Business Data Management

Final Submission

GrocerAnalytics:

Grocery Insights Deep Dive

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1) **Executive Summary and Title**:

Title: **"GrocerAnalytics: Grocery Insights Deep Dive"** for a unorganized B2C Grocery Store

Kamal Store, a medium-sized retailer established in 2014, specializes in grocery products. The company currently faces challenges related to profit margins and inventory management, impacting its net profit and sales. The proposed capstone project aims to address these challenges by focusing on inventory management, sales enhancement, and the formulation of effective marketing strategies to boost net profit and sales.

The primary goal of the capstone project is to increase net profit, optimize inventory management, and streamline goods flow. This will involve conducting a detailed analysis of sales data and fluctuations in purchase prices throughout the period. Identifying gaps and areas for improvement in the current strategy is crucial for achieving these objectives. The project will also entail a comprehensive analysis of sales data to uncover patterns and trends, allowing for the identification of top-performing and underperforming SKUs. This insight will inform the development of targeted marketing strategies to improve net sales and increase net profit.

Upon completing a thorough analysis, the project report will focus on providing recommendations to address the identified problem areas effectively. To facilitate the analysis of sales data and support informed decision-making, various Excel tools such as pivot tables, bar graphs, and line graphs will be utilized. These tools offer valuable graphical representations, aiding in the identification of trends, patterns, and key insights. By using Excel tools to analyze product performance, formulate recommendations, and develop data-driven marketing strategies, the project aims to optimize revenue generation.

2) **Detailed Explanation of Analysis Process/Method**:

2.1: Analysis of Sales and Purchase Data:

As mentioned above, MS Excel serves as the primary tool for conducting the analysis. Initially, sales data is collected from the bill book records along with prices of each product from "Kamal Store" over the period of 2 months.

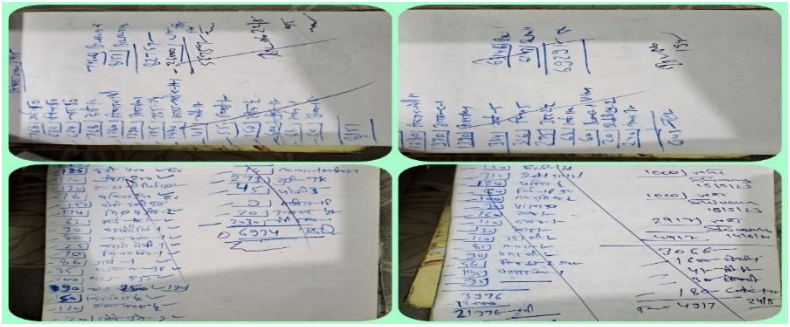


Figure-1: Shop's way to store data (Informal)

The collected data is subsequently entered into Excel, where basic data pre-processing tasks, such as handling missing values, correcting typing errors & sorting, are performed.

- The pre-processed sales data comprises a total of 31 columns. Among these, 1 column represents the date, the next 15 columns represent the sales quantity of each SKU, and the following 15 columns represents the selling price of each SKU on the given day.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Date	SALES QUANTITY														
	CHAKKI ATTA	MILL ATTA	RAW RICE	SELA RICE	ARHAR DAL	URAD DAL	MOONG DAL	CHOLE	RAJMA	COOKING OIL	REFINED	GHEE	CASHEW	MAKHANA	ELAICHI
1-Apr-24	10	3	40	31	14	13	7	10	3	28	17	8	9	10	10
2-Apr-24	10	4	39	31	13	14	7	10	3	28	17	6	8	10	11
3-Apr-24	11	4	41	29	10	15	8	12	4	27	18	7	8	9	7
4-Apr-24	10	2	40	30	12	15	9	14	3	35	19	4	9	8	11
5-Apr-24	10	3	42	29	13	15	8	15	3	24	16	6	8	8	10
6-Apr-24	11	4	38	32	14	15	7	13	4	25	17	7	10	7	12
7-Apr-24	10	3	39	30	9	16	10	12	5	25	16	8	8	8	13
8-Apr-24	12	3	39	30	10	16	10	11	4	26	19	5	8	7	12
9-Apr-24	10	3	40	29	11	11	9	10	3	29	19	7	10	8	10
10-Apr-24	10	4	42	28	12	13	6	14	5	30	20	8	9	7	10

Table-1: Data of Sales Quantity

A	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
Date	SELLING PRICE														
	CHAKKI ATTA	MILL ATTA	RAW RICE	SELA RICE	ARHAR DAL	URAD DAL	MOONG DAL	CHOLE	RAJMA	COOKING OIL	REFINED	GHEE	CASHEW	MAKHANA	ELAICHI
1-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹250	₹40
2-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹250	₹40
3-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹250	₹40
4-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹250	₹40
5-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹275	₹40
6-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹275	₹40
7-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹275	₹40
8-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹275	₹40
9-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹275	₹40
10-Apr-24	₹328	₹32	₹50	₹39	₹165	₹125	₹125	₹150	₹160	₹115	₹115	₹460	₹200	₹275	₹40

Table-2: Data of Selling Price

- Using the sales quantity and selling price, the revenue for each SKU on any given day, total daily revenue, and the average of sales quantity, selling price and revenue can be calculated using the following formulas:

Revenue = Sales Quantity * Selling Price

Total Daily Revenue = Σ (Revenue of SKU on any given day)

Average = Sum of values for each SKU / Number of days

- Similarly, purchase data has been collected for every SKU, which consists of purchase quantity and purchase price. Using this data, the cost is calculated for each SKU.

Date	PURCHASE QUANTITY														
	CHAKKI ATTA	MILL ATTA	RAW RICE	SELA RICE	ARHAR DAL	URAD DAL	MOONG DAL	CHOLE	RAJMA	COOKING OIL	REFINED	GHEE	CASHEW	MAKHANA	ELAICHI
1-Apr-24	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0
2-Apr-24	0	0	350	250	0	0	0	0	0	0	0	0	0	0	0
3-Apr-24	0	0	0	0	0	0	0	100	35	0	0	0	0	0	0
4-Apr-24	0	0	0	0	105	105	90	0	0	0	0	0	0	0	0
5-Apr-24	100	25	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Apr-24	0	0	0	0	0	0	0	0	0	245	145	0	300	275	400
7-Apr-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Apr-24	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0
9-Apr-24	0	0	350	250	0	0	0	0	0	0	0	0	0	0	0
10-Apr-24	0	0	0	0	0	0	0	100	35	0	0	0	0	0	0

Table-3: Data of Purchase Quantity

Date	PURCHASE PRICE														
	CHAKKI ATTA	MILL ATTA	RAW RICE	SELA RICE	ARHAR DAL	URAD DAL	MOONG DAL	CHOLE	RAJMA	COOKING OIL	REFINED	GHEE	CASHEW	MAKHANA	ELAICHI
1-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹225	₹30
2-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹225	₹30
3-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹225	₹30
4-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹225	₹30
5-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹250	₹30
6-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹250	₹30
7-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹250	₹30
8-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹250	₹30
9-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹250	₹30
10-Apr-24	₹318	₹29	₹46.5	₹37	₹155	₹110	₹110	₹138	₹140	₹110	₹109	₹430	₹180	₹250	₹30

