BUSINESS DATA MANAGEMENT CAPSTONE PROJECT

Optimizing Business Model of a Local Grocery Shop

Name – Om Aryan

Roll no. – 21F3002286

Declaration Statement

I am working on a Project Title **"Optimizing Business Model of a Local Grocery Shop"**. I extend my appreciation to **The Need Shop, Faridabad**, 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.

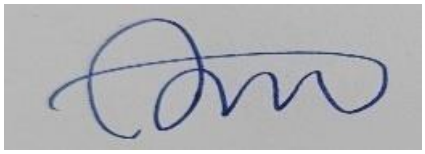
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

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: OM ARYAN

Date: 02-11-2024

Table of Contents

Executive Summary

The report discusses about the solutions of the challenges faced by The Need Shop, a small grocery shop located in Faridabad, Haryana. The major problems of the business include reduced footfall due to increased competition from online delivery applications and big supermarkets, along with the corresponding high-cost prices by the distributors which limit profit margins and other operational challenges such as increasing maintenance bills.

To elaborate on these challenges, the project studies into the issues through the various studies projecting different aspects of the issue, with visual projections in the form of tables and pie charts, among others. Additionally, a time series analysis is performed to illustrate the trend of sales turnover over 12 weeks explaining the changes in demand and profitability. It should also be noted that the overall analysis was hence made stronger with manual data cleaning, organization, and visualization, in order to highlight the strong patterns detected in this analysis.

The report is organized into four core sections that support its findings. The Analysis Process encompasses the work done in advance of the data analysis and the use of Excel Tools for the evaluation of business performance metrics and generating insights and accordingly making decisions. It also involves the numeric equations and computations applied to arrive at the results and conclusions. The Results and Findings portion gives quantitative information concerning the important commodities, patterns, and sales. These findings are further synthesized in the Interpretation of Results and Recommendations section, which contains feasible solutions to the existing problems of the business such as stock level optimization, high margin product orientation, and sales trends manipulations. The intended results promote better resource distribution, high customer retention, and consistent revenue expansion for the firm.

Detailed Explanation of Analysis Process/Methods

1. Data Collection and Preparation:

The primary data collection process developed by engaging the owner of the business in simple dialogues in a series of meetings in order to observe, record, and define the record-keeping practices in use, business model, business challenges, and the proposed or implement actions to address those challenges. This conversation helped me understand the

company's operational framework in brief along with its customer base. This paved the way for the understanding of the purchasing and selling behaviour of the business in an in-depth manner.

The business owner provided me with the data of Sales and Purchase for 12 weeks period for their Top selling 10 SKUs in informal/handwritten logs. This handwritten information is transformed into structured format in excel consisting of digital sheets manually for the purpose of enabling further analysis and interpretation of the information. The SKUs and their description with units are mentioned in Image 1.1. The Sales, Purchases and Inventory data is managed in different sheets in Excel for further analysis and get insights on the data provided by the business.

SKUs		
Category	Item Name	Description
Dairy & Bakery	Milk (1kg), Bread (1 unit) , Eggs (1 unit)	Basic dairy and bakery items
Snacks	Chocolates (1unit) , Snacks & Biscuits (1 unit), Chips & Wafers (1 unit)	Popular snack choices
Staples	Atta (5kg) , Pulses (1kg)	Essential household staples
Beverages	Beverages (1 unit)	Cold drinks and juices
Others	Cigarettes (1 unit)	Miscellaneous

Image 1.1 SKUs considered for Analysis

2. Data Analysis for Sales and Purchases:

In this analysis, I employed a combination of techniques based on Excel in order to extract knowledge from the data in an efficient manner for this analysis. Firstly, in order to summarize and organize the large amounts of information contained in the database, Pivot Tables were employed to help in the quick aggregation and filtration of data by SKU, time intervals measured weekly, and the values of purchases and sales. Pivot Tables gave a more categorical glance of the main trends occurring on the shop transactions and inventory flow. To have an in-depth analysis, I employed Descriptive Statistics to compute fundamental statistical measures such as Mean, standard deviation & range etc.

The Sales sheet includes three tables, Sold Quantity specifies the quantity sold for each SKU, Sales Amount includes Total Revenue/Sales generated by each SKU over a 12-week period and Selling Price table mentions the price of each SKU sold at. Each table is divided into 13 columns with first column as the SKU Name and rest 12 columns signify each week ranging from Week 1 to Week 12 whereas rows include the SKU names.

2.1 Statistical measures for Sales sheet

Sold Quantity														
SKUs	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	Total Sold Quantity	Avergae Sold Quantity
Milk & Dairy	1004	996	1071	985	1007	990	1109	1004	1010	985	998	1010	12169	1014.08
Bread	485	485	497	475	433	507	490	490	460	515	469	485	5791	482.58
Chocolates	48	49	42	40	69	77	65	54	36	48	40	38	606	50.5
Cigarettes	412	395	320	484	421	455	360	390	429	376	382	387	4811	400.92
Eggs	285	290	305	296	300	315	306	310	305	260	302	286	3560	296.67
Atta	49	15	20	54	10	25	63	15	30	30	44	49	404	33.67
Organic Pulses	13	9	12	15	16	7	9	10	14	12	20	4	141	11.75
Beverages	79	79	74	94	66	79	59	70	74	58	78	64	874	72.83
Snacks and Biscuits	33	33	30	30	25	47	42	43	24	33	32	28	400	33.33
Chips and Wafers	146	131	171	126	145	149	169	131	112	160	172	141	1753	146.08
Total Sold Quantity (Weekly)	2554	2482	2542	2599	2492	2651	2672	2517	2494	2477	2537	2492	30509	

Image 2.1.1. Sold Quantity table with statistical values

- Total Sold Quantity is calculated for each SKU by summing up all the sold quantity over 12-weeks period and for each week by adding sold quantities for each SKU in that specific week.

$$\text{Total Sold Quantity (SKU)} = \sum_{i=1}^{12} Q_{\text{Sold, SKU, Week } i}$$

$$\text{Total Sold Quantity (Week } i) = \sum_{j=1}^{10} Q_{\text{Sold, SKU } j\text{, Week } i}$$

where $Q_{Sold,SKU\ ,Week\ \ i}$ is Sold quantity of the specific SKU in week 'i',

$Q_{\text{Sold, SKU } j\text{, Week } i}$ is Sold quantity of SKU 'j' in week 'i'.

The Total Sold Quantity for all SKUs over 12-weeks period is **30509 units**.

- Average Sold Quantity is the average quantity sold of each SKU over 12-weeks period. It is calculated with the help of given formula:

$$\text{Average Sold Quantity (SKU j)} = \frac{\sum_{i=1}^{12} Q_{\text{Sold, SKU j, Week i}}}{12}$$

where $Q_{Sold,SKU\ \ j,Week\ \ i}$ is Sold quantity of SKU 'j' in week 'i'.

