

Business Process Optimization for a Local Retail Shop

A Mid Term report for the BDM Capstone Project

Submitted by

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Declaration Statement

I am working on a Project Title “Business Process Optimization for a Local Retail Shop.” I extend my appreciation to Jai Ambe Store, 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 analysed 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:



Name: Sagar Kumar

Roll no. : 23f2002523

2. Executive Summary and Title

The project is based on a medium-scale grocery store named Jai Ambe Traders, located in Gorakhpur district, Uttar Pradesh. The store is managed by Mr. Rajan Kumar and deals with both small business owners and individual customers, selling products in wholesale as well as retail quantities.

For this project, essential data was collected related to customer credit records, product purchases and sales, current stock levels, and wastage due to expiry or rodent damage, covering a period from November 2024 to April 2025.

The purpose of this project is to derive meaningful descriptive statistics that can summarise the store's data effectively. I calculated key statistics such as average and maximum credit given, average quantities purchased and sold per product, total outstanding balances, and wastage trends.

To obtain these insights, the data was first cleaned and errors were corrected, such as incorrect dates or missing entries. Then, various analysis techniques and charts like line charts, column charts, and pie charts were used to visualise the findings in an understandable way.

Through this analysis, important results emerged, such as:

- Products and categories with high unsold stock or wastage
- Rising outstanding balances due to customer credit
- Major reasons for wastage and the monthly wastage trends

These findings will help the store improve its credit management, inventory planning, and reduce wastage, ultimately increasing profitability.

3. Proof of Originality of Data

a. About the shop

Shop Name: Jai Ambe Trader

Proprietor: Mr. Rajan Kumar

Address: Gorakhpur, Uttar Pradesh

b. Background of the shop

M/s Jai Ambe Traders is a medium scale grocery store located near the Government Medical College in Gorakhpur district, Uttar Pradesh. Established in 2010 by Mr. Shambhu Kumar, the store initially focused on retail sales, serving to the daily needs of the local population. After his death, the business was taken over by his son, Mr. Rajan Kumar, who now manages operations. Under his leadership, the store expanded to supply small business stores as well as individual customers, offering both wholesale and retail services.

Jai Ambe Traders currently employs six staff members who work in two shifts to ensure continuous service until 10 PM.

c. Images of shop

As a proof of originality of my data, I took some pictures of the shop.



Fig. 1



Fig. 2



Fig. 3



Fig. 4

d. Letter Head of shop

I got a letter head from the shop owner with his sign.

[illegible]

e. Interaction video with shop owner

The link given below is a short video which I recorded during the interaction with the shop owner.

The

4. Metadata

M/s Jai Ambe Traders is a medium-scale grocery store located in Gorakhpur, Uttar Pradesh, which sells both wholesale and retail products to customers. The collected data contains records from November 2024 to April 2025, covering approximately six months. The data was collected by me in May 2025 for this project.

For this project, the shop owner shared the following information:

- Day-to-day credit sales data of customers
- Inventory details, including arrival dates and stock levels
- Losses caused due to product expiry and rodent damage
- Product details including name, category, quantity, and brand type (branded or local)

The snapshot of the gathered data as spreadsheet is mentioned below:

	A	B	C	D	E	F	G	H
	Customer Name	Date of Purchase on Credit	Credit Amount Given	Due Date for Payment	Payment Date (if paid)	Outstanding Balance	Customer Type (regular/wholesale)	Contact Details (for follow-ups)
1	Chandani Nayar	2025-01-31	15239	2025-02-19		15239	regular	00161814348
2	Bachittar Nayar	2024-12-01	15112	2024-12-26	2024-12-19	0	regular	*915787219632
3	Chaaya Dave	2025-02-26	22394	2025-03-17	2025-02-26	0	wholesale	*914868416745
4	Deepa Mohanty	2024-12-06	39480	2024-12-27		0	wholesale	*9853490757
5	Ayushman Mandal	2025-03-31	37329	2025-04-22	2024-12-06	37329	wholesale	*376830393
6	Abha Sahni	2025-03-07	34936	2025-04-03	2025-03-13	0	wholesale	*332645786
7	Baljiwan Babu	2025-04-28	20915	2025-05-20		20915	regular	*916188837534
8	Omya Chaudhari	2025-01-13	10578	2025-02-16		10578	regular	*93829062059
9	Hredhaan Pillai	2024-12-28	41630	2025-01-15	2025-01-14	0	regular	*918795524586
10	Patrick Basu	2025-01-07	12287	2025-01-31		12287	wholesale	*9417453450
11	Maya Ahluwalia	2025-01-22	18346	2025-02-27		18346	regular	*917913017389
12	Arjun Datta	2024-12-17	48166	2025-01-08	2025-01-03	0	regular	*8815289010
13	Omaja Salvi	2025-03-13	46695	2025-04-16		46695	wholesale	*915810923367
14	Ubika Lal	2025-02-25	48773	2025-04-04		48773	regular	*8015718127
15	Madhav Char	2024-11-11	11064	2024-12-03	2024-12-02	0	wholesale	*03191010514
16	Meera Dutta	2024-11-26	21222	2024-12-28		21222	regular	*01368206462
17	Aayush Valla	2024-11-29	48852	2025-01-03	2024-12-05	0	wholesale	*917806960426
18	Pushti Bora	2024-12-16	9157	2025-01-12	2025-01-03	0	wholesale	*911109023682
19	Baljiwan Sehgal	2025-02-14	5797	2025-03-10		5797	regular	*6087657437
20	Isha Sahota	2024-11-18	21576	2024-12-11	2024-12-06	0	regular	*6872687942
21	Fitan Kara	2024-11-07	22022	2024-12-11	2024-11-25	0	regular	*916624573759
22	Quincy Vyas	2025-04-17	35686	2025-05-08	2025-04-23	0	wholesale	*03488897576
23	Charita Chander	2025-01-21	27473	2025-03-07		27473	wholesale	*6416777327
24	Parth Samra	2024-11-23	7581	2024-12-30	2024-11-26	0	regular	*03940769959
25	Chakrika Parikh	2024-12-26	7294	2025-02-04		7294	wholesale	*00680357800
26	Ishani Mishra	2024-11-21	12522	2024-12-15	2024-12-04	0	wholesale	*3138583731
27	Hemal Jha	2024-12-22	44636	2025-01-31		44636	regular	*013284413
28	Lila Barai	2025-02-17	9185	2025-03-08		9185	wholesale	*08516790305

Fig. 1: Collected data of customer and credit details

	A	B	C	D	E	F	G
	Product Name	Product Category	Date of Arrival	Quantity Purchased	Quantity Sold	Current Stock Level	Company Type
1	Mosquito repellents (Good Knight)	Household Products	2024-10-15	472	389	83	branded
2	Detergent cakes (Rin)	Household Products	2025-01-09	442	392	50	branded
3	Baby soap	Baby Care	2024-12-26	454	383	71	branded
4	Chocolates (Dairy Milk)	Food & Beverages	2025-04-23	462	373	89	branded
5	Soft drinks (Pepsi)	Food & Beverages	2025-03-28	405	337	68	branded
6	Razors	Personal Care & Hygiene	2025-01-24	435	327	108	branded
7	Biscuits (Parle-G)	Food & Beverages	2025-02-24	677	520	157	branded
8	Ready-to-eat snacks (Bikaji)	Food & Beverages	2025-03-10	598	588	10	branded
9	Matchboxes	Household Products	2025-04-11	448	382	66	branded
10	Diapers	Baby Care	2025-04-12	608	449	159	branded
11	Bathing soaps (Lifebuoy)	Personal Care & Hygiene	2024-11-22	481	339	142	branded
12	Rice (Sona Masoori)	Food & Beverages	2024-12-29	389	306	83	branded
13	Mosquito repellents (Good Knight)	Household Products	2024-09-17	523	523	0	branded
14	Chocolates (Dairy Milk)	Food & Beverages	2025-01-18	365	337	28	branded
15	Garbage bags	Household Products	2025-02-27	457	368	89	branded
16	Bathing soaps (Dove)	Personal Care & Hygiene	2024-10-26	566	415	151	branded
17	Coffee (Filter)	Food & Beverages	2025-01-05	650	567	83	branded
18	Bread	Food & Beverages	2024-12-23	429	392	37	branded
19	Chips (Kurkure)	Food & Beverages	2025-04-05	621	509	112	branded
20	Buttermilk	Dairy Products	2024-12-14	350	265	85	branded
21	Pooja items	Others	2025-04-14	449	378	71	branded
22	Candles	Household Products	2024-11-20	613	475	138	branded
23	Cooking oils (Sunflower)	Food & Beverages	2025-03-23	551	476	75	branded
24	Tea (Branded)	Food & Beverages	2024-11-26	637	524	113	branded
25	Dry fruits (Pistachios)	Food & Beverages	2024-11-24	363	352	11	branded
26	Salt (Iodised)	Food & Beverages	2025-02-11	346	257	89	branded
27	Tea (Loose)	Food & Beverages	2025-03-25	654	578	76	branded
28	Pulses (Urad Dal)	Food & Beverages	2024-11-01	342	342	0	branded