Table-4: Data of Purchase Price

- Along with the cost, total daily cost, total cost, and average of purchase price for each SKU are calculated for 2 months using the following formulas:

Cost = Purchase Quantity * Purchase Price
Total Daily Cost = Σ (Cost of SKU on any given day)
Average = Sum of values for each SKU / Number of days

2.2: Enhancing Overall Business Profitability:

- During my discussion with the owner of Kamal Store, we identified that profits are declining due to high competition, the emergence of new shops, and the presence of online shopping. The inconsistency of profits poses challenges to the sustainability of the business.
- Therefore, our initial step was to assess the profitability of each day & each SKU at Kamal Store. To accomplish this, I utilized sales and purchase data to compute the profit/loss, profit/loss (%) & revenue (%) for each SKU on a daily basis using the

following formulas:

Profit/Loss = Revenue - Cost
Total Profit/Loss (%) = (Profit (SKU) / Total Profit) * 100
Total Revenue (%) = (Revenue (SKU) / Total Revenue) * 100

Product	Profit/Loss	Revenue	% of Total Profit/Loss	% of Total Revenue	Profit Margin %
CHAKKI ATTA	-₹ 22,622	₹ 2,09,146	-18%	13%	3%
MILL ATTA	-₹ 41	₹ 6,368	-0.03%	0.40%	9%
RAW RICE	₹ 10,460	₹ 1,22,850	8%	8%	7%
SELA RICE	₹ 5,846	₹ 74,314	5%	5%	5%
ARHAR DAL	₹ 11,138	₹ 1,13,118	9%	7%	5%
URAD DAL	₹ 11,535	₹ 91,095	9%	6%	10%
MOONG DAL	₹ 8,320	₹ 62,000	7%	4%	12%
CHOLE	₹ 11,294	₹ 1,11,380	9%	7%	10%
RAJMA	₹ 5,620	₹ 40,480	4%	3%	10%
COOKING OIL	₹ 13,520	₹ 2,05,115	11%	13%	13%
REFINED	₹ 8,418	₹ 1,24,005	7%	8%	4%
GHEE	₹ 15,310	₹ 1,62,100	12%	10%	5%
CASHEW	₹ 13,490	₹ 1,03,470	11%	7%	6%
MAKHANA	₹ 25,325	₹ 1,22,250	20%	8%	10%
ELAICHI	₹ 7,620	₹ 28,920	6%	2%	8%
	₹ 1,25,233	₹ 15,76,611			8%

Table-5: Profitability Analysis for each SKU's

A	B	C	D
Date	Total Revenue	Total Expenditure	Total Profit/ Loss
1-Apr-24	₹ 26,930	₹ 25,800	₹ 1,130
2-Apr-24	₹ 25,792	₹ 25,525	₹ 267
3-Apr-24	₹ 26,407	₹ 18,700	₹ 7,707
4-Apr-24	₹ 26,364	₹ 37,725	-₹ 11,361
5-Apr-24	₹ 25,917	₹ 32,525	-₹ 6,608
6-Apr-24	₹ 26,989	₹ 1,77,505	-₹ 1,50,516
7-Apr-24	₹ 26,546	₹ 0	₹ 26,546
8-Apr-24	₹ 25,822	₹ 25,800	₹ 22
9-Apr-24	₹ 26,142	₹ 25,525	₹ 617

Table-6: Profitability Analysis on any given day

- Given that there was initial inventory for every SKU at the beginning and end of the data collection period, the COGS of each SKU was determined using the following formula:

COGS = Initial Inventory + Purchases (Cost) – Ending Inventory

A	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
Date		COST														
	ELAICHI	CHAKKI ATTA	MILL ATTA	RAW RICE	SELA RICE	ARHAR DAL	URAD DAL	MOONG DAL	CHOLE	RAJMA	COOKING OIl	REFINED	GHEE	CASHEW	MAKHANA	ELAICHI
31-May-24	₹30	₹31,100	₹725	₹0	₹0	₹0	₹0	₹0	₹0	₹0	₹0	₹0	₹0	₹0	₹0	₹0
	₹30	₹2,82,600	₹6,525	₹1,46,475	₹86,250	₹1,54,980	₹1,09,200	₹89,100	₹1,16,400	₹44,100	₹2,05,625	₹1,29,190	₹2,44,200	₹1,01,500	₹1,37,500	₹24,000
	Initial Inventory	₹21,942	₹522	₹3,999	₹1,258	₹9,300	₹6,600	₹4,180	₹9,936	₹3,500	₹15,730	₹9,483	₹1,290	₹9,000	₹10,125	₹1,950
	Ending Inventory	₹72,774	₹638	₹38,084	₹19,040	₹62,300	₹36,240	₹39,600	₹26,250	₹12,740	₹29,760	₹23,086	₹98,700	₹20,520	₹50,700	₹4,650
	COGS	₹2,31,768	₹6,409	₹1,12,391	₹68,468	₹1,01,980	₹79,560	₹53,680	₹1,00,086	₹34,860	₹1,91,595	₹1,15,587	₹1,46,790	₹89,980	₹96,925	₹21,300

Table-7: COGS / Final Expenditure Analysis

- Finally, the cumulative profit was calculated for the Pareto chart:

i) Sort the profits of each SKU in descending order. ($P_1 >= P_2 >= P_3 >= \ldots >= P_n$)

ii) Calculate the cumulative profit as go down the sorted list. ($CP_i = P_1 + P_2 + \ldots + P_i$)

Product	% of Total Profit	Cumulative Profit %
MAKHANA	20.22%	20.22%
GHEE	12.23%	32.45%
COOKING OIL	10.80%	43.24%
CASHEW	10.77%	54.02%
URAD DAL	9.21%	63.23%
CHOLE	9.02%	72.24%
ARHAR DAL	8.89%	81.14%
RAW RICE	8.35%	89.49%
REFINED	6.72%	96.21%
MOONG DAL	6.64%	102.86%
ELAICHI	6.08%	108.94%
SELA RICE	4.67%	113.61%
RAJMA	4.49%	118.10%
MILL ATTA	-0.03%	118.06%
CHAKKI ATTA	-18.06%	100.00%

Table-8: Profit Analysis of each SKU for Pareto Chart

2.3: Inventory Optimization:

- After discussing with the owner, we learned that inventory management was the primary concern. The owner mentioned that there was an excessive accumulation of inventory at the end of each month, which made it challenging to purchase new stock due to inflation and lower profits.
- Inventory data was collected for every SKU on the first day of data collection (i.e., 1/4/24). Subsequently, inventory data was calculated using sales, purchases, and initial inventory, as described by the following formula:

Ending Inventory = Initial Inventory + Purchases (Qty.) – Sales (Qty.)

