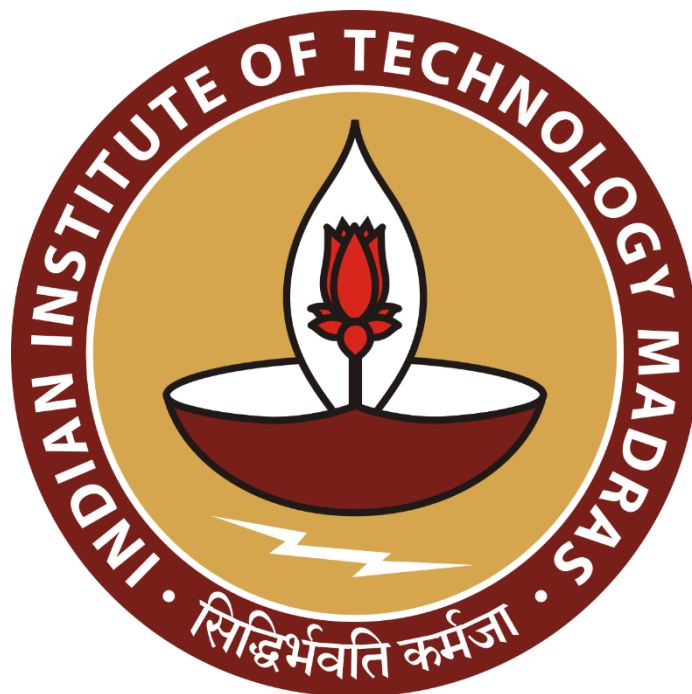# Efficient Inventory Management using Sales Data Analytics for a Kirana Store

A Final report for the BDM capstone Project

Submitted by

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1 Executive Summary

Efficient inventory management is a key challenge for unstructured business like Kirana stores. I am working for my project to solve this issue for a small Kirana store named "Bablu Kirana store" which serves the local communities with range of products. This business is facing issues like overstocks, stockouts, inefficient order quantity, inefficient working capital management, and poor reorder timing. To address these issues, I have collected sales data for five weeks, for 100 SKUs manually (using pen paper method). After that entered the data on excel, cleaned the data by removing the outliers, and by imputing the missing values and removing the SKUs having negligible sales values. Done Descriptive Statistics using Google Colab. Plotted Pareto chart and done ABC Analysis to know top performing SKUs. Also done Time Series Analysis to forecast accurate future demand of the products like dairy and bakery which have a limited shelf life and can spoils quickly, using methods like naive, moving average and exponential smoothing. Also calculated the safety stock for each SKUs to meet the unusual demand. And calculated the reorder point (SKU level at which he needs to place order). And also calculated optimal order quantity for SKUs. Also calculated the time between replenishment. This will help the business to maintain its stock at right level without stockouts and overstocking's. Accurate future demand will also help the bakery and dairy products to maintain its stock at efficient level without spoilage as it has a shorter shelf life. And also help the business to maintain the efficient reorder point and replenishment with optimal order quantity. These will help to manage the working capital efficiently and can invest in the new upcoming SKUs. Which overall will help the business to grow. And the revenue will be maximized.

2   Proof of originality of the Data

I have attached the Google drive Link below which contains some photographs of me taking data from the Business Owner and also the video of the Interview with the Business owner, and also attached the original dataset below.

Photos of the Data Collected	https://drive.google.com/drive/folders/1ziw46NVORP4x1p2gMElsBFY7YxO1m--o?usp=drive_link
Photos with Owner	https://drive.google.com/drive/folders/1_OCtaUPfX6HpGhJFeB6ANNRBL2SmYxFz?usp=drive_link
Interview with the Business Owner	https://drive.google.com/drive/folders/1A8VdnaiK3zNo10Z_8bRq16HxBTydH4Oe?usp=sharing
Dataset	https://drive.google.com/drive/folders/1VJnhXiz5de_TuJgBy_om7dXAScTZG37C?usp=sharing

3   Analysis Process and Method

To Solve this problem, I have collected the sales data from the date (28/05/2024 to 05/07/2024) for the total 100 SKUs, and the total cost associated with running the business, like rent and transportation cost. The method I have used here to collect the data is, manually by visiting the shop every day in person. I have noted the sales data in my notebook, talking with the business owner for the given SKUs.