Fig. 2: Collected data of product details and thier arrival

	A	B	C	D	E	F	G	H
	Product Name	Product Category	Date of Arrival	Expiry Date	Date Vastage Recorded	Quantity Vasted	Reason for Vastage	Storage Location
1	Bunermilk	Dairy Products	2025-01-11	2025-10-22 00:00:00	2025-11-03 00:00:00	10	expiry	Store 3
2	Pulses (Urad Dal)	Food & Beverages	2025-03-04	2025-02-02 00:00:00	2025-02-05 00:00:00	35	expiry	Store 2
3	Pulses (Moong Dal)	Food & Beverages	2024-12-28	2025-05-15 00:00:00	2025-06-12 00:00:00	39	expiry	Warehouse B
4	Cooking oils (Groundnut)	Food & Beverages	2025-04-06	2025-04-01 00:00:00	2025-04-16 00:00:00	44	expiry	
5	Tea (Loose)	Food & Beverages	2024-12-04	2025-03-17 00:00:00	2025-03-17 00:00:00	35	expiry	
6	Tea (Blended)	Food & Beverages	2025-01-03	2025-06-19 00:00:00	2025-06-23 00:00:00	25	expiry	
7	Chips (Kurkure)	Food & Beverages	2025-03-28	2025-10-02 00:00:00	2025-10-27 00:00:00	31	expiry	Warehouse A
8	Detergent cakes (Rin)	Household Products	2025-03-09	2025-05-25 00:00:00	2025-06-04 00:00:00	49	expiry	Store 3
9	Dry fruits (Pistachios)	Food & Beverages	2025-03-27	2025-06-07 00:00:00	2025-06-28 00:00:00	20	expiry	
10	Lasst	Dairy Products	2025-02-20	2025-05-17 00:00:00	2025-05-31 00:00:00	49	expiry	Warehouse A
11	Pooja items	Others	2024-11-05	2025-04-01 00:00:00	2025-04-06 00:00:00	35	expiry	Backroom
12	Candies & toffees	Food & Beverages	2025-01-23	2025-11-10 00:00:00	2025-11-16 00:00:00	18	expiry	Warehouse B
13	Sanitary pads	Personal Care & Hygiene	2024-11-17	2025-02-07 00:00:00	2025-02-17 00:00:00	37	expiry	Warehouse B
14	Pasta	Food & Beverages	2024-12-09	2025-09-10 00:00:00	2025-07-12 00:00:00	43	expiry	Warehouse A
15	Baby lotion	Baby Care	2025-02-23	2025-09-17 00:00:00	2025-09-28 00:00:00	37	expiry	
16	Dishwash bar (Vin)	Household Products	2025-02-11	2025-02-26 00:00:00	2025-03-07 00:00:00	27	expiry	Warehouse B
17	Pickles	Food & Beverages	2024-09-05	2025-12-03 00:00:00	2025-12-22 00:00:00	37	expiry	Backroom
18	Detergent powder (Sulfi)	Household Products	2025-03-19	2025-12-25 00:00:00	2026-01-10 00:00:00	9	rodent damage	Store 1
19	Lasst	Dairy Products	2025-01-29	2025-09-02 00:00:00	2025-09-15 00:00:00	50	expiry	Backroom
20	Face wash	Personal Care & Hygiene	2025-02-10	2025-06-17 00:00:00	2025-07-10 00:00:00	19	expiry	
21	Baby food (Cerelac)	Baby Care	2024-11-10	2025-12-15 00:00:00	2026-01-05 00:00:00	16	expiry	Warehouse B
22	Papad	Food & Beverages	2025-02-01	2025-05-20 00:00:00	2025-06-16 00:00:00	10	expiry	Warehouse B
23	Cooking oils (Mustard)	Food & Beverages	2025-02-24	2025-10-05 00:00:00	2025-10-28 00:00:00	50	expiry	Store 3
24	Cheese slices	Dairy Products	2025-03-31	2025-02-18 00:00:00	2025-03-18 00:00:00	28	expiry	Store 1
25	Soft drinks (Coca Cola)	Food & Beverages	2024-10-12	2025-08-13 00:00:00	2025-08-23 00:00:00	11	expiry	Warehouse A
26	Pooja items	Others	2024-12-09	2025-03-14 00:00:00	2025-03-23 00:00:00	27	expiry	Warehouse A
27	Biscuits (Good Day)	Food & Beverages	2025-04-03	2025-09-04 00:00:00	2025-09-25 00:00:00	7	expiry	Warehouse A
28	Shampoo	Personal Care & Hygiene	2024-09-02	2025-03-25 00:00:00	2025-04-21 00:00:00	25	expiry	Warehouse A
29	Toothpaste	Personal Care & Hygiene	2025-02-15	2025-05-22 00:00:00	2025-06-13 00:00:00	44	expiry	Warehouse B
30	Detergent powder (Sulfi)	Household Products	2024-11-14	2025-08-25 00:00:00	2025-09-18 00:00:00	7	rodent damage	