"THE ENDING INVENTORY OF THE PREVIOUS DAY WILL SERVE AS THE INITIAL INVENTORY FOR THE CURRENT DAY."

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Date	INVENTORY														
	CHAKKI ATTA	MILL ATTA	RAW RICE	SELA RICE	ARHAR DAL	URAD DAL	MOONG DAL	CHOLE	RAJMA	COOKING OIL	REFINED	GHEE	CASHEW	MAKHANA	ELAICHI
1-Apr-24	69	18	86	34	60	60	38	72	25	143	87	3	50	45	65
2-Apr-24	59	15	46	3	46	47	31	62	22	115	70	55	41	35	55
3-Apr-24	49	11	357	222	33	33	24	52	19	87	53	49	33	25	44
4-Apr-24	38	7	316	193	23	18	16	140	50	60	35	42	25	16	37
5-Apr-24	28	5	276	163	116	108	97	126	47	25	16	38	16	8	26
6-Apr-24	118	27	234	134	103	93	89	111	44	1	0	32	8	0	16
7-Apr-24	107	23	196	102	89	78	82	98	40	221	128	25	298	268	404
8-Apr-24	97	20	157	72	80	62	72	86	35	196	112	17	290	260	391
9-Apr-24	85	17	118	42	70	46	62	75	31	170	93	72	282	253	379
10-Apr-24	75	14	428	263	59	35	53	65	28	141	74	65	272	245	369

Table-9: Data of Inventory

Using inventory data, we calculate the total daily inventory, average daily inventory, and average inventory for each SKU using the following formulas:

Total Daily Inventory = Σ (Inventory of SKU on any given day)
Average Daily Inventory = Total Daily Inventory / Number of SKUs
Average (for each SKU) = Sum of values for each SKU / Number of days

A	Q	R
Date	TOTAL DAILY INVENTORY	AVERAGE DAILY INVENTORY
1-Apr-24	855	57
2-Apr-24	702	47
3-Apr-24	1091	73
4-Apr-24	1016	68
5-Apr-24	1095	73
6-Apr-24	1010	67
7-Apr-24	2159	144
8-Apr-24	1947	130
9-Apr-24	1795	120
10-Apr-24	2186	146

Table-10: Total & Average Inventory Analysis on any given day

2.3: Analysis of Fixed Costs:

- For Fixed Cost Analysis, cost of furniture, storage containers, CCTV Cameras were calculated for a period of 2 months (according to data) along with depreciation rates defined in AS.
- According to the data, total fixed cost (Net Book Value) was calculated using the following formula:

Net Book Value = Original Cost of Asset – Depreciation Expense
Depreciation Expense = (Original Cost of Asset * Depreciation Rate)/100
Total Fixed Cost = ∑ (Net Book Value)

A	B	C	D	E
FIXED COST ANALYSIS				
	Cost	Rate of Depreciation	Depreciation	Net Book Value
Furniture	₹ 1,80,000	15%	₹ 27,000	₹ 1,53,000
Storage Containers	₹ 22,000	40%	₹ 8,800	₹ 13,200
CCTV Cameras	₹ 47,000	40%	₹ 18,800	₹ 28,200
Salary Paid	₹ 32,000	100%	₹ 32,000	₹ 0
Electricity Paid	₹ 2,553	100%	₹ 2,553	₹ 0
Carry Bags	₹ 6,000	100%	₹ 6,000	₹ 0
Total Fixed Cost	₹ 2,89,553	Total Normalized Fixed Cost	₹ 95,153	₹ 1,94,400

Table-11: Normalized Fixed Cost Analysis

3) Results and Findings:

3.1: Analysis (Sales and Purchases):

The following graph shows the revenue generated on any given day over a period of 2 months from April to May.

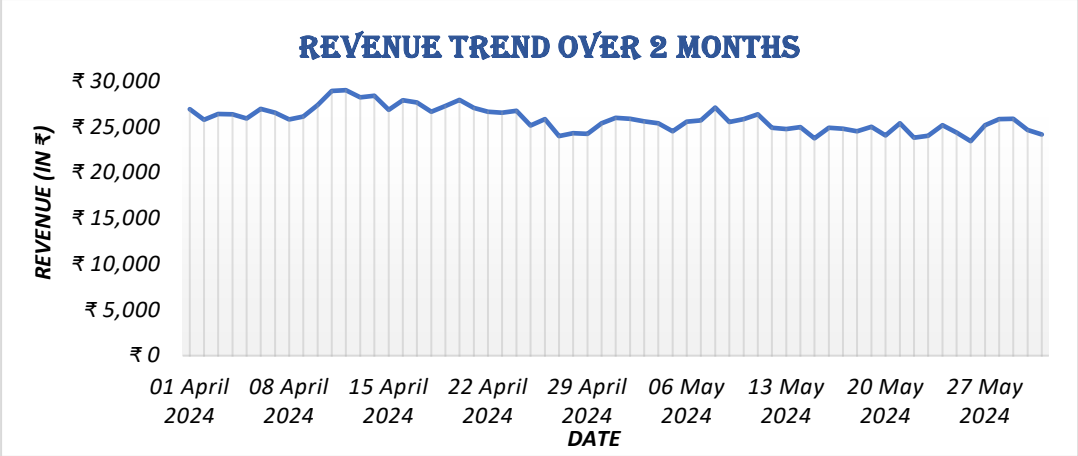


Chart-1: Revenue Trend over 2 months

- The revenue fluctuates significantly from day to day, indicating unpredictable variations in sales pattern. This could be due to various factors, such as demand cycles, promotional activities, or stock availability.
- The analysis indicates that the Average Daily Revenue stands at *₹25,846.08*, with a standard deviation of *₹1,327.74*. This high standard deviation suggests moderate revenue fluctuation around the average.
- Maximum revenue generated: *₹29,018*
- Minimum revenue generated: *₹23,443*
- Range = *₹5,575* which can be find by using formula,

Range = Max - Min

The following graph shows the revenue generated by each SKUs over a period of 2 months from April to May.