Selling Price (per unit)													
SKUs	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	Average Selling Price
Milk & Dairy	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 61.00	₹ 61.00	₹ 60.17
Bread	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00	₹ 50.00
Chocolates	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00	₹ 65.00
Cigarettes	₹ 15.00	₹ 15.00	₹ 15.00	₹ 15.00	₹ 15.00	₹ 15.00	₹ 15.00	₹ 16.00	₹ 16.00	₹ 16.00	₹ 16.00	₹ 16.00	₹ 15.42
Eggs	₹ 10.00	₹ 10.00	₹ 9.00	₹ 9.00	₹ 10.00	₹ 10.00	₹ 10.00	₹ 9.00	₹ 9.00	₹ 9.00	₹ 9.00	₹ 9.00	₹ 9.42
Atta	₹ 330.00	₹ 330.00	₹ 330.00	₹ 335.00	₹ 330.00	₹ 330.00	₹ 330.00	₹ 340.00	₹ 340.00	₹ 340.00	₹ 340.00	₹ 340.00	₹ 334.58
Organic Pulses	₹ 210.00	₹ 210.00	₹ 210.00	₹ 215.00	₹ 220.00	₹ 220.00	₹ 210.00	₹ 210.00	₹ 210.00	₹ 220.00	₹ 220.00	₹ 220.00	₹ 214.58
Beverages	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00	₹ 40.00
Snacks and Biscuits	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00	₹ 30.00
Chips and Wafers	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00	₹ 20.00

Image 2.1.2. Selling Price table with statistical values

- Average Selling Price is the measure calculated by calculating the mean of the selling price of a SKU considering range from Week 1 to Week 12. Formula used for calculating Average Selling Price:

$$\text{Average Selling Price (SKU } j) = \frac{\sum_{i=1}^{12} P_{\text{Selling, SKU } j\text{, Week } i}}{12}$$

where $P_{Selling,SKU\ j,Week\ i}$ is Selling price of SKU 'j' in a specific week 'i'.

	Sales Amount												
SKUs	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	Total Sales
Milk & Dairy	₹ 60,240.00	₹ 59,760.00	₹ 64,260.00	₹ 59,100.00	₹ 60,420.00	₹ 59,400.00	₹ 66,540.00	₹ 60,240.00	₹ 60,600.00	₹ 59,100.00	₹ 60,878.00	₹ 61,610.00	₹ 7,32,148.00
Bread	₹ 24,250.00	₹ 24,250.00	₹ 24,850.00	₹ 23,750.00	₹ 21,650.00	₹ 25,350.00	₹ 24,500.00	₹ 24,500.00	₹ 23,000.00	₹ 25,750.00	₹ 23,450.00	₹ 24,250.00	₹ 2,89,550.00
Chocolates	₹ 3,120.00	₹ 3,185.00	₹ 2,730.00	₹ 2,600.00	₹ 4,485.00	₹ 5,005.00	₹ 4,225.00	₹ 3,510.00	₹ 2,340.00	₹ 3,120.00	₹ 2,600.00	₹ 2,470.00	₹ 39,390.00
Cigarettes	₹ 6,180.00	₹ 5,925.00	₹ 4,800.00	₹ 7,260.00	₹ 6,315.00	₹ 6,825.00	₹ 5,400.00	₹ 6,240.00	₹ 6,864.00	₹ 6,016.00	₹ 6,112.00	₹ 6,192.00	₹ 74,129.00
Eggs	₹ 2,850.00	₹ 2,900.00	₹ 2,745.00	₹ 2,664.00	₹ 3,000.00	₹ 3,150.00	₹ 3,060.00	₹ 2,790.00	₹ 2,745.00	₹ 2,340.00	₹ 2,718.00	₹ 2,574.00	₹ 33,536.00
Atta	₹ 16,170.00	₹ 4,950.00	₹ 6,600.00	₹ 18,090.00	₹ 3,300.00	₹ 8,250.00	₹ 20,790.00	₹ 5,100.00	₹ 10,200.00	₹ 10,200.00	₹ 14,960.00	₹ 16,660.00	₹ 1,35,270.00
Organic Pulses	₹ 2,730.00	₹ 1,890.00	₹ 2,520.00	₹ 3,225.00	₹ 3,520.00	₹ 1,540.00	₹ 1,890.00	₹ 2,100.00	₹ 2,940.00	₹ 2,640.00	₹ 4,400.00	₹ 880.00	₹ 30,275.00
Beverages	₹ 3,160.00	₹ 3,160.00	₹ 2,960.00	₹ 3,760.00	₹ 2,640.00	₹ 3,160.00	₹ 2,360.00	₹ 2,800.00	₹ 2,960.00	₹ 2,320.00	₹ 3,120.00	₹ 2,560.00	₹ 34,960.00
Snacks and Biscuits	₹ 990.00	₹ 990.00	₹ 900.00	₹ 900.00	₹ 750.00	₹ 1,410.00	₹ 1,260.00	₹ 1,290.00	₹ 720.00	₹ 990.00	₹ 960.00	₹ 840.00	₹ 12,000.00
Chips and Wafers	₹ 2,920.00	₹ 2,620.00	₹ 3,420.00	₹ 2,520.00	₹ 2,900.00	₹ 2,980.00	₹ 3,380.00	₹ 2,620.00	₹ 2,240.00	₹ 3,200.00	₹ 3,440.00	₹ 2,820.00	₹ 35,060.00
Total Sales	₹ 1,22,610.00	₹ 1,09,630.00	₹ 1,15,785.00	₹ 1,23,869.00	₹ 1,08,980.00	₹ 1,17,070.00	₹ 1,33,405.00	₹ 1,11,190.00	₹ 1,14,609.00	₹ 1,15,676.00	₹ 1,22,638.00	₹ 1,20,856.00	₹ 14,16,318.00
Monthly Sales		₹ 4,71,894.00				₹ 4,70,645.00				₹ 4,73,779.00			
Average Sales	₹ 1,18,026.50			Max Sales	₹ 1,33,405.00			Min Sales	₹ 1,08,980.00			Standard Deviation	7026.799485

Image 2.1.3. Sales Amount table with statistical values

- Total Sales is the amount calculated for each SKU by summing up all the sold quantity amount over 12-weeks period and for each week by adding sold quantity amount for each SKU in that specific week.

$$\text{Total Sales for Each SKU } (j) = \sum_{i=1}^{12} Q_{\text{Sold, SKU } j\text{, Week } i} \cdot P_{\text{Selling, SKU } j\text{, Week } i}$$

$$\text{Total Sales for Each Week } (i) = \sum_{j=1}^{10} Q_{\text{Sold, SKU } j\text{, Week } i} \cdot P_{\text{Selling, SKU } j\text{, Week } i}$$

where $Q_{Sold,SKU\ j,Week\ i}$ is Sold quantity of SKU 'j' in week 'i',

$P_{Selling,SKU\ j,Week\ i}$ is Selling price of SKU 'j' in a specific week 'i'.

The total Sales Amount of the business for 3 months is **₹14,16,318**.

