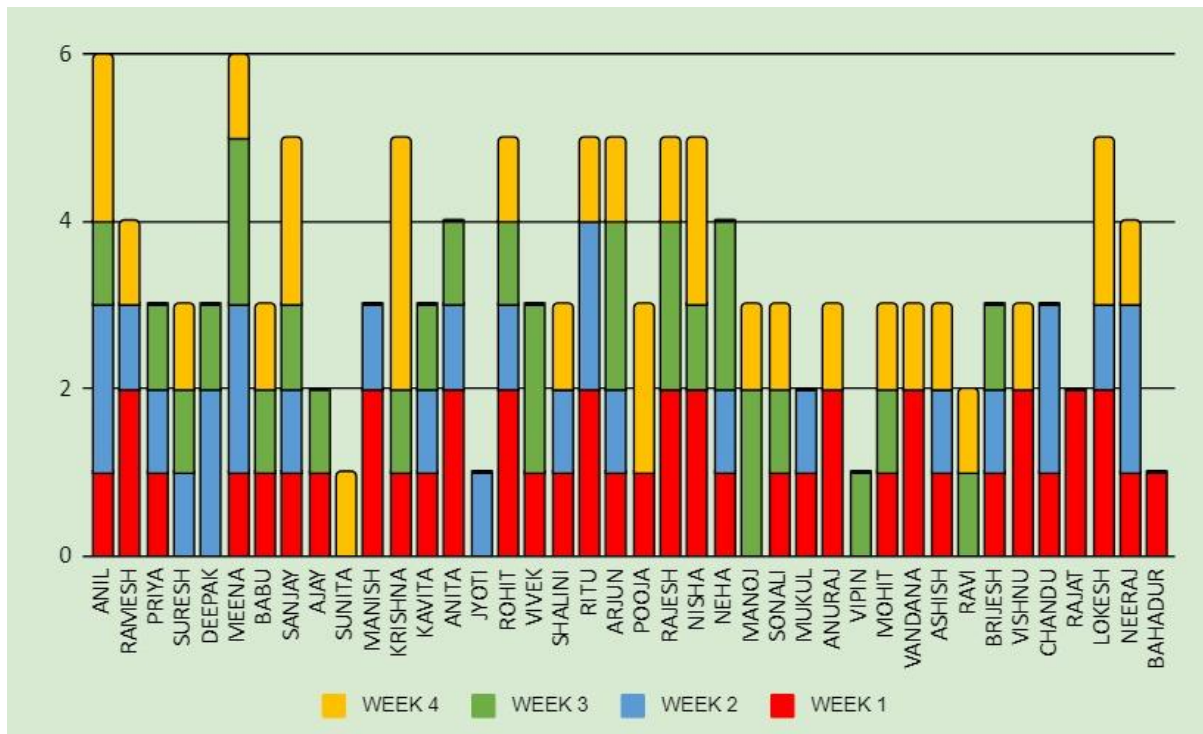


Figure 8

Based on the above graphs, it is clearly visible that the customer visited for the entire 4 weeks and a particular week as well. We can get the knowledge of each and every customer accordingly.

### **III.(b) Customer loyalty: -**

The question of which consumers are frequent or not is also a major problem for store owners; thus, we divide all of the customers into four segments: loyal, regular, potential, and at risk.