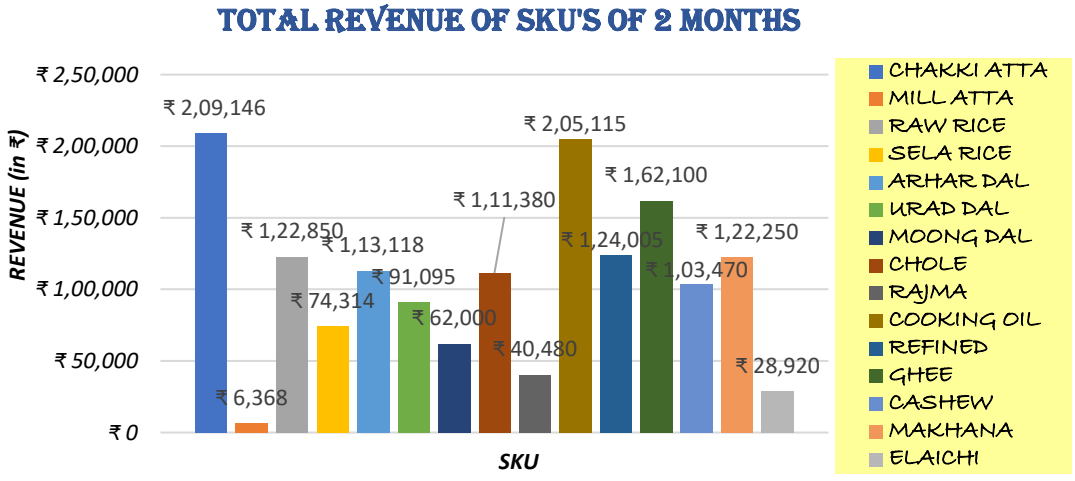


Chart-2: Total Revenue of SKU's of 2 months

- Maximum Revenue generated of *₹2,09,146* by SKU "Chakki Atta"

The following graph is to identify the most significant contributors to the Total revenue.

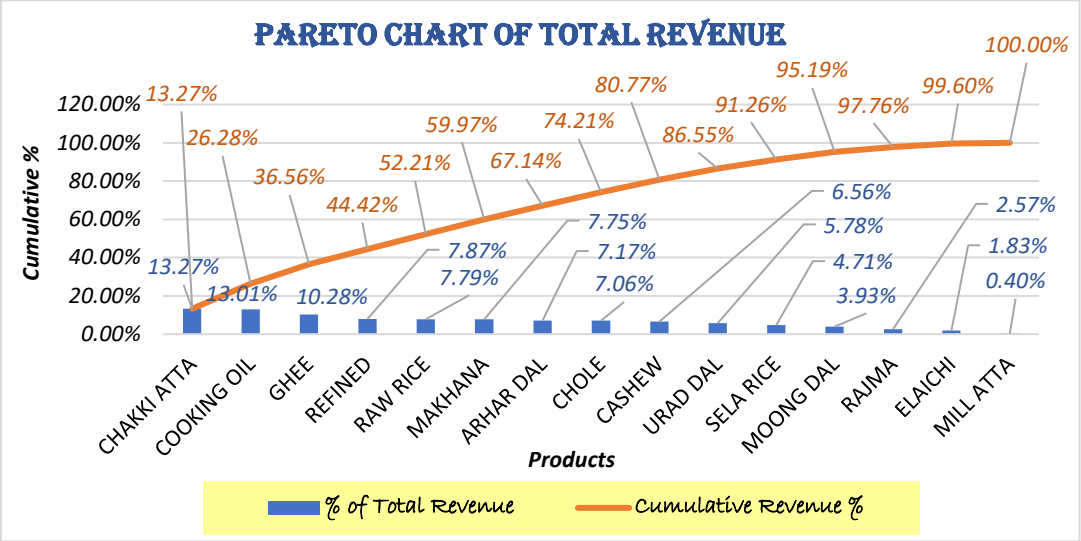


Chart-3: Pareto Chart of Total Revenue

- Based on above analysis, it is evident that "Chakki Atta", "Cooking Oil", "Ghee", "Refined", "Raw Rice", "Makhana", "Arhar Dal", "Chole", "Cashew" are the primary revenue generating SKUs for the shop. These nine SKUs contribute approximately 80% to the total revenue generated by the shop, as depicted on the Pareto chart.

The following graph illustrates the proportion of each SKU's contribution to the total revenue generated, as well as to the total sales volume of the shop over a period of 2 months from April to May.

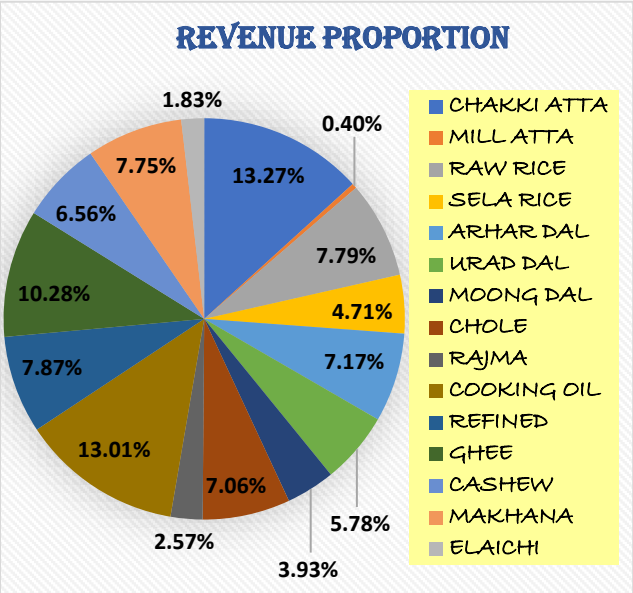


Chart-4: Revenue Proportion

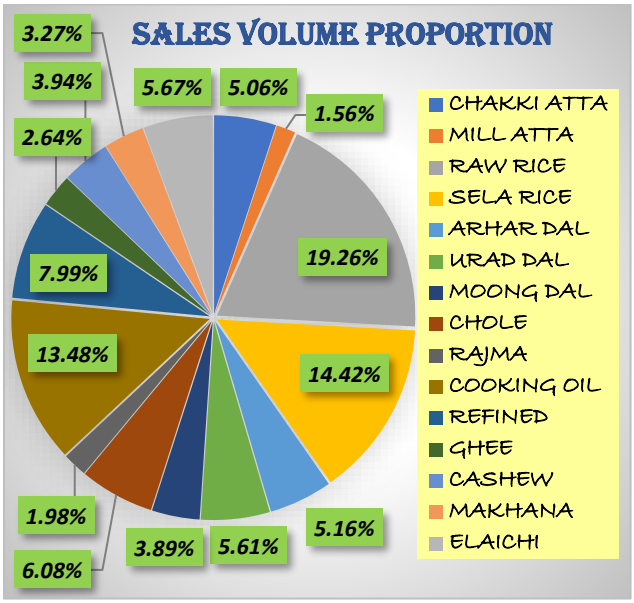


Chart-5: Sales Volume Proportion

From the above analysis, following observations can be made:

- "Chakki Atta": Dominates both revenue and volume, indicating a staple product with

high sales and good pricing.

- "Arhar Dal": High in both metrics, reflecting strong demand and good pricing.
- "Ghee": High revenue and volume indicate a popular, premium product.
- "Cooking Oil", "Raw Rice", "Mill Atta", "Moong Dal", "Sela Rice": Moderate contributions to both metrics, indicating stable and consistent demand.
- "Cashew": Higher revenue than volume, indicating a premium-priced product.
- "Refined", "Chole", "Rajma": Lower contributions in both, indicating lesser demand or competitive pricing.
- Makhana": Very low in both, indicating niche market.
- Elaichi: Low revenue despite moderate volume, suggesting lower pricing.