- Monthly Sales is simply calculated by summing up the Total Sales Amount of four weeks. The Monthly Sales for consecutive three months are ₹4,71,894, ₹4,70,645, and ₹4,73,779 respectively.
- Maximum and Minimum Sales is calculated by using the inbuilt Excel functions MAX and MIN which considers the Total sales for each week. According to the calculation, maximum sales is ₹1,33,405 and minimum sales is ₹1,08,980.
- Average and Standard Deviation is calculated by using AVERAGE and STDEV Excel functions considering the Total sales made in each week. Standard deviation is a measure of the amount of variation or dispersion of a set of data points. The Average sales is ₹1,18,026 and standard deviation is 7026.79

2.2 Statistical measures for Purchases sheet

SKUs	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	Total Purchased Quantity
Milk & Dairy	1010	1000	1080	995	1000	980	1100	1010	1005	990	1000	1020	12190
Bread	490	490	500	475	430	510	480	495	470	500	475	490	5805
Chocolates	50	50	45	40	70	75	65	50	40	50	35	40	610
Cigarettes	420	390	330	470	425	460	360	395	415	380	380	400	4825
Eggs	300	280	285	310	285	320	300	310	320	280	280	275	3545
Atta	50	15	20	55	10	25	60	15	30	30	45	50	405
Organic Pulses	15	5	15	15	15	5	10	10	15	10	20	5	140
Beverages	80	80	75	95	65	80	60	70	75	60	70	65	875
Snacks and Biscuits	35	35	30	25	25	50	45	45	25	30	30	25	400
Chips and Wafers	150	135	160	130	145	145	170	135	125	145	170	145	1755
Total Purchased Quantity (Weekly)	2600	2480	2540	2610	2470	2650	2650	2535	2520	2475	2505	2515	30550

Image 2.2.1. Purchased Quantity table with statistical values

- Total Purchased Quantity is calculated for each SKU by summing up all the purchased quantity over 12-weeks period and for each week by adding purchased quantities for each SKU in that specific week.

$$\text{Total Purchased Quantity (SKU)} = \sum_{i=1}^{12} Q_{\text{Purchased, SKU, Week } i}$$

$$\text{Total Purchased Quantity (Week } i) = \sum_{j=1}^{10} Q_{\text{Purchased, SKU } j\text{, Week } i}$$

where $Q_{\text{Purchased }, SKU\ , Week\ \ i}$ is Purchased quantity of the specific SKU in week 'i',

$Q_{\text{Purchased , SKU } j\text{, Week } i}$ is Purchased quantity of SKU 'j' in week 'i'.

The Total Purchased Quantity for all SKUs over 12-weeks period is **30550 units**.

SKUs	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	Average Cost Price
Milk & Dairy	₹ 59.00	₹ 59.00	₹ 59.00	₹ 59.00	₹ 59.00	₹ 59.50	₹ 59.50	₹ 59.50	₹ 59.50	₹ 59.50	₹ 60.00	₹ 60.00	₹ 59.38
Bread	₹ 46.00	₹ 46.00	₹ 46.00	₹ 46.00	₹ 46.00	₹ 46.00	₹ 47.00	₹ 47.00	₹ 47.00	₹ 47.00	₹ 47.00	₹ 47.00	₹ 46.50
Chocolates	₹ 58.00	₹ 58.00	₹ 58.50	₹ 58.50	₹ 58.50	₹ 58.50	₹ 58.50	₹ 60.00	₹ 60.00	₹ 60.00	₹ 60.00	₹ 61.00	₹ 59.13
Cigarettes	₹ 13.00	₹ 13.00	₹ 13.00	₹ 13.00	₹ 13.00	₹ 14.00	₹ 14.00	₹ 14.00	₹ 15.00	₹ 15.00	₹ 15.50	₹ 15.50	₹ 14.00
Eggs	₹ 8.00	₹ 8.00	₹ 7.50	₹ 7.50	₹ 8.00	₹ 8.50	₹ 8.00	₹ 7.00	₹ 7.00	₹ 7.00	₹ 7.50	₹ 8.00	₹ 7.67
Atta	₹ 280.00	₹ 280.00	₹ 290.00	₹ 295.00	₹ 290.00	₹ 290.00	₹ 290.00	₹ 300.00	₹ 300.00	₹ 300.00	₹ 310.00	₹ 310.00	₹ 294.58
Organic Pulses	₹ 170.00	₹ 170.00	₹ 170.00	₹ 190.00	₹ 190.00	₹ 190.00	₹ 185.00	₹ 185.00	₹ 185.00	₹ 190.00	₹ 190.00	₹ 190.00	₹ 183.75
Beverages	₹ 38.00	₹ 38.00	₹ 38.00	₹ 38.00	₹ 39.00	₹ 39.00	₹ 39.00	₹ 39.00	₹ 39.00	₹ 39.00	₹ 39.00	₹ 39.00	₹ 38.67
Snacks and Biscuits	₹ 28.00	₹ 28.00	₹ 28.00	₹ 28.00	₹ 28.00	₹ 29.00	₹ 29.00	₹ 29.50	₹ 29.50	₹ 29.50	₹ 29.50	₹ 29.50	₹ 28.79
Chips and Wafers	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.00	₹ 18.50	₹ 18.50	₹ 18.08

Image 2.2.2. Purchased Quantity table with statistical values

- Average Cost Price is the measure calculated by calculating the mean of the cost price of a SKU offered by the distributors ranging from Week 1 to Week 12. Formula used for calculating Average Cost Price:

$$\text{Average Cost Price (SKU } j) = \frac{\sum_{i=1}^{12} P_{\text{Cost, SKU } j\text{, Week } i}}{12}$$

Purchase Amount													
SKUs	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	Total Expenditure
Milk & Dairy	₹59,590.00	₹59,000.00	₹63,720.00	₹58,705.00	₹59,000.00	₹58,310.00	₹65,450.00	₹60,095.00	₹59,797.50	₹58,905.00	₹60,000.00	₹61,200.00	₹7,23,772.50
Bread	₹22,540.00	₹22,540.00	₹23,000.00	₹21,850.00	₹19,780.00	₹23,460.00	₹22,560.00	₹23,265.00	₹22,090.00	₹23,500.00	₹22,325.00	₹23,030.00	₹2,69,940.00
Chocolates	₹2,900.00	₹2,900.00	₹2,632.50	₹2,340.00	₹4,095.00	₹4,387.50	₹3,802.50	₹3,000.00	₹2,400.00	₹3,000.00	₹2,100.00	₹2,440.00	₹35,997.50
Cigarettes	₹5,460.00	₹5,070.00	₹4,290.00	₹6,110.00	₹5,525.00	₹6,440.00	₹5,040.00	₹5,530.00	₹6,225.00	₹5,700.00	₹5,890.00	₹6,200.00	₹67,480.00
Eggs	₹2,400.00	₹2,240.00	₹2,137.50	₹2,325.00	₹2,280.00	₹2,720.00	₹2,400.00	₹2,170.00	₹2,240.00	₹1,960.00	₹2,100.00	₹2,200.00	₹27,172.50
Atta	₹14,000.00	₹4,200.00	₹5,800.00	₹16,225.00	₹2,900.00	₹7,250.00	₹17,400.00	₹4,500.00	₹9,000.00	₹9,000.00	₹13,950.00	₹15,500.00	₹1,19,725.00
Organic Pulses	₹2,550.00	₹850.00	₹2,550.00	₹2,850.00	₹2,850.00	₹950.00	₹1,850.00	₹1,850.00	₹2,775.00	₹1,900.00	₹3,800.00	₹950.00	₹25,725.00
Beverages	₹3,040.00	₹3,040.00	₹2,850.00	₹3,610.00	₹2,535.00	₹3,120.00	₹2,340.00	₹2,730.00	₹2,925.00	₹2,340.00	₹2,730.00	₹2,535.00	₹33,795.00
Snacks and Biscuits	₹980.00	₹980.00	₹840.00	₹700.00	₹700.00	₹1,450.00	₹1,305.00	₹1,327.50	₹737.50	₹885.00	₹885.00	₹737.50	₹11,527.50
Chips and Wafers	₹2,700.00	₹2,430.00	₹2,880.00	₹2,340.00	₹2,610.00	₹2,610.00	₹3,060.00	₹2,430.00	₹2,250.00	₹2,610.00	₹3,145.00	₹2,682.50	₹31,747.50
Total Expenditure	₹1,16,160.00	₹1,03,250.00	₹1,10,700.00	₹1,17,055.00	₹1,02,275.00	₹1,10,697.50	₹1,25,207.50	₹1,06,897.50	₹1,10,440.00	₹1,09,800.00	₹1,16,925.00	₹1,17,475.00	₹13,46,882.50
Monthly Ependiture	₹4,47,165.00				₹4,45,077.50				₹4,54,640.00				