Fig. 3: Collected data of product and their expiry along with the cause of expiry

5. Descriptive Statistics

I have mentioned 3 descriptive stats below-

a. For customer credit and payments :

- Average credit amount given - ₹27,616.27
- Median credit amount - ₹27,517.50
- Maximum credit amount given - ₹49,997.00
- Minimum credit amount given - ₹5,010.00
- Average outstanding balance - ₹14,006.81
- Maximum outstanding balance - ₹49,879.00
- Total credit given (Nov 24 – Apr 25) - ₹2,74,52,098.00
- Total outstanding credit amount - ₹2,10,10,209.00

b. For Product details, stock, and their sales :

- Average quantity purchased per product - 373.77 units
- Average quantity sold per product - 310.38 units
- Maximum quantity purchased (in last 6 month) - 747,524 units
- Maximum quantity sold (in last 6 month) - 620,757 units
- Average current stock level - 63.4 units

*NOTE: Units vary by product type and include kg, packets, cartons, and litres.

c. For product wastage :

- Total wastage quantity (expiry + rodent) - 9432 units
- Month with highest wastage - March(2092) units
- Month with lowest wastage - January(1071) units
- Total loss due to expiry - 8,674 units
- Total loss due to rodent damage - 758 units

*NOTE: Units vary by product type and include kg, packets, cartons, and litres.

6. Detailed Explanation of Analysis Process

For this project, I collected six months of data from Jai Ambe Traders, a grocery store in Gorakhpur, to understand and solve their major business problems such as high customer credit, inventory mismanagement, and product wastage. The data included information about customer credit records, product purchase details, sales, current stock, and wastage recorded due to expiry or rodent damage.

Initially, the data was completely unorganised and contained many errors like missing dates, blank storage locations, expiry dates before arrival dates, and wastage recorded even after the analysis period. Therefore, the first step was to clean and prepare the data properly. I checked and corrected:

- Missing and wrongly formatted dates
- Blank storage location entries
- Expiry dates that were before arrival dates
- Wastage dates recorded long after expiry dates

After ensuring that the data was accurate and properly formatted, I began my analysis using descriptive statistical methods. I calculated the average, median, maximum, minimum, and total values for different parameters to summarise the data effectively.

To make the analysis more meaningful and easy to understand, I used various types of graphs and charts:

- **Line Charts:** These were used to show trends in per day credit given, outstanding balances over months, and monthly wastage quantities to identify if these issues were increasing or decreasing over time.
- **Clustered Column Charts:** These helped compare quantity purchased vs quantity sold per product category to identify slow-moving items that lead to excess stock and wastage. I also used column charts to compare credit amounts given to different customers to identify top debtors.
- **Pie Charts:** These were used to show the proportion of branded vs local products in total inventory, the distribution of different product categories (dairy, snacks, grocery, etc.), and the share of wastage reasons between expiry and rodent damage.

These charts and analyses helped in identifying key problem areas clearly, such as which products were causing more wastage, which customers were taking high credit, and how the inventory levels could be managed better.

Overall, this detailed analysis process will help Jai Ambe Traders to take data-driven decisions, improve their credit recovery and inventory planning, and reduce losses due to wastage.