After Sales, to analyze the fluctuation or trend in purchase price, the below graph is plotted for the purchase price of each SKU over the period of 2 months.

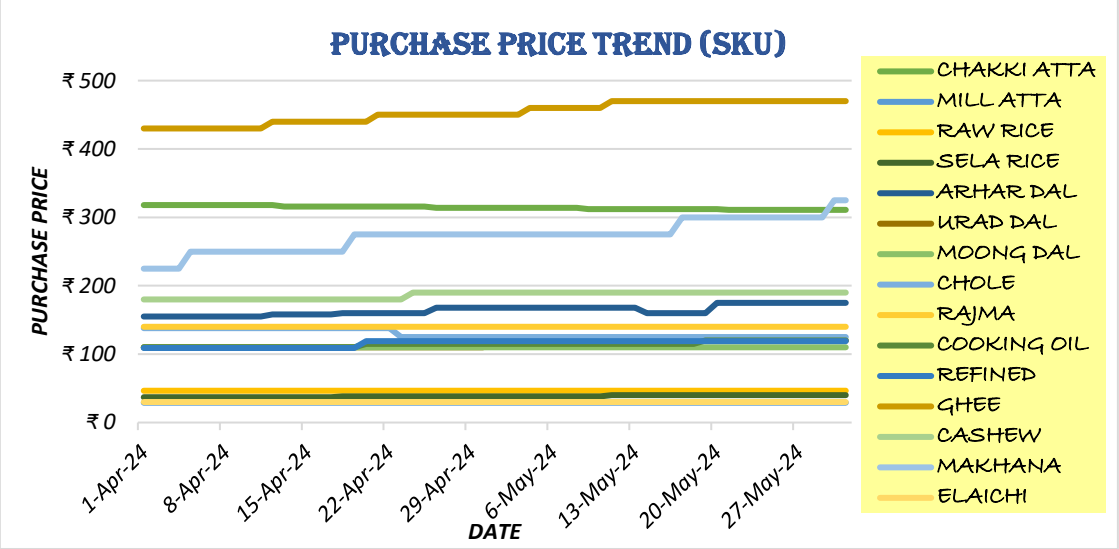


Chart-6: Purchase Price Trend

- Most SKUs have stable prices over the observed period, indicating consistent market conditions or supplier pricing strategies.
- "Ghee" is one of the highest-priced SKUs throughout the period, suggesting it is a premium product with higher production costs or demand.
- "Elaichi" and "Sela Rice" are significantly lower in price, indicating these might be budget or niche products with different market dynamics.
- "Ghee" shows a significant increase in its purchase price from approximately ₹430 to ₹470, suggesting a seasonal or supply-related price increase.
- "Makhana" shows a significant increase in its purchase price from approximately ₹225 to ₹325, indicating potential seasonal demand or supply constraints.

- Other SKUs, such as "Moong Dal" and "Arhar Dal", show minor price fluctuations, indicating possible market variability or supply chain adjustments.

Based on above analysis, below graph is plotted for Ghee Purchase quantity v/s Ghee Purchase price to analyze the buying decision made by the owner for this SKU.

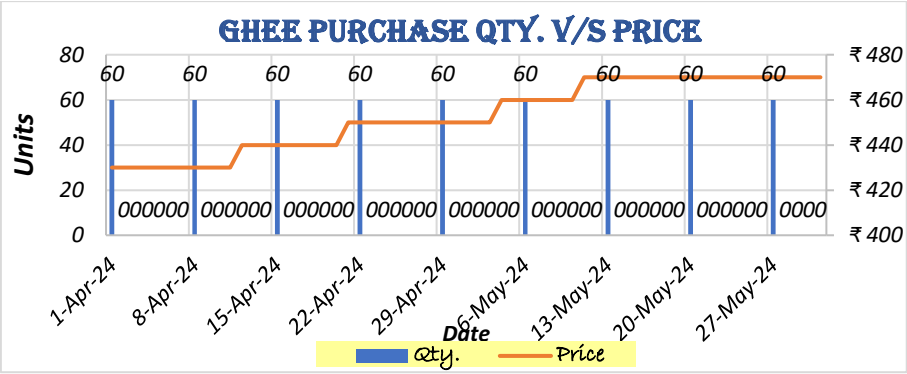
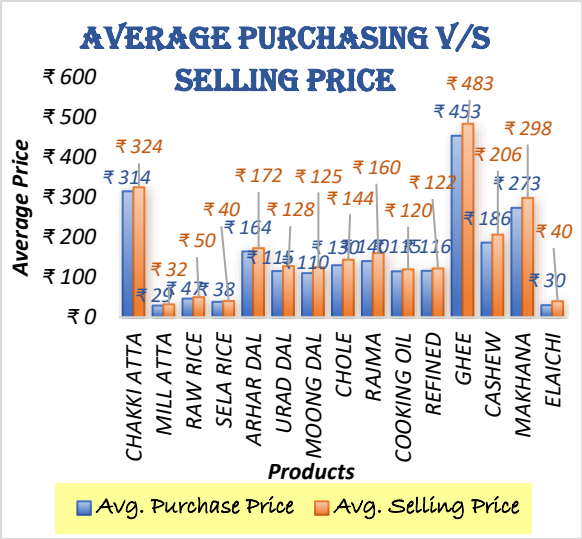


Chart-7: Ghee Purchase Quantity v/s Ghee Purchase Price

- The purchase volume remains consistent at 60 units throughout the observed period, despite the increase in purchase price from ₹420 to ₹470. This suggests bulk buying to maintain inventory levels or meet anticipated demand regardless of price fluctuations.
- The consistent purchase quantities despite increasing prices indicate that cost savings opportunities might not be the primary concern. The priority seems to be ensuring a steady supply of Ghee.
- There is no consistent pattern of buying at lower prices, suggesting that factors other than price, such as stable demand and inventory requirements, are driving the purchase decisions.

3.2: Profit/Loss Analysis:

The following graph illustrates the comparison between the average purchase price and the average selling price for each item in the shop. This comparison can be further utilized to calculate the average profit per item, facilitating the analysis of areas or SKUs that can be improved to increase net profit.