Image 2.2.3. Purchase Amount table with statistical values

- Total Expenditure is the amount calculated for each SKU by summing up all the purchased quantity amount over 12-weeks period and for each week by adding purchased quantity amount for each SKU in that specific week. It can be calculated with the help of given formula:

$$\text{Total Expense for Each SKU}(j) = \sum_{i=1}^{12} Q_{\text{purchased, SKU } j\text{, Week } i} \cdot P_{\text{Cost, SKU } j\text{, Week } i}$$

$$\text{Total Expense for Each Week}(i) = \sum_{j=1}^{10} Q_{\text{purchased, SKU } j\text{, Week } i} \cdot P_{\text{Cost, SKU } j\text{, Week } i}$$

where $Q_{Purchased,SKU\ \ j,Week\ \ i}$ is Purchased quantity of SKU 'j' in week 'i',

$P_{Cost,SKU\ \ j,Week\ \ i}$ is Cost price of SKU 'j' in a specific week 'i'.

The total expenditure of the business for 3 months is **₹13,46,882**.

- Monthly Expenditure is simply calculated by summing up the Total Expenditure of four weeks. The Monthly Expenditure for consecutive three months is ₹4,47,165, ₹4,45,077, and ₹4,54,640 respectively.

2.3 Inventory optimization

Inventory											
WEEK	Milk	Bread	Chocolates	Cigarettes	Eggs	Atta	Pulses	Beverages	Snacks and Biscuits	Chips and Wafers	Total Inventory
Week 1	3	2	2	12	32	2	4	1	3	7	68
Week 2	7	7	3	7	22	2	0	2	5	11	66
Week 3	16	10	6	17	2	2	3	3	5	0	64
Week 4	26	10	6	3	16	3	3	4	0	4	75
Week 5	19	7	7	7	1	3	2	3	0	4	53
Week 6	9	10	5	12	6	3	0	4	3	0	52
Week 7	0	0	5	12	0	0	1	5	6	1	30
Week 8	6	5	1	17	0	0	1	5	8	5	48
Week 9	1	15	5	3	15	0	2	6	9	18	74
Week 10	6	0	7	7	35	0	0	8	6	3	72
Week 11	8	6	2	5	13	1	0	0	4	1	40
Week 12	18	11	4	18	2	2	1	1	1	5	63
Average Inventory	9.92	6.92	4.42	10	12	1.5	1.42	3.5	4.17	4.92	

Image 2.3.1 Inventory table with statistical values

- Total Inventory and Average Inventory is calculated using the SUM and AVERAGE available in Excel. Inventory table includes the Initial and Final inventory outstanding from week 1 to week 12 for each SKU. For instance, initial inventory for Milk is 3 and closing inventory is 7 which is the opening inventory for next week. This statistical measure helps the business to predict stockouts and also prevent over stocked inventory.

2.4 P/L Analysis and Insights:

SKUs	Milk	Bread	Chocolates	Cigarettes	Eggs	Atta	Pulses	Beverages	Snacks and Biscuits	Chips and Wafers	
Average Cost Price	₹59.37	₹46.50	₹59.12	₹14.00	₹7.67	₹294.58	₹183.75	₹38.67	₹28.79	₹18.08	
Average Selling Price	₹60.17	₹50.00	₹65.00	₹15.42	₹9.42	₹334.58	₹214.58	₹40.00	₹30.00	₹20.00	
Average Profit	₹0.80	₹3.50	₹5.88	₹1.42	₹1.75	₹40.00	₹30.83	₹1.33	₹1.21	₹1.92	
Margin of Profit	1.33%	7.00%	9.05%	9.21%	18.58%	11.96%	14.37%	3.33%	4.03%	9.60%	8.84%
P/L	₹8,375.50	₹19,610.00	₹3,392.50	₹6,649.00	₹6,363.50	₹15,545.00	₹4,550.00	₹1,165.00	₹472.50	₹3,312.50	₹69,435.50
Percentage of Total P/L	12.06%	28.24%	4.89%	9.58%	9.16%	22.39%	6.55%	1.68%	0.68%	4.77%	
Percentage of Total Sales	51.69%	20.44%	2.78%	5.23%	2.37%	9.55%	2.14%	2.47%	0.85%	2.48%	

Image 3.1 P/L table with statistical values

This section includes the information/insight generated from the collected data from the business and arranged into different sheets. This sheet includes major insights like Average Cost Price, Average Selling Price, Average Profit and many more. It also includes Margin earned by the business on selling each SKU which would help the business to get the insight about highest selling SKU and the SKUs with most margin of profit. The insights and their explanation are discussed below:

- Average Cost Price and Selling Price is defined as the mean of cost price and selling price respectively over 12 weeks for each SKU. The values added in this sheet is taken from the Purchases table as specified on Page 8.
- Average Profit is calculated by subtracting to average selling price from average cost price which give us the margin in rupees the business earns on a SKU. It is calculated using the AVERAGE function is Excel.
- Margin of Profit is the percentage of margin secured by the business on each SKU. As seen in Image 3.1, Eggs have the highest margin with 18.58%, followed by Organic Pulses with 11.96% and least margin on Milk which is also the highest selling product of the business. Average Margin of Profit is nearly **8.84%.**

- Profit/Loss is defined as the profit earned by the business on each SKU in the period of 3 months. BREAD provided the highest revenue to the business followed by ATTA. Total Profit earned by the business in 3 months is **₹69,435**. Further this report will analyse the fixed assets of the business which will be considered for final profit/loss insights.
- Percentage of Total P/L is the percentage profit of the given SKU from the total profit generated i.e. ₹69,435.
- Percentage of Total Sales is calculated by dividing the Sales of particular SKU by the total sales made in the given time span. It calculated using the given formula:

```
=Sales!N$17 / Sales!N$27
```

Results and Findings

1. Profit Analysis

The main problems highlighted by the business mentioned high-cost prices of the SKU provided by the distributors which resulted in low margin on each product sales which cuts down the profit. In this section, we will provide analysis and insights to overcome this problem and possible recommendations we can generate from these charts.