7. Results and Findings

The charts which generated from the data are attached to below:

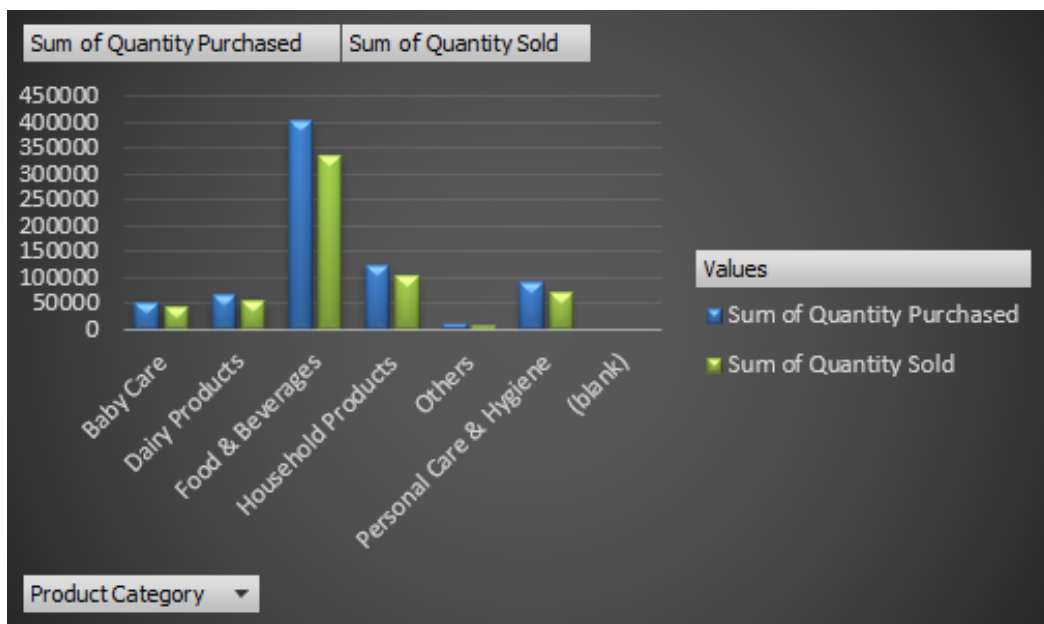


Chart 1: Shows what quantity of products are purchased and sold

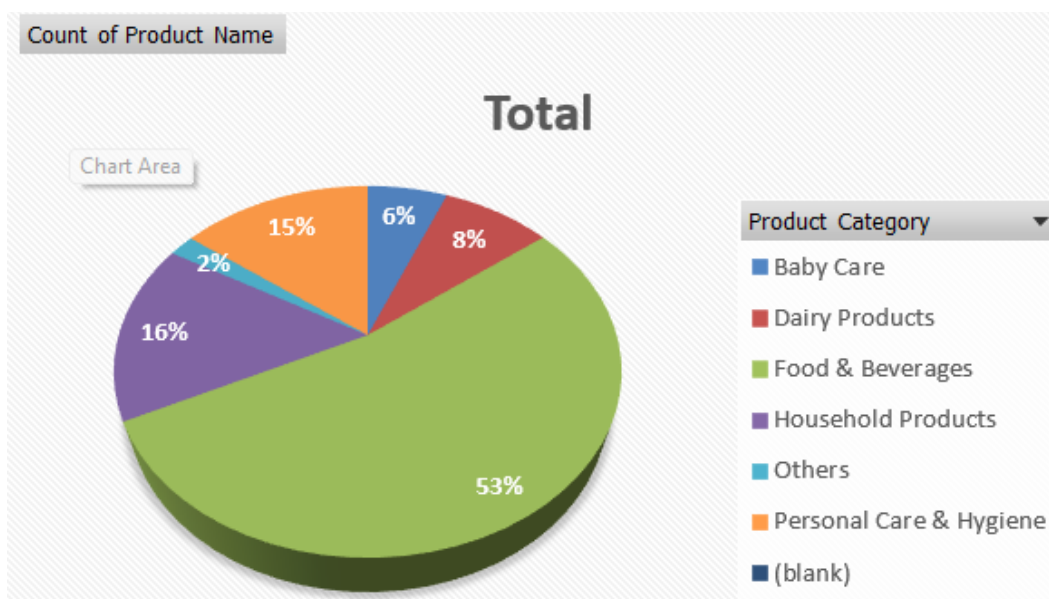


Chart 2: Shows different categories of products that had been purchased

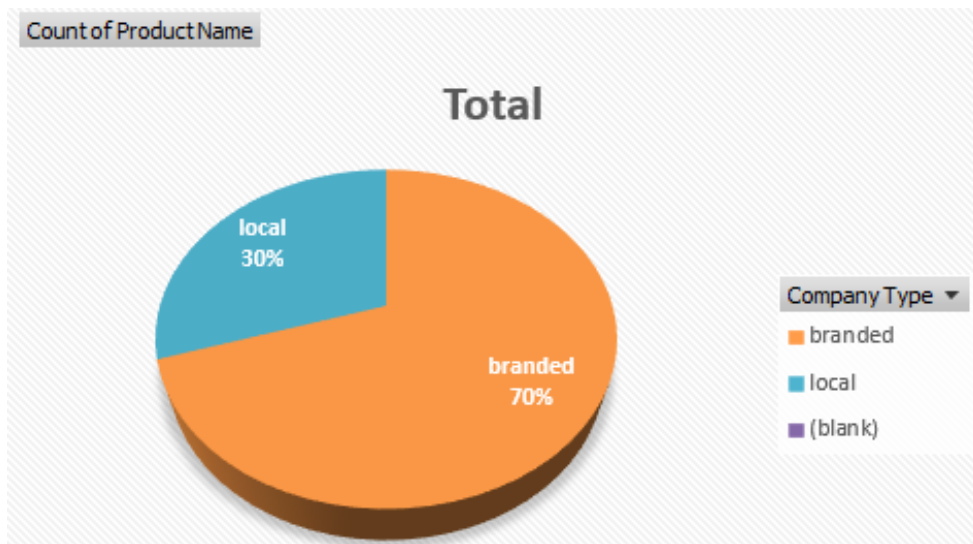


Chart 3: Shows the type of product either branded or local

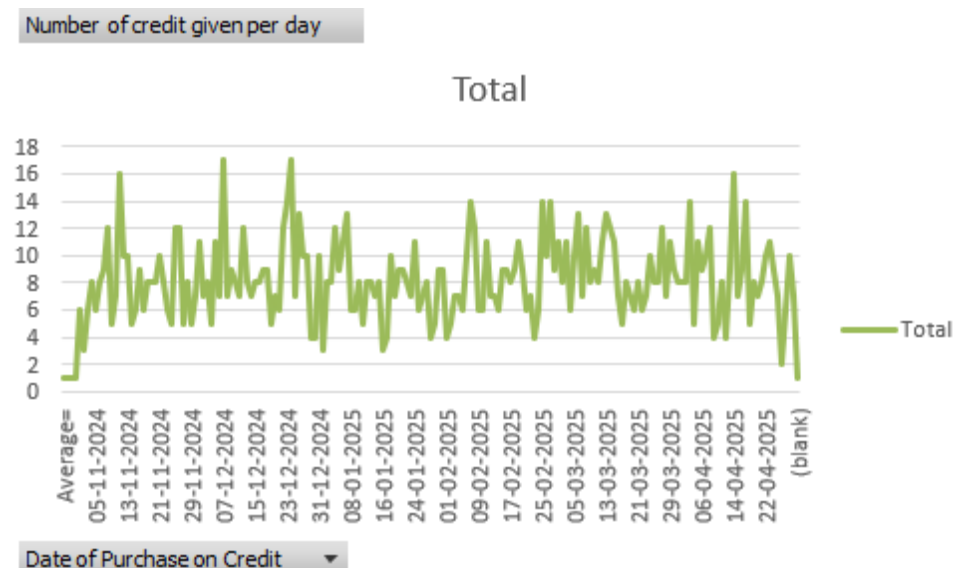


Chart 4: Shows number of credit given each day

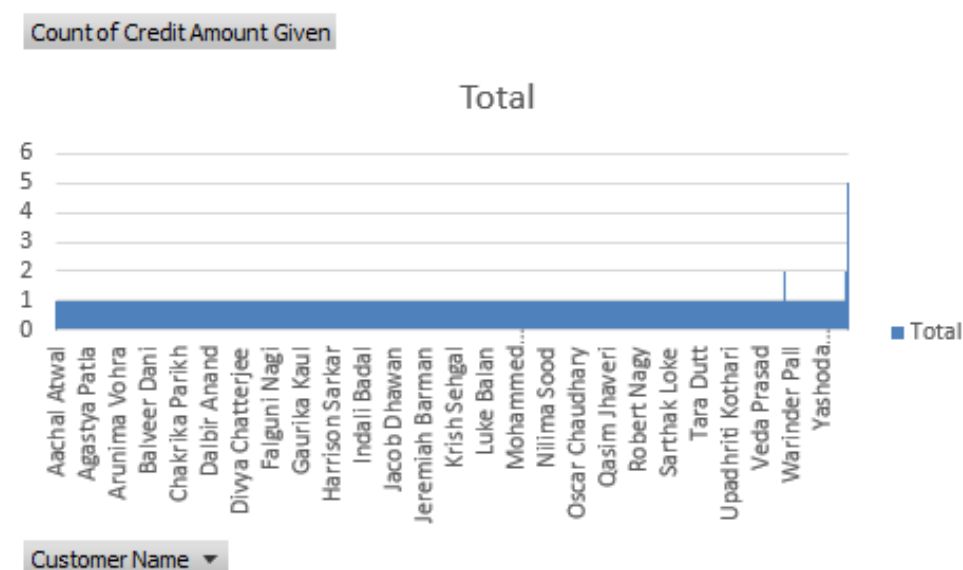


Chart 5: Shows the customer with highest no. of credit

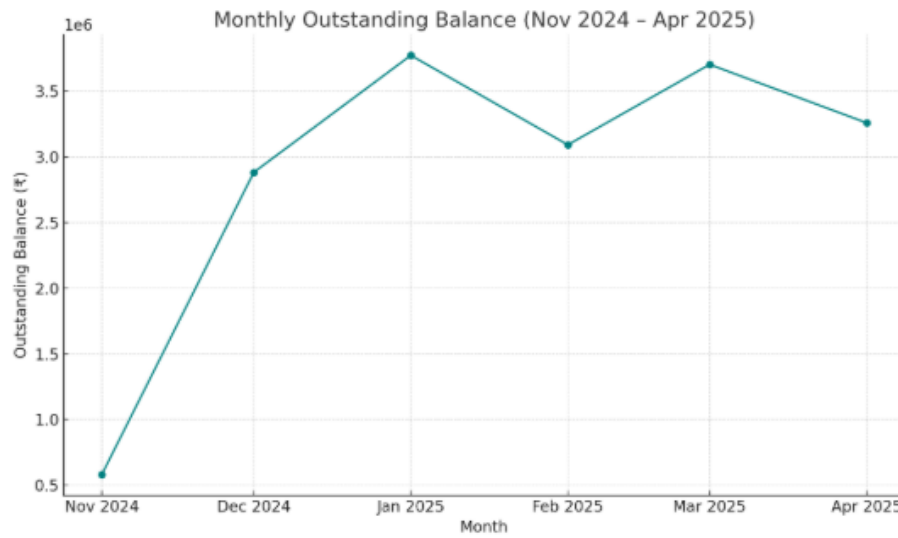


Chart 6: Shows monthly Outstanding Balance from November 2024 to April 2025,