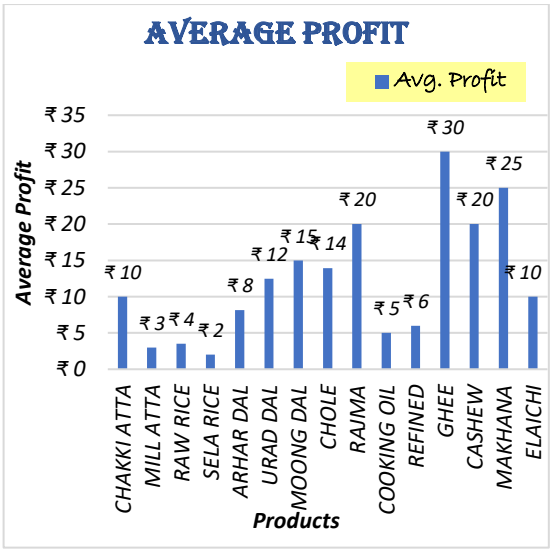


Chart-8: Average Purchase v/s Selling Price

Chart-9: Average Profit

- From the above graph, it can be observed that Ghee, Makhana and Cashew are the items with the highest profit-generating capacity. While their sales volume is relatively lower compared to other items, their high profit margin indicate that they are already significant contributors to the shop's total revenue. Therefore, to increase net profit, it may be beneficial to focus on maximizing the profit margin for these items or optimizing their sales strategies.

To further analyze, the following graph illustrates each SKU's contribution to profit compared to its contribution to revenue:

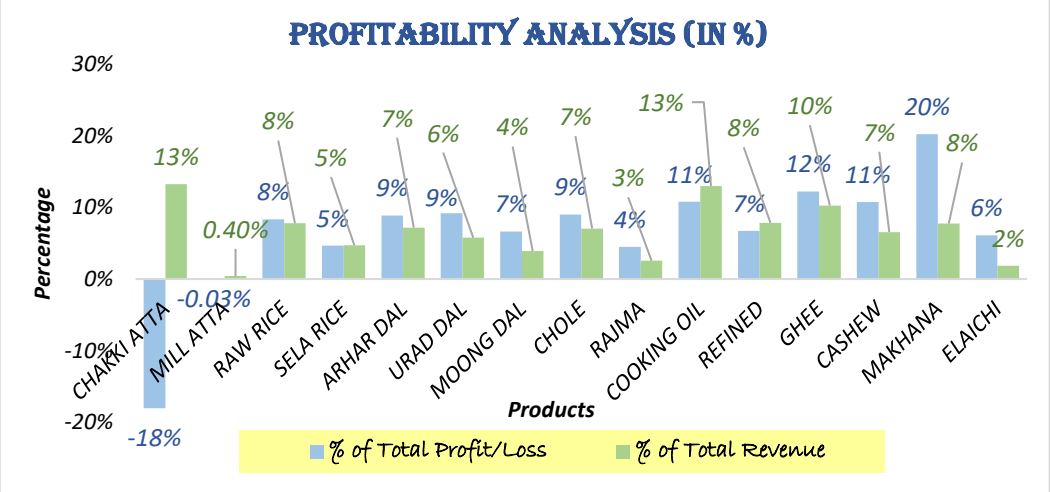


Chart-10: Profitability Analysis

- The above analysis validated our previous analysis about Ghee, Makhana and Cashew.

To validate our aforementioned findings, the following Pareto chart for total profit is plotted:

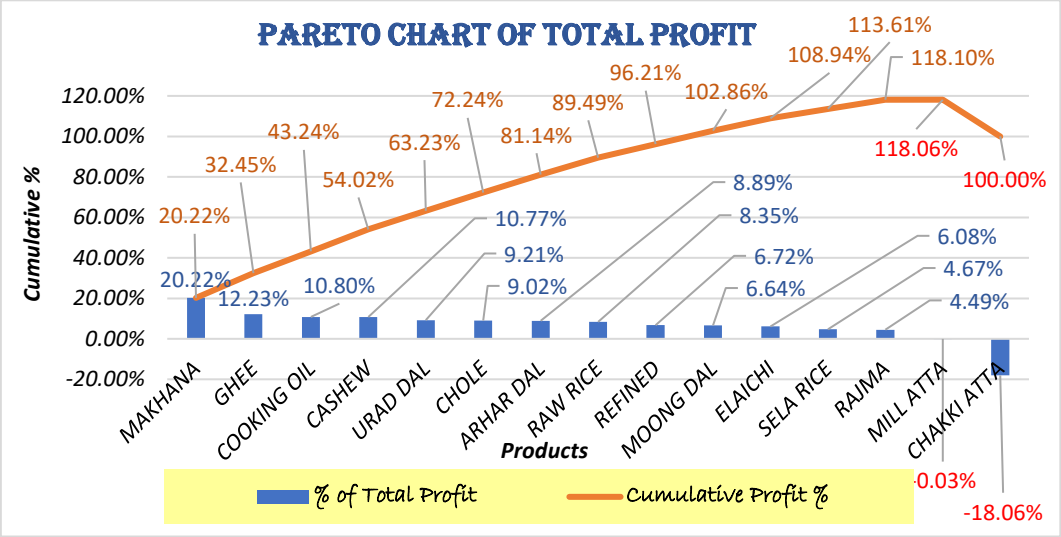


Chart-11: Pareto Chart of Total Profit

- From the above graph, we can see that Makhana, Ghee, Cooking Oil, Cashew, Urad Dal, Chole, Arhar Dal to be the 7 SKU contributing to the 80% of shop total profit.

Furthermore, below graph is generated to analyze the Gross Profit/Loss over the period of 2 months:

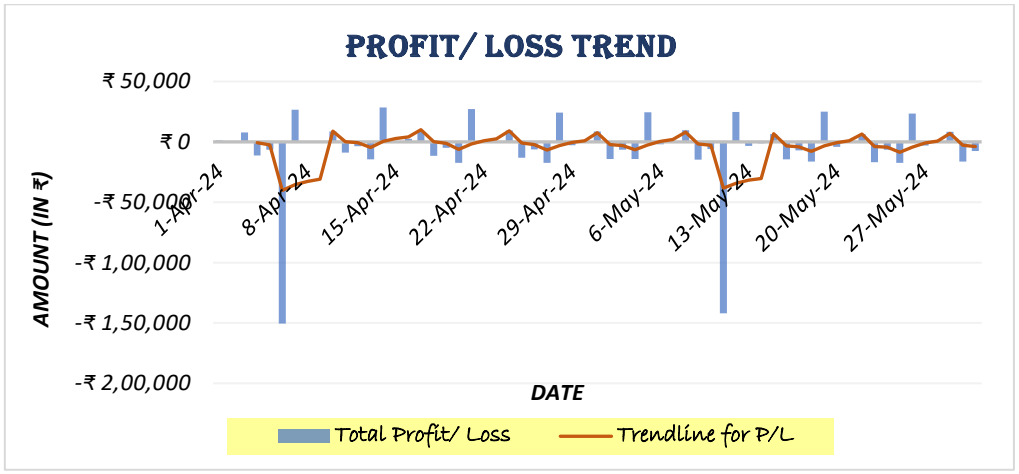


Chart-12: Profit/ Loss Trend

- There are significant dips into losses around the end of several months (e.g., around 8-Apr, 13-May). These sharp declines likely indicate periodic large expenses.
- The timing of the dips suggests they could be related to regular monthly expenses such as salaries, large inventory re-stocking purchases.
- The trendline for P/L shows fluctuations with recurring dips, indicating a pattern of cyclical expenses impacting profitability.