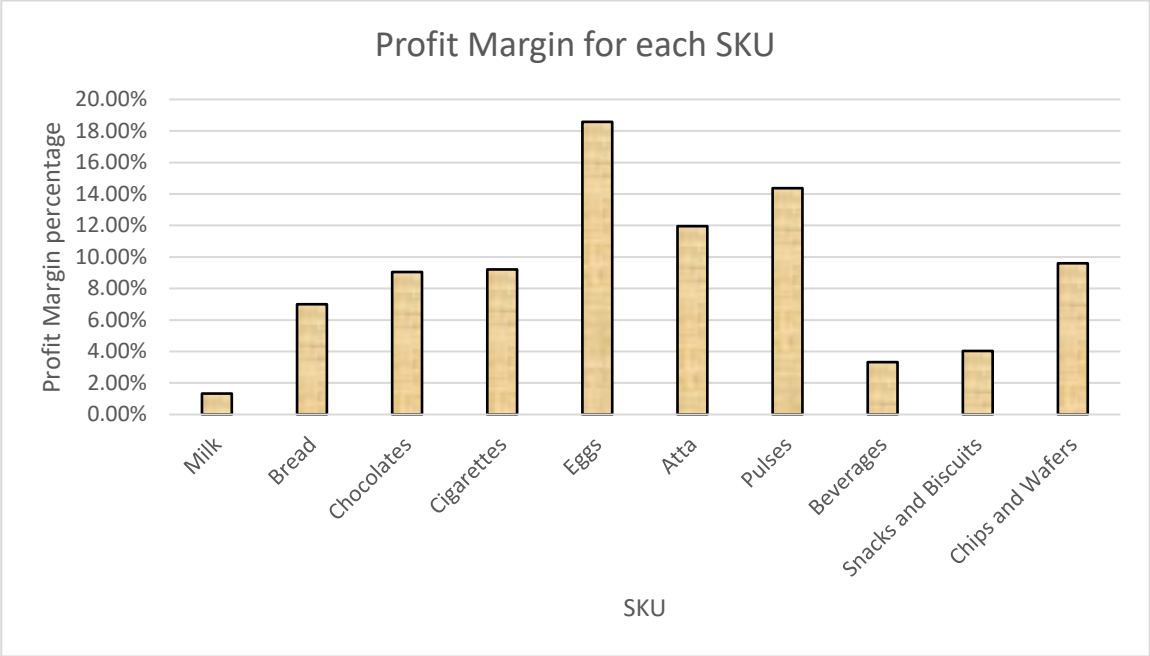
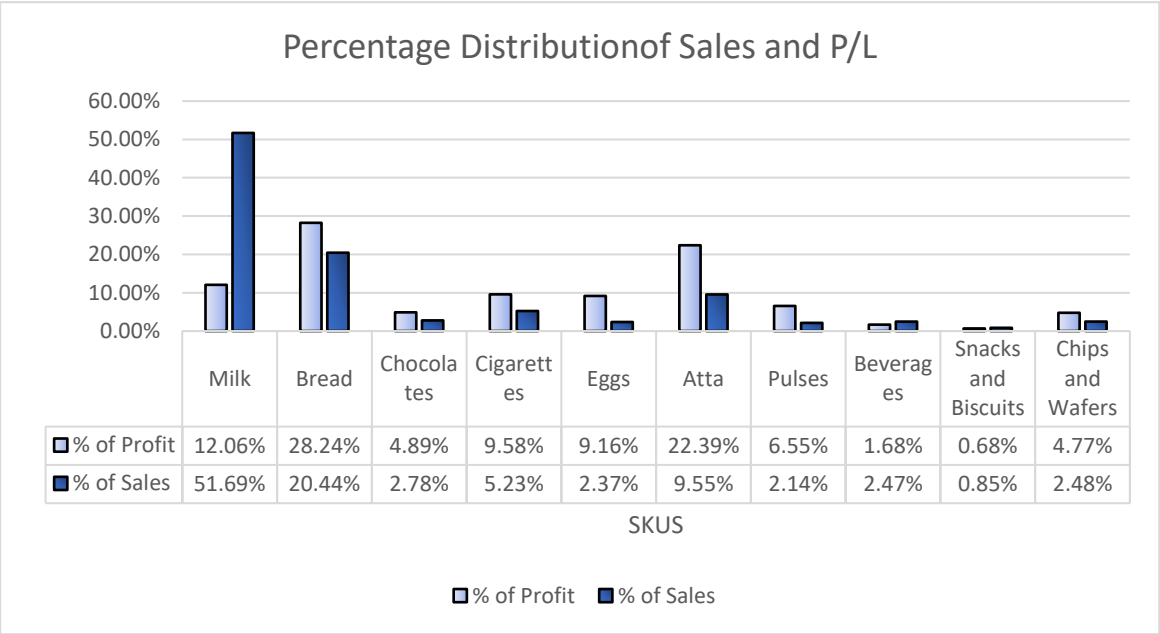


Chart 1.1 Profit Margin Bar chart for each SKU

This graph illustrates a few important points that are elaborated on below:

- Out of all the categories, the highest margins of profitability are experienced by Eggs, Pulses and Chips and Wafers, with Eggs being approximately 20% placed above the rest. It can be observed that these products enhance profitability and thus should be treated as inventory stocking.

- Milk, Beverages and Snacks and Biscuits are associated with the smaller revenue returns compared to profit making while Milk remains the least profitable of them all.



	Milk	Bread	Chocolates	Cigarettes	Eggs	Atta	Pulses	Beverages	Snacks and Biscuits	Chips and Wafers
% of Profit	12.06%	28.24%	4.89%	9.58%	9.16%	22.39%	6.55%	1.68%	0.68%	4.77%
% of Sales	51.69%	20.44%	2.78%	5.23%	2.37%	9.55%	2.14%	2.47%	0.85%	2.48%

Chart 1.2 Percentage Distribution of Profit VS Sales

This chart considers the Sales and the Profit generated for each SKU and their comparison. Data Table is also included to see the comparison and statistical values clearly. This chart is important considering the profit margin and inventory management problems. Key takeaways identified from the Chart 1.3 are mentioned below:

- Over 50% of revenue is derived from Milk but it accounts for only 12% of profit suggesting that either Milk Product pricing or sourcing needs to be modified to support better margins.

- Products like Atta and Cigarettes which command high margins with relatively low sales should be focus areas for both sale and stock management.

- Products such as Snacks and Biscuits, which bring in low sales and low profits, are either in need of effective improvement strategies or should be discarded so that forward-looking products can be developed.