The tools I have used for the data analysis is Excel and Google Colab.

After putting the data on excel sheet, I have done data cleaning like Handling missing values, I have removed 7 SKU's while cleaning, which had so many missing values. Also substituted the missing cells with zero, to do a proper analysis. In case of floating value, converted that to a nearest integer. Also handled some outliers in the data. And transformed the table with the help of pivot table, so that it will help in the data analysis.

After that I have done Exploratory data analysis. For that I have used Google colab. Firstly, I have read my csv file in google colab with df.read_csv method. After creating the data frame with the help of data.head() method, I tried seeing my data to know about some patterns. After that with data.describe() method, I got to know about descriptive statistics of each of the SKUs, their mean, median, mode and variance . After knowing about each of the SKUs, that how they are varying among different dates. What is the sales pattern, like dairy product are being sold the most, their mean sales are more than the other products etc.

- **Minimizing Excess inventory for slow moving product:**

  To address this issue, I will analyze the sales data and also categories the item based on the sales volume and the contribution on the revenue.

  The different charts are plotted with the pivot table on excel sheet to know about the patterns of sales. Firstly, I have plotted the pareto chart for revenue and total volume sales, to know about the top selling SKU in terms of volume, and to know which SKU are contributing more in revenue.

  SKUs which are not contributing more in revenue and also their sales volume is less, we will reduce such excess inventory by introducing some combo offer with the newly introduced SKU's. Which will also let our customers to know about the new SKUs and will also minimize the excess inventory of slow-moving SKUs.

- **Minimizing stock out:**

  To address this issue, I have categorized the SKUs in terms of broad categories by grouping some categories, so that can do better analysis and know more about the sales. Better are those whose categories of products are sold more. And Such categories can be prioritized. For this I have plotted line chart to know about the sales of data distributed among different categories over a month. Also, did day wise analysis, to know on which day of the weekend, the sales are high and on which day the sales are less. Also did the weekly analysis to know how sales are distributed among different weeks over the month.

  After that done the time series Analysis to predict the future demand accurately with the help of different forecasting techniques like moving averages. With the help of this, can maintain the inventory at right level without over stocking it and will also minimize the excess slow-moving SKUs from the inventory.

- **Determining Safety stock for Sudden surge in demand and Reorder Point:**

Safety stock is the extra inventory kept to prevent stockout due to sudden surge in demand or lead time.

To calculate safety stock formula used is: -

Safety Stock = Z * (Std. Deviation of daily demand) * sqrt(L) [3][2]

where:

Z = Z-score, which corresponds to desired Service level goal (probability of not experiencing stock out)

Std. Deviation = Standard deviation of daily demand

L = Lead time in days (how long it takes to arrive order)

I have taken lead time as 2 as it takes maximum 2 days to arrive order. But for dairy products, I have taken it as 1, as dairy products come on every day.

Service level used for different type of SKUs.

- For Type A SKUs = 98 % service level (Aim for enough inventory to meet demand 98 % of the time)

- For type B SKUs = 90 % of service level (Aim for enough inventory to meet demand 90 % of the time)

- For Type C SKUs = 85 % of service level (Aim for enough inventory to meet demand 85 % of the time)

Reorder point (ROP) is the inventory level at which new order should be placed to replenish the stock before it runs out. It ensures that there is enough stock on hand to meet the demand during the lead time (period between placing an order and receiving it).

To calculate reorder point, formula I have used is:

Reorder Point (ROP) = Lead Time Demand + Safety Stock

Lead Time = Average Demand * Lead Time Demand [3]

Where:

- Lead Time Demand: The demand for a product during the lead time (how many units are needed while waiting for the new order to arrive).