3.3: Inventory Analysis:

To start with inventory analysis, below graph represents the average stock in units for every item.

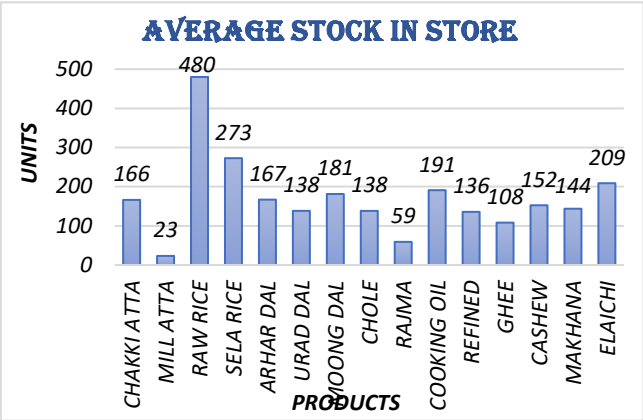


Chart-13: Average Stock in Store

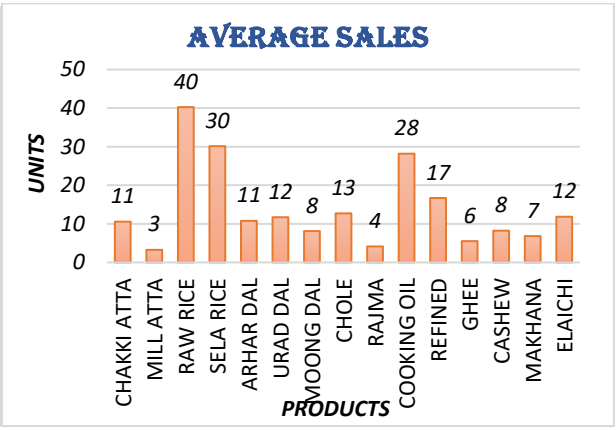


Chart-14: Average Sales

- After comparing the above avg. stock graph with the avg. sales of each item, it was found that items such as Raw Rice, Sela Rice, Moong Dal, Cooking Oil, and Elaichi have stock levels significantly higher than their average sales, indicating potential overstocking.

As per owner claim of inefficient inventory management, the below graph is plotted to analyze inventory fluctuation over the period of 2 months:

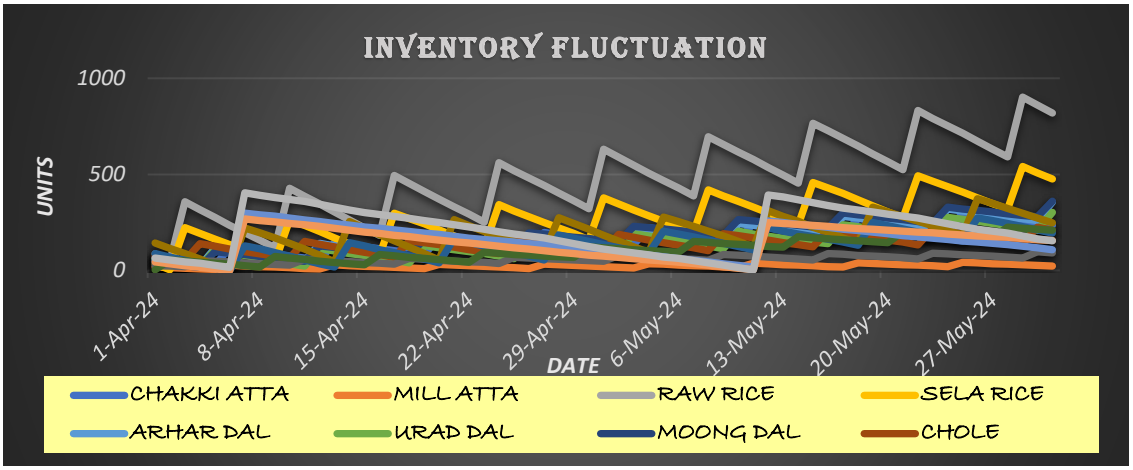


Chart-15: Inventory Fluctuation

- The high fluctuations across all SKUs indicate poor inventory planning. Despite restocking in response to demand, the persistent pattern of fluctuations suggests inefficiencies in inventory management.
- While restocking in response to low inventory levels is a good practice, the consistent high variance indicates that this approach may not be effectively managed. This could lead to increased holding costs and potential stockouts or overstocking.

3.4: Profit/Loss Insights:

A	B	C	D	E
FIXED COST ANALYSIS				
	Cost	Rate of Depreciation	Depreciation	Net Book Value
Furniture	₹ 1,80,000	15%	₹ 27,000	₹ 1,53,000
Storage Containers	₹ 22,000	40%	₹ 8,800	₹ 13,200
CCTV Cameras	₹ 47,000	40%	₹ 18,800	₹ 28,200
Salary Paid	₹ 32,000	100%	₹ 32,000	₹ 0
Electricity Paid	₹ 2,553	100%	₹ 2,553	₹ 0
Carry Bags	₹ 6,000	100%	₹ 6,000	₹ 0
Total Fixed Cost	₹ 2,89,553	Total Normalized Fixed Cost	₹ 95,153	₹ 1,94,400

Chart-16: Fixed Cost Analysis

To further analyze the net profit, we first calculate the fixed costs using the data provided by the owner.

- The above table provides us with Fixed cost analysis along with depreciation rate
- Items in above table can be majorly divided into two segments: Fixed Assets and Monthly Expenses
- From the above table, following calculations can be made:
  - Total Fixed Cost: *₹2,89,553*
  - Total Normalized Fixed Cost: *₹95,153*, which can be used to calculate "Net Profit" by using formula:

    Net Profit = Gross Profit – Total Normalized Fixed Cost

  - Net Profit: *₹30,080*

Further, the below graph is plotted to analyze Fixed Cost proportion:

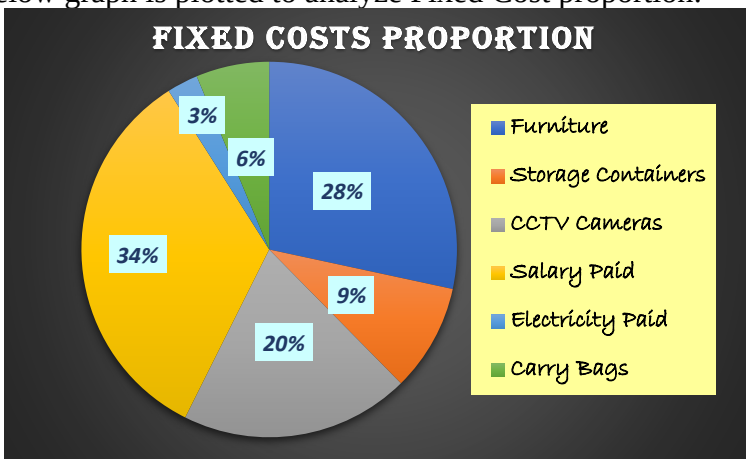


Chart-17: Fixed Cost Proportion

- From the above graph, it's evident that Salary and Electricity are the main contributors to the fixed costs. However, these expenses are essential for the shop's operation, there may not be much possibility for reduction.