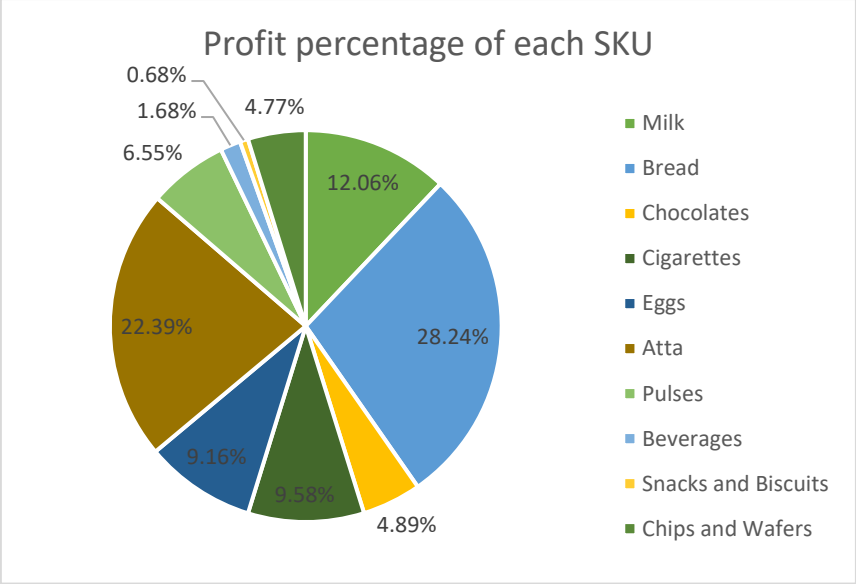


Chart 1.3 Pie Chart for Profit percentage distribution

This pie chart highlights the contribution of each SKU for profit generation. This chart can be utilised to increase less sold SKU' s promotion for sales and manage inventory accordingly. Some of the key insights are:

- Bread dominates the profit distribution, contributing 28.24%, making it the most profitable SKU and an important focus for sustaining overall profitability.
- Atta (22.39%) and Milk (12.06%) are also significant profit contributors, and have imprtant roles in revenue generation.

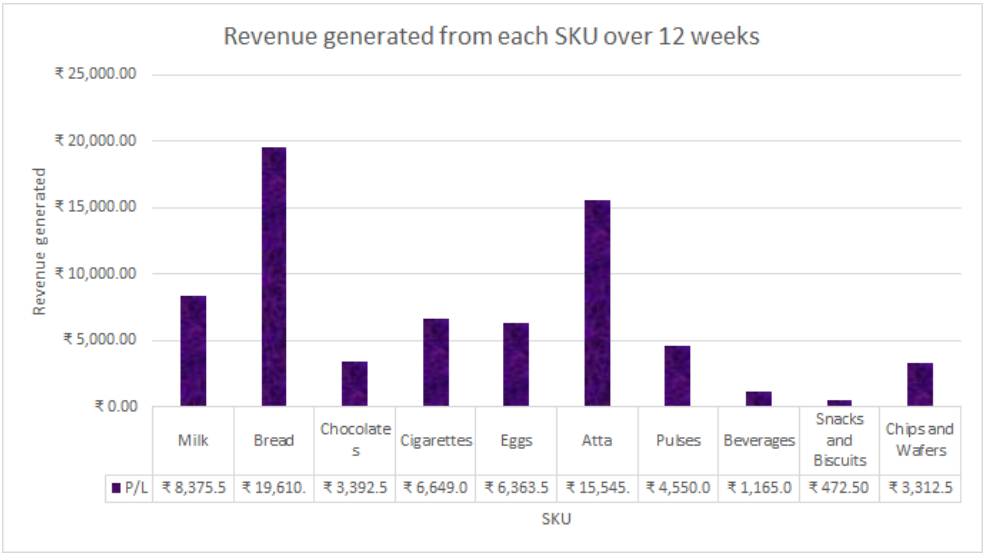


Chart 1.4 Bar Chart for revenues generated for each SKU

Analysing the 12-week revenue data, it is clear that Bread and Atta ranked the highest among the SKU's sales, with Bread generating ₹19,610 and Atta grossing ₹15,545 which indicates that bread and flour do seem to be staples that customers readily purchase. Similarly, this chart mentions the statistical figures as well as the revenue breakdown for each of the SKU's.

2. Sales Analysis

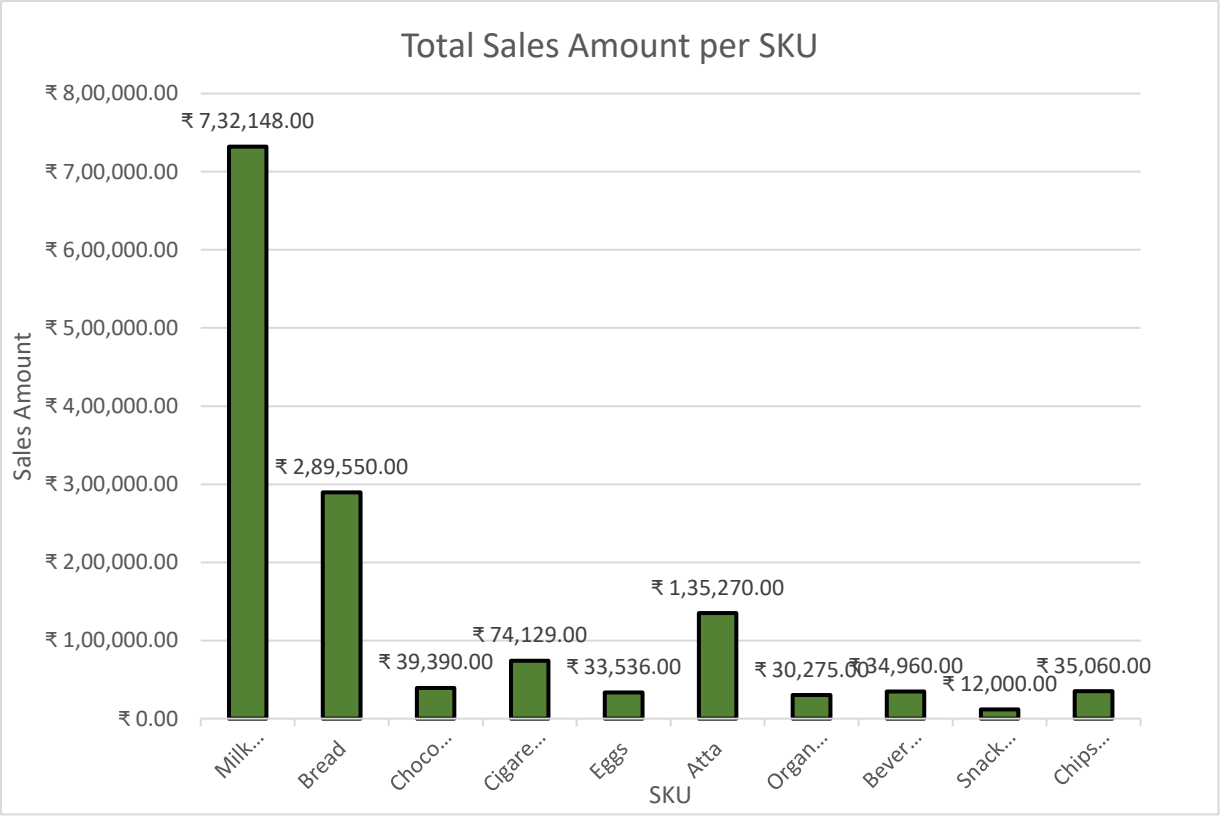


Chart 1.5 Bar Chart for Total revenue generated by each SKU

- Milk products as well as Dairy products overtake all in sales figures at ₹7,32,148 with only Bread coming in second at ₹2,89,550 demonstrating that these two basic commodities are the leading sources of income for the firm.

- A distance third is Atta at ₹1,35,270 on the chart whereas other categories all record sales of below ₹75,000 each showing a big disparity performance wise between the top three staples.