- Safety Stock: The buffer stock kept to account for variability in demand and supply.

The Lead Time that I have used for calculation is 2 days as order takes maximum 2 days to arrive.

- **Determining optimal order quantity:**

  To address this issue, I will calculate the economic order quantity of each SKUs to determine the optimal order quantity.

  For this, the Formula that I have used is:

  Economic Order Quantity (EOQ) = Sqrt (2*Demand*Ordering Cost/Holding Cost) [3][2]

  Where:

  - Demand = average 15 days demand in unit (time frame used is weekly)
  - Ordering cost = Cost per order (or cost associated with placing each order)
  - Holding Cost = Cost associated with storing 1 unit per 15 days

  Ordering cost taken is Rs100 (Got this from business owner)

  Holding cost taken is 5% of product value per unit in 15days.

- **Proper management of costs associated with inventory, holding and ordering costs**.
  To address this issue, I will use all the results that I got earlier.
  Safety stock will help to keep stock at level which will reduce stockout.
  Reorder point will give the level at which we need to do the replenishment and will also manage the working capital, so that any stock doesn't get overstock.
  Optimal order quantity will give the economic order quantity to order, which will reduce the ordering cost.
  Also, I will calculate the Replenishment timing for each stock, to manage each stock well and to manage the ordering cost.
  Formula used is:

  Replenishment Timing = Economic order quantity/Time (here I have used 15days period of time) [3]

  This will give the time for each stock to place an order. With the help of this, I have also calculated the efficient timing which business owner can use to place order. Which will manage inventory and working capital efficiently.

4 Results and Finding

- **Minimizing Excess inventory for slow moving product:**
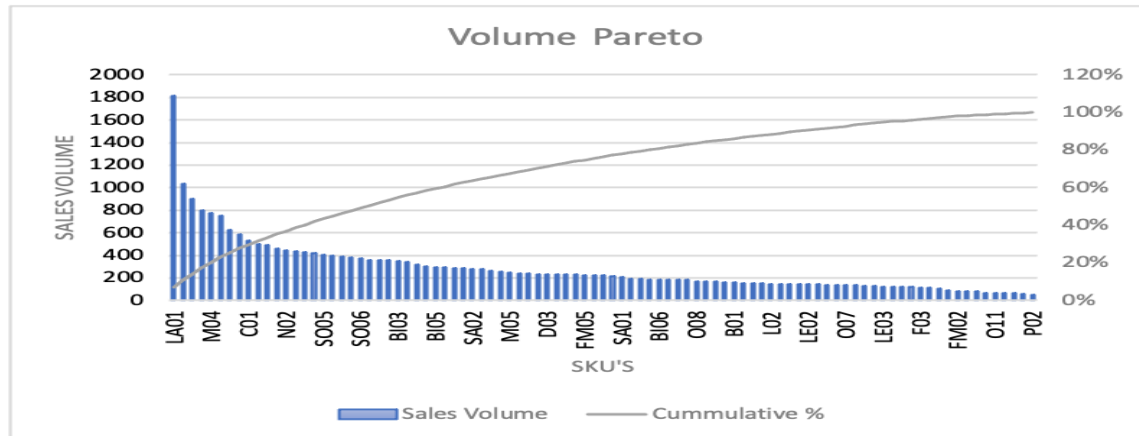
Figure 4.1: Volume Pareto and Revenue Pareto
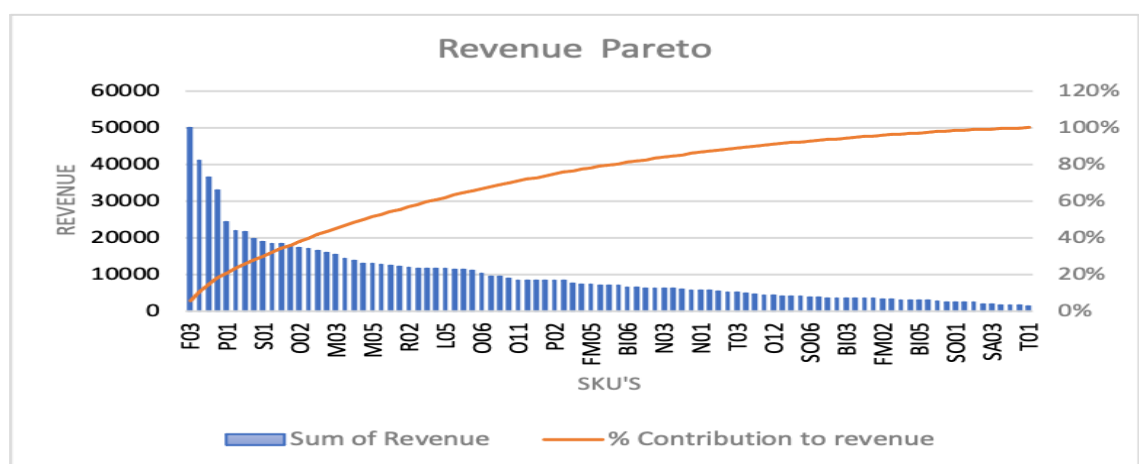
Figure 4.2: Volume Pareto and Revenue Pareto

By doing Volume Pareto and Revenue Pareto, the results I got is. In volume Pareto I got the top performing SKUs in terms of quantity sold like (LA01, M04, C01 etc.) are contributing more in revenue.

From Revenue Pareto I got the top performing SKUs which are generating High revenue we need to focus more on this type and ensure that these SKUs don't get stockout. And the SKUs which yielding low revenue we need to see that it doesn't get accumulated and need to minimize this stock. From both pareto, also got to know that SKUs like FM02 which have very low sales volume and also very low Revenue don't get stock up and usually be in low number

in the stock. If number is high for this type of SKUs, then need to add this type of product with newly SKUs as combo offer and reduce its number.

With the help of revenue and sales volume categorize the SKUs in A, B and C. So that Can focus more on the A categories items and raise its service level to 98%. So, customer don't face stock up for these types of items.

This help to find the slow-moving product and thus can reduce the slow-moving product from inventory if its number is high.

SKU's	SKU Categories	SKU's2	Categories	SKU'S3	Categories4
FO3	A	MIO1	B	SOO6	C
FO2	A	OO8	B	TPO3	C
MO1	A	O11	B	SOO4	C
MO2	A	O10	B	SOO2	C
PO1	A	RO1	B	BIO3	C
LAO1	A	DO2	B	BIO1	C
MO4	A	PO2	B	BO2	C
OO3	A	RO3	B	IO5	C
SO1	A	IO3	B	FMO2	C
LO4	A	IO4	B	TPO2	C
OO9	A	FMO5	B	SOO3	C
OO4	A	CO3	B	GCO1	C
OO2	A	VO2	B	BIO5	C
OO5	A	IO6	B	TO2	C
OO1	A	BIO6	B	DO4	C
DO3	A	FMO6	B	NO4	C
MO3	A	IO2	B	SOO1	C
LO3	A	NO2	B	TPO1	C
OO7	A	NO3	B	BIO4	C
LO2	A	CO4	B	BIO2	C
MO5	A	CO2	B	SAO3	C
FMO1	A	SAO1	B	FMO3	C
FO1	A	NO1	B	SAO4	C
DO1	A	LEO4	B	SAO5	C
RO2	A	CO1	B	TO1	C
MO6	A	MIO2	B		
LEO2	A	TO3	B		
LO1	B	BO1	B		
LO5	B	IO1	B		
VO1	B	LO6	C		
DO5	B	O12	C		
LEO1	B	SAO2	C		
OO6	B	FMO4	C		
LEO3	B	SOO5	C		

Figure 4.3: Segmentation of SKUs in A, B and C category

As I have total 93 SKUs it is difficult to analyze that's Why I have categorized it and Plotted Volume and Revenue Trends.