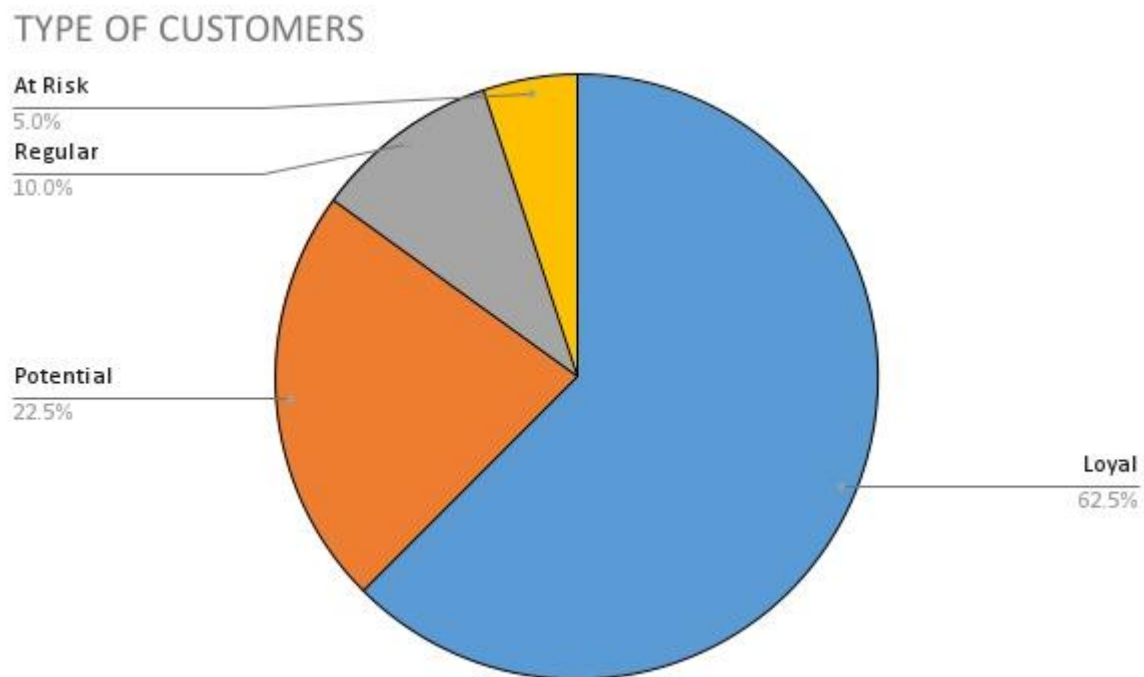


Figure 9 pie chart

The above figure shows the percentage of different customer segments that visited the store in February. It is evident that most customers are loyal, some are potential customers (meaning they depend on a small number of products from the store), a small percentage of regular customers (meaning they visit occasionally but not frequently), and a very small percentage of at-risk customers (meaning they visit occasionally, maybe once a week or twice a fortnight).

### **III.(C) Count of categories sale:**

The question raises an issue that owners of retail firms frequently deal with knowing client preferences by category is essential to efficient inventory control. Owners can avoid overstocking or understocking by evaluating which categories sell better and which are less popular and then optimizing their inventory accordingly. This is especially important for product categories where expiration dates are an issue, such as groceries and dairy products, as it prevents waste and raises expenses.

Extra Perspectives:  
Customer-focused inventory control:

It is crucial to comprehend consumer preferences and purchasing trends by category to properly adjust inventory levels to match demand. Owners can guarantee sufficient stock levels to avoid stockouts and improve customer satisfaction by recognizing popular categories.

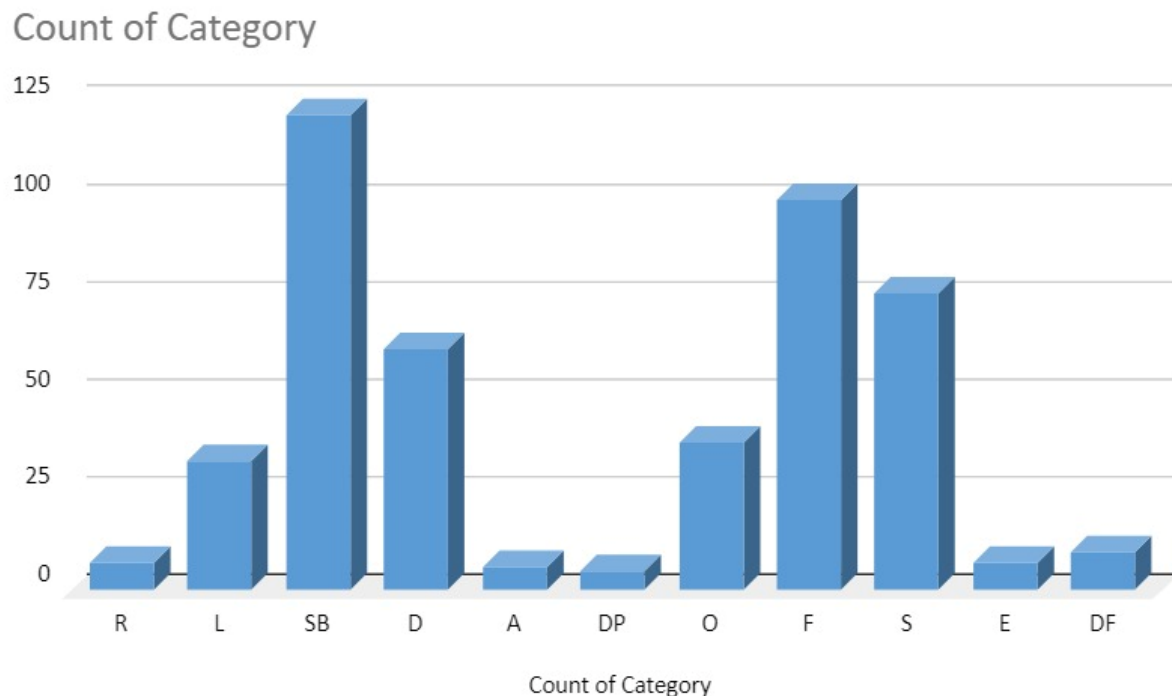


Figure 10

Category	Acronym
ANIMAL FOOD (A)	A
EDIBLE OIL (E)	E
DAL & PULSES (D)	D
FLOUR (F)	F
SPICES (S)	S
LAUNDRY (L)	L
SNACKS & BEVERAGES (SB)	SB
OTHER ITEMS	O
DRY FRUITS (DF)	DF
DAIRY PRODUCT (DP)	DP
RICE (R)	R

Figure 11

The graph above demonstrates that the snacks and drinks are the most popular items in this category; customers come in and buy them regularly. Flour is the next most popular item, and customers do come in and buy it from the shop. Spices are the next most popular item; without them, Indian food would not be complete.

Conversely, animal food dairy products sell for less; they expire quickly, which is a loss factor that forces the owner to keep less inventory on hand; also, dairy goods need a refrigerated climate to prevent waste. Furthermore, as fewer individuals own animals like cows or buffalo, the consumption of animal products declines on a regular basis. Because most people own animals, there was a good need for animal food in the past.

### **III.(D) Count of products: -**

The sources provided offer valuable insights into retail inventory management, emphasizing the significance of understanding customer preferences by category to optimize inventory control effectively. By analyzing which categories sell more and which sell less, owners can prevent overstocking or understocking issues, particularly crucial for perishable categories like groceries and dairy products to avoid wastage and increased costs.

### Additional Insights:

### Product-Centric Inventory Management:

Understanding product preferences and sales trends by category is vital for tailoring inventory levels to meet demand accurately.

By identifying high-selling categories, owners can ensure adequate stock levels to prevent stockouts and enhance customer satisfaction.

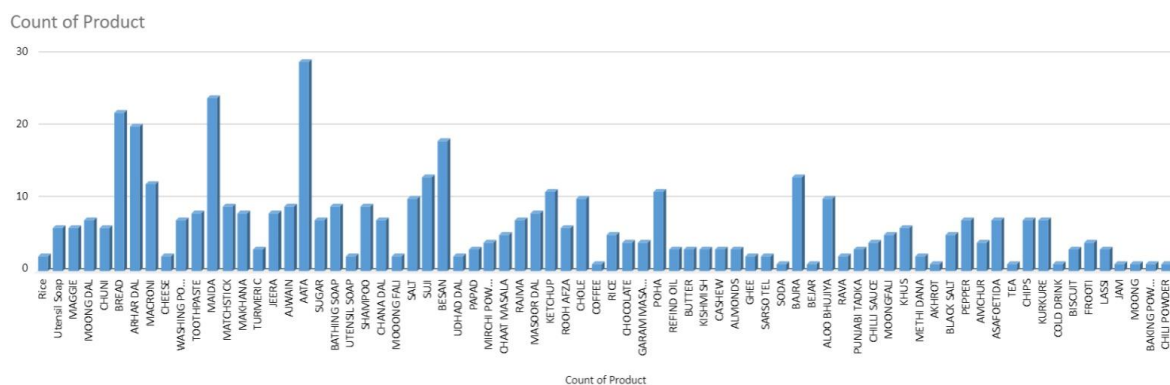


Figure 12



The graph above demonstrates that the most profitable product is the Aata, which is used in every home and generates good profits as well. In addition, Maida is the shop's second most profitable product. Since fast food and junk food are so popular these days and are primarily made of Maida, demand for them is always high, as seen in figure.

However, jam bleaching powder sold less, so he could adjust everything properly.

#### **IV. Interpretation from the Project:**

From the Case Study, we have insights such as: -

##### **1. Customer Loyalty Analysis:**

Interpretation: Out of the total customer base, 62.5% are loyal customers who regularly patronize the shop, 22.5% are potential customers who might become loyal with proper engagement, 10% are regular customers who visit occasionally, and 5% are at-risk customers who may stop patronizing the shop.

Results: The shop has a substantial loyal customer base, indicating satisfaction with its products and services. However, there is a notable portion of potential customers who could be converted into loyal customers with targeted marketing efforts. It's also important to pay attention to the at-risk customers and implement strategies to retain them.

##### **2. Customer Visit Frequency:**

Interpretation: Meena and Anil are the most frequent visitors to the shop, with 6 visits during the period, followed by Sanjay, Krishna, Ritu, etc., who visited 5 times.

Results: Meena and Anil show consistent patronage, suggesting high satisfaction or specific needs met by the shop. Sanjay, Krishna, Ritu, etc., also exhibit regular visitation patterns, indicating a loyal customer base among this group. Understanding the reasons behind their visits can help tailor marketing and product offerings to their preferences.

##### **3. Best Selling Category:**

Interpretation: Snacks and beverages are the most sold category in the shop, indicating that these products have the highest demand among customers.

Results: The shop should focus on maintaining a diverse and high-quality selection of snacks and beverages to meet customer demand and maximize sales revenue. Additionally, understanding the popularity of this category can inform inventory management and marketing strategies.

##### **4. Top Selling Product and Profitability:**

Interpretation: Aata (flour) is the best sold product in the shop, with 29 customers purchasing it. It belongs to the flour category and generates the most profit for the shop.

Results: Aata's popularity suggests that it is a staple item for customers, indicating its importance in the shop's product offering. Since it also contributes significantly to the shop's

profitability, optimizing its availability, pricing, and promotion can further enhance overall business performance. Additionally, analyzing other high-profit products and their sales patterns can provide insights into customer preferences and purchasing behavior.

## **V. Recommendation:**

### **I. Customer Engagement Strategies:**

Target Potential Customers: Implement targeted marketing campaigns and promotional offers to engage potential customers (22.5%) and encourage them to become loyal patrons. This could include loyalty programs, personalized discounts, or special events to attract their attention and incentivize repeat visits.

Retain At-Risk Customers: Identify at-risk customers (5%) through customer feedback, purchase history, or engagement metrics, and implement retention strategies such as personalized communications, exclusive offers, or enhanced customer service to prevent them from churning and encourage continued patronage.

### **II. Enhanced Customer Experience:**

Understand Customer Preferences: Conduct surveys or feedback sessions to understand the reasons behind frequent visits from Meena, Anil, Sanjay, Krishna, Ritu, etc. (5 times or more), and tailor product offerings, promotions, and services to meet their specific needs and preferences.

Improve Customer Service: Focus on providing excellent customer service to enhance overall satisfaction and loyalty. Train staff to greet customers warmly, assist them promptly, and address any concerns or complaints effectively to ensure a positive shopping experience.

### **III. Optimize Product Assortment:**

Capitalize on Best Selling Categories: Since snacks and beverages are the most sold categories, ensure a well-stocked and diverse selection of these products to meet customer demand. Regularly review sales data and customer feedback to identify popular items and trends and adjust inventory accordingly to maximize sales and profitability.

Diversify Product Range: While snacks and beverages are popular, consider expanding the product range to include complementary items or new offerings that align with customer preferences and market trends. This could include healthier snack options, specialty beverages, or locally sourced products to attract a wider customer base and differentiate the shop from competitors.