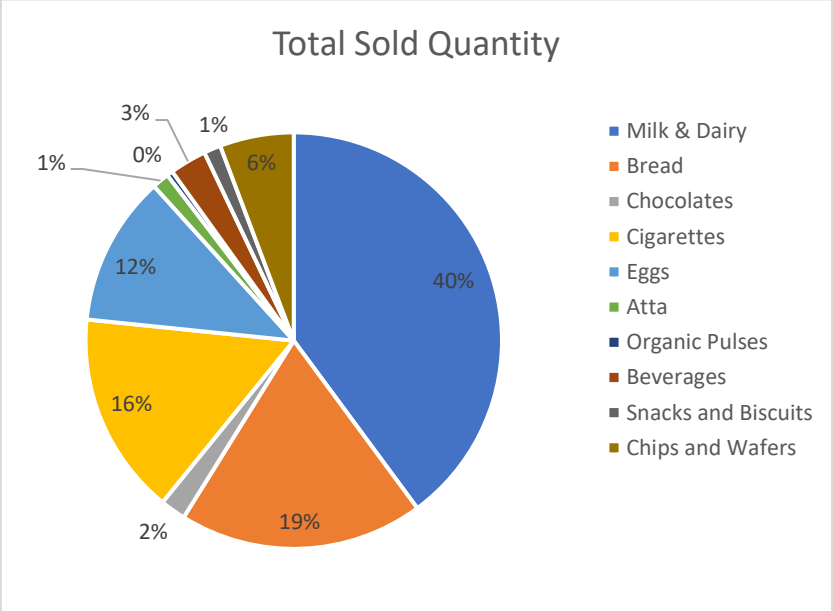


Chart 1.6 Pie Chart depicting total sold quantity of each SKU

In Chart 1.6, contribution of each SKU towards Total Sales quantity is depicted. Some of the key insights are:

- Milk & Dairy represents the largest share of total sold quantity at 49%, followed by Bread at 19%, showing that these two categories account for over two-thirds of all units sold.
- Cigarettes command a sizable portion of the share at 16% of the total quantity sold while that of Eggs is 12% which suggests that these are the second most consumed goods after cigarettes even though their revenue percentage is lower.

- The other six categories (Chocolates, Atta, Organic Pulses, Beverages, Snacks and Biscuits Chips, and Wafers) contribute only 4% of the total quantity sold indicating very low unit movement although some of them have a higher revenue unit.

3. Purchase Trends and Inventory Analysis

Purchase Trends and Inventory Analysis is crucial for business success as it helps identify buying patterns, optimize stock levels, and prevent stockouts or overstocking. This analysis would help the business to solve the problem with better inventory management and insights.

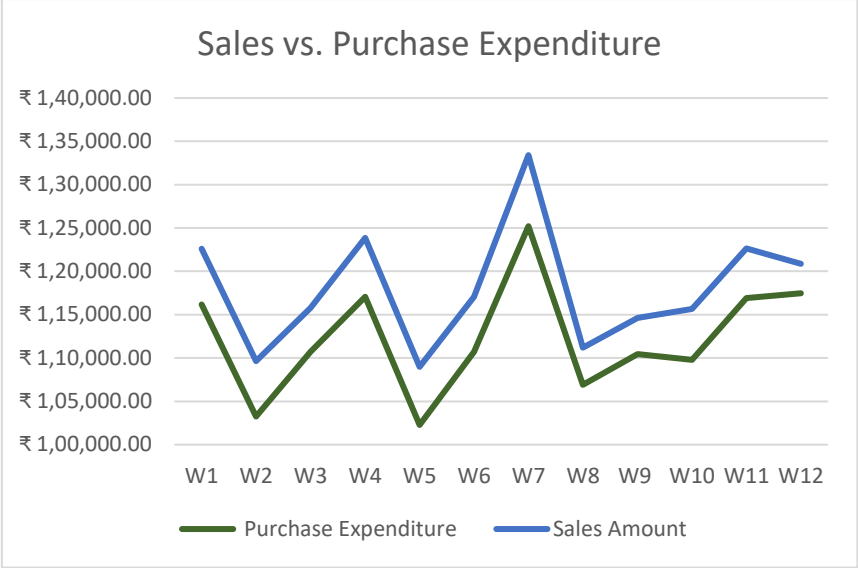


Chart 1.7 Line Chart highlighting Sales and Purchase trend

As observed in Chart 1.7, it is apparent that the company employed a good strategy that ensured a reasonable relationship between the two main parameters: purchasing costs and sales income, thus enabling it perhaps sustain a certain level of competitive pricing against the competitors without incurring losses. In the 7th week (W7), average cost price and average selling price reached their peak levels and W5 recorded the lowest levels of the averages. These peaks suggest that there are oscillations in the demand that occurs particularly during the sales season enabling a demand forecast during such sales high season.

Chart 1.8 Bivariate analysis between cost price and selling price

Atta is the highest grossing item on the SKU attended to, Organic Pulses being the second. They however appear to hold low positions in the purchase and sales graphs of the given periods and therefore can be said to be high margin sale items with low market penetration.

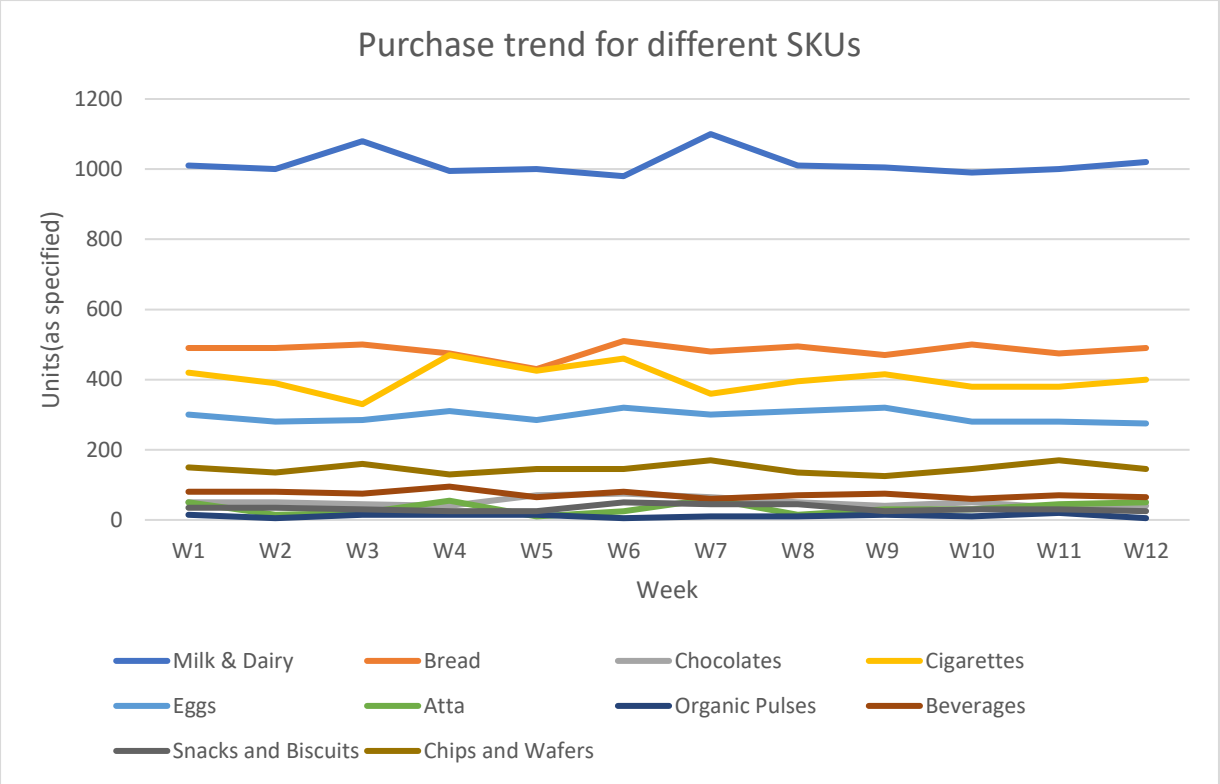


Chart 1.9 Purchase trend for different SKUs

In Chart 1.9, it is observed that Weeks 6 (W6) and 7 (W7) are remarkable in that they have higher sales figures with emphasis on movement of various other SKUs. Such trend analysis will assist in stock planning in order for the companies to be able to satisfy customers during the peak sales periods.