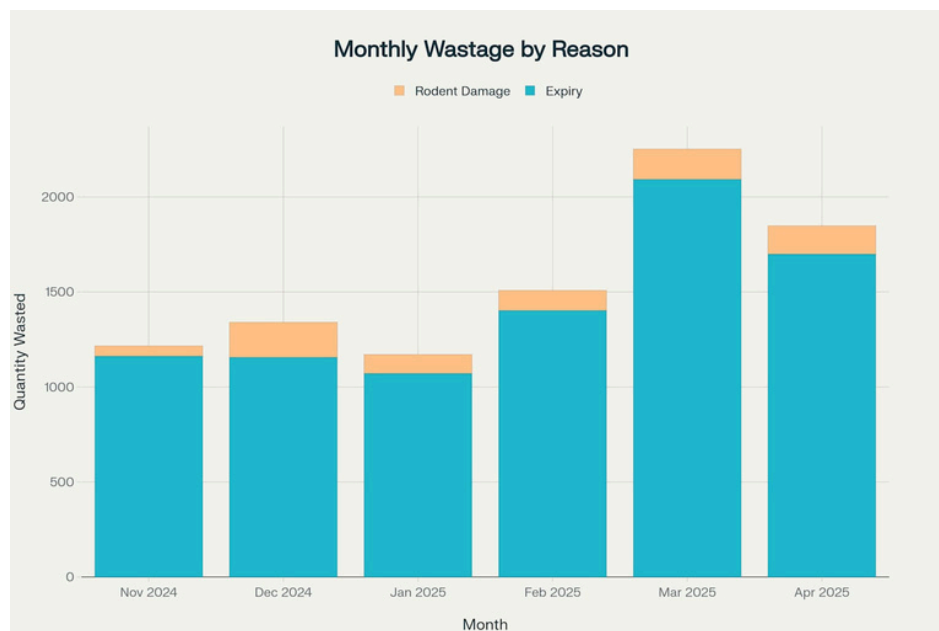


Chart 7: Shows Monthly Total Wastage by Reason (Nov 2024 - Apr 2025)

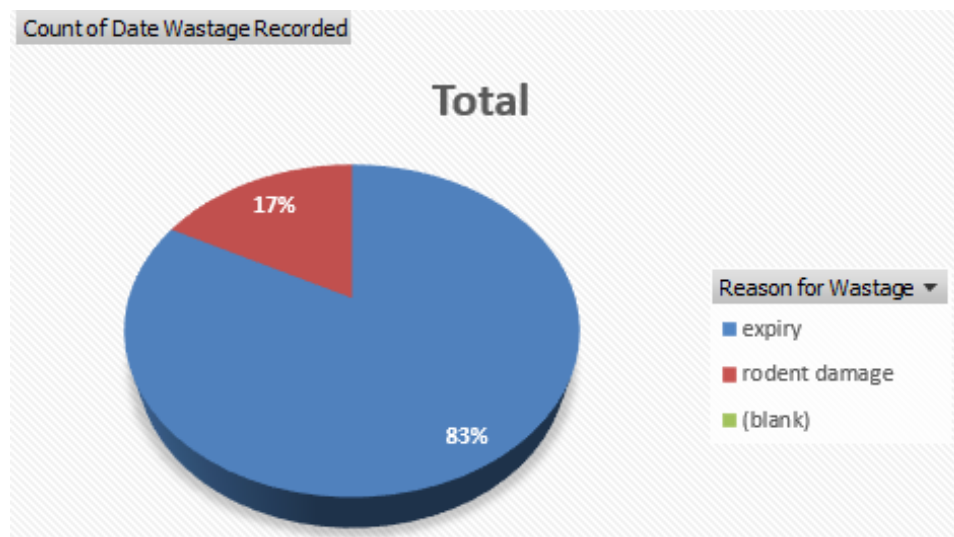


Chart 8: Shows the waste of product either by expiry or by rodents



Chart 9: Shows total quantities wasted from November 2024 to April 2025

After analysing the entire data and charts, the following key findings emerged:

- Household products have the highest purchase and sales but also a big gap (purchased more than sold), indicating excess stock or slow movement.
- Food and beverages category shows good movement with lesser unsold stock.
- Other categories like baby care, dairy, and personal care have relatively balanced purchase and sale, but volumes are low.
- Food & beverages occupy the largest share (53%) of all products stocked.
- Household products (16%) and personal care & hygiene (15%) also have significant share.
- Very few items are in baby care (6%) and dairy (8%).
- The store deals 70% in branded products and 30% in local products, indicating focus on brand reliability but also good local sourcing.
- Daily credit given ranges between 4-12 customers per day.
- Shows consistently high credit activity, indicating reliance on credit sales which can affect cash flow.
- Very few customers are taking credit repeatedly (bars with higher count).
- Majority of customers have taken credit only once, indicating a large variety of debtor
- Outstanding balance increased sharply from Nov 2024 to Jan 2025, peaking in Jan.
- Though there is a dip in Feb, balances rise again in March, indicating poor recovery or excessive new credit.

- 83% of wastage is due to expiry, only 17% due to rodent damage.
 - Indicates inventory mismanagement is a bigger issue than pest control.
 - Wastage was stable from Nov to Jan, but increased sharply from Feb, peaking in March 2025.
 - Indicates that inventory planning and rotation was not improved in later months.
 - Every month, expiry wastage is dominant, rodent wastage remains small but constant.
 - Highest total wastage is in March 2025, needing urgent review of stocking and FIFO practices.
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Thanks For Reading