4) Interpretation of Results and Recommendations:

4.1: Recommendation-1: Increase Sales of High-Profit Items

Based on the analysis, it is evident that Ghee, Cashew, and Makhana have significantly higher profit margins compared to other items. The shop owner can take advantage of this by increasing the sales of these items, resulting in higher profits and improve business performance.

Steps to Increase Sales of High-Profit Margin Items:

- Strategic Planning:
  - Review the pricing strategy to ensure it is competitive yet profitable.
- Promotion and Advertising:
  - Develop targeted advertising campaigns to highlight the benefits and quality of these items.
- Educational Outreach:
  - Educate customers on the benefits and proper usage of Ghee, Cashew, and Makhana.
- Incentivize Bulk Purchases:
  - Offer promotions or discounts for bulk purchases to encourage larger orders.

4.2: Recommendation-2: Optimize Inventory Levels

In line with the first recommendation, it is important to address items like Raw Rice, Sela Rice, Moong Dal, Cooking Oil, and Elaichi, which have stock levels significantly higher than their average sales, indicating potential overstocking. To optimize inventory and increase sales, implement the following strategies:

- Optimize Product Placement:
  - Ensure these items are prominently displayed and easily accessible to customers.
- Cross-Promotion:
  - Cross-promote these items with other popular or high-margin items to increase visibility and encourage additional sales.

- Create Bundle Deals:
    - Bundle these items with complementary products to encourage customers to purchase them together.

4.3: Recommendation-3: Adjust Inventory Re-order Level

The shop owner made poor decisions in purchasing certain items, resulting in significant overstocking. To avoid such situations and optimize inventory management, the following recommendations can be implemented:

- Time-based Restocking:
    - Restock inventory at fixed intervals to avoid last-minute purchasing decisions.
- Implement Minimum and Maximum Stock Levels:
    - Define minimum and maximum stock levels for each SKU to ensure optimal inventory levels. This helps in maintaining optimal inventory levels and preventing overstocking.
- Timing Restock with High Sales Periods:
    - Restock inventory slightly earlier than high sales periods to meet demand effectively. It helps to ensure sufficient inventory availability without excessive load or unnecessary risks.
- Demand Forecasting:
    - Use historical sales data and market trends to forecast demand accurately. This helps in making informed purchasing decisions and avoiding overstocking.

4.4: Recommendation-4: Optimize Financial Health

The analysis reveals that the shop's current ratio is 2.40, which indicates a relatively good liquidity position. However, there is always room for improvement to ensure long-term financial stability. The current ratio can be further improved by increasing current assets through enhanced sales strategies. (based on formula given below)

Current Ratio = Current Assets / Current Liabilities
Current Assets = Cash & cash equivalents + Debtors + Inventory
Current Liabilities = Creditors + Bank Overdraft + O/S Expense

Current Assets = ₹6,00,000

Current Liabilities = ₹2,50,000

Current Ratio = *2.40*

Considering the constraints of the scenario, where the majority of profits are allocated to essential expenses for running the business, reducing liabilities might not be a feasible option. Therefore, the focus should be on increasing sales to boost current assets.

4.5: Recommendation-5: Additional Measures

4.5.1: Implement Effective Pricing Strategies

To further boost profitability, consider implementing effective pricing strategies tailored to the business. Explore the following approaches:

- Bundle Pricing: Create bundled offers where related products are sold together at a discounted price. This strategy encourages customers to purchase multiple items and increases the overall value of each transaction.
- Promotional Pricing: Introduce periodic promotions, such as volume discounts, seasonal offers, or loyalty rewards, to incentivize purchases and attract customers. These promotional pricing tactics can drive sales during peak seasons and cultivate customer loyalty.

4.5.2: Enhance Shop Display and Visual Merchandising

Enhance the visual appeal of the shop and improve merchandising strategies to attract more customers:

- Strategic Product Placement: Showcase high-demand products prominently near the entrance or in high-traffic areas to capture customers' attention. Utilize eye-catching signage and displays to highlight featured products and promote their benefits.
- Interactive Demonstrations: Organize interactive demonstrations or workshops to educate customers about the effectiveness and usage of various products. This hands-on approach allows customers to experience the products firsthand and increases their confidence in making purchases.

By implementing the aforementioned recommendations, the shop owner can enhance profitability, optimize inventory levels, and further improve the current ratio. This will lead to a more financially stable business and improved overall performance.

5) Conclusion:

In conclusion, the analysis of Kamal Store's sales and purchase data has provided valuable insights and actionable recommendations to enhance profitability and optimize inventory management.

The analysis identified certain items, such as Ghee, Cashew, and Makhana, which have high-profit margins and represent significant opportunities for increasing sales. By implementing targeted marketing strategies, including seasonal promotions and partnerships with other businesses, the shop can capitalize on these high-profit items. Offering bulk sales and discounts can further incentivize customers to purchase larger quantities, thereby boosting sales volume and overall profitability.

Optimizing inventory management emerged as a crucial area for improvement. By restocking inventory earlier during high-sales periods and improving planning and forecasting, the shop can ensure sufficient stock availability without buildup or shortages. This proactive approach will help maintain customer satisfaction, reduce carrying costs, and enhance operational efficiency.

Additionally, the analysis highlighted the importance of making informed purchase decisions. Monitoring price fluctuations and market trends will enable the shop owner to avoid purchasing items at inflated prices, minimizing losses and increasing profitability.

The analysis of fixed costs identified areas of expenditure that require attention. Continuously evaluating and optimizing these costs will improve cost efficiency and maximize profit margins.

Moreover, recommendations to enhance store display and implement effective pricing strategies can contribute to increased customer attraction and sales. Strategic product placement, interactive demonstrations, and promotional pricing create a positive shopping experience and encourage additional purchases, leading to higher revenue and profitability.

By implementing these recommendations, Kamal Store can improve its financial performance, increase profitability, and strengthen its position in the market. It is crucial for the shop owner to continually monitor and evaluate the effectiveness of these strategies, making necessary adjustments to ensure long-term growth and sustainability.

6) Important Links:

Spreadsheet: Link-1: click here to open

Presentation: Link-2: click here to open

(I used Microsoft Excel & Microsoft PowerPoint, so please open these files in those apps.)