Interpretation of Results and Recommendation

The findings of the research indicated that Milk and Dairy products are the most bought SKU which accounted for 40% of the total sales quantity, followed by Bread which is also always available. What is more surprising is that Atta accounts for merely 1% of the sales quantity yet comes third in the revenue due to its high price, making it a key item for profitability. More sales were recorded in weeks 6 and 7 while week 5 had the least. Furthermore, high margin products such as Atta and Organic Pulses all offer lucrative opportunities sensibly despite having less demand. This implies that there is need to do stock planning in a focused manner

towards the periods associated with high sales levels especially for high sales and high profit products. The analysis further reveals that there is no need to hold an excessive quantity of low demand products since all excesses translate to unnecessary costing and management of stock control. This way, there is avoided stock surplus, cash flow improved, stock levels are optimal and there are no stock out situations which enhance the use of resources, improve customer service and grow the business revenue consistently.

Recommendations for the business for future smooth operations

1. **Increase the Sales of High-Profit Items:**

   Bread and Atta have proven to be significantly higher profit margins among other products. The sheer profit-earning capacity of such products entails targeted strategies that can maximize the sale of such products.' At each of the sales promotion's activities, the Direction finds applicable recommendations and methods on how the situations can be changed. Possible alternatives for major activities to promote high-profit items will be as follows:

- **Business-to-Business (B2B) partnerships**: Form alliances with bakeries, restaurants, or any other small businesses that need high-volume supplies of Bread and Atta. Competitive pricing can pull in bigger orders that will broaden the profit base, although profit margins per unit will not be too attractive.
- **Bulk Discounts**: Incentivize per-unit volume purchase by attractive discounts for bulk purchases for Atta or Bread. While the sale goes up, this encourages more consumers to come back for repeat purchases.

2. Optimize Inventory for Underperforming Items

Items like Beverages, Snacks, and Biscuits currently have low profit. By optimizing inventory management for these specific products, the shop can manage cash flow, reduce wastage and have better inventory management. Steps to optimize inventory management:

- **Targeted Promotions:** The items should in introduced to time-bound discounts or combo offers to clear slower-moving inventory.
- **Adjust Inventory Levels:** Use sales data to know about the demand patterns and reduce the overstocking of SKU which are not performing good

- **Replace Low-Performing SKUs:** Substitute slow-moving products with better-performing alternatives that align with customer preferences.

3. Focus on High-Sales but Low-Profit Items

Milk constitutes a significant portion of sales volume but has limited profit margins. By improving its profitability and utilizing its high demand, the shop can create opportunities for additional revenue. Some of the key steps to increase profitability and sales of Milk and dairy products:

- **Morning Sales Strategy:** Milk sales normally occur during the morning hours. Ensure sufficient stock availability during this morning period and cross-sell complementary products like Bread and Eggs to get the best out of that time.
- **Home Delivery:** Implement a free home delivery service to increase customer convenience and loyalty. After an initial promotional phase, gradually introduce nominal delivery charges to cover costs.
- **Subscription Services:** Offer subscription plans for Milk and managing Milk card for customers, enabling customers to place repeat and fixed orders daily. This ensures consistent sales and simplifies inventory management.

2. Additional Recommendation for smooth operations and increased footfall

To further improve profitability, the shop owner can implement innovative pricing approaches:

- **Bundle Pricing:** Create value packs by bundling related items, such as Bread and Eggs or Atta and Sugar, at a discounted price. This approach increases the overall value of each transaction and incentivizes customers to buy more.
- **Promotional Pricing:** Periodically introduce discounts or B1G1 offers to attract more customers. Special promotions during off-peak seasons can also generate interest and improve sales patterns.

A well-organized and visually appealing store layout can increase customer engagement and sales. Some recommendations for aesthetics of the store:

- **Eye-Catching Displays:** Position high-margin items like Bread and Atta in prominent, high-traffic areas of the store. Use creative signage and decorations to grab customer attention.

Conclusion

Key business challenges include fierce competition from online delivery platforms and large supermarkets, soaring supplier costs, and inefficiencies in human resources. These factors have collectively resulted in a decrease in customer numbers, squeezed profit margins, and challenges in both distribution and supply chain. However, the analysis provides pragmatic solutions to tackle these challenges and improve the store's overall profitability and sustainability.

One of the main threats is that the safety net of online delivery channels and large supermarkets has shrunk the number of consumers and purchases. To counter this, the store can focus on the customer experience by offering discounted home delivery of basic products like milk. Stores should also draw attention to high-profit products such as Bread and Atta through promotional activities, packages, and defeat some other leading sellers in a short time. Delivery and cooperation with click-and-collect services ensures retailers continue to overcome the gap between traditional retailing and online convenience.

To cope with the increased supplier costs, the analysis recommends strengthening alliances with suppliers to achieve volume discounts, searching for new suppliers with lower costs, and joining purchasing groups to make full use of the combined purchasing power. Manage inventory skilfully to stock popular products during major sales opportunities and food service dates to reduce costs while not forcing retailers to source from this seller. Meanwhile, key operational savings reflect the content of human resources, such as inefficient staffing, which requires retailers to spend a lot of time and energy on human resources.

Additional maintenance costs and soaring public service costs mean retailers are overspending. The use of part-time employees to manage the opening commission of off-peak hours and to automate compensation requirements such as billing and store management can increase retailer productivity and reduce costs. By always working to keep the lights off, retailers can also afford high energy bills. Replacing old and inefficient equipment with new and efficient equipment reduces shop electricity costs. In addition, the use of existing assets, such as delivery trucks to sell milk every evening, is a better way to use, significantly increasing asset returns.

Furthermore, to cope with rising operational costs, the store has gradually implemented flat-rate delivery charges over time. Finally, the shop can create a niche offering by emphasizing high-quality, high-margin products and personalized customer service. Expanding into e-commerce or collaborating with third-party delivery platforms will enhance the shop's reach

and competitiveness. Monitoring competitor pricing and customer preferences will ensure the shop remains adaptive to market trends, helping maintain customer loyalty and profitability.

By addressing these issues with tailored solutions, the shop can overcome current challenges, optimize operations, and ensure long-term financial sustainability. The implementation of these recommendations will enable the business to thrive in a competitive environment, retain customers, and achieve its profitability goals.

- **SPREADSHEET LINK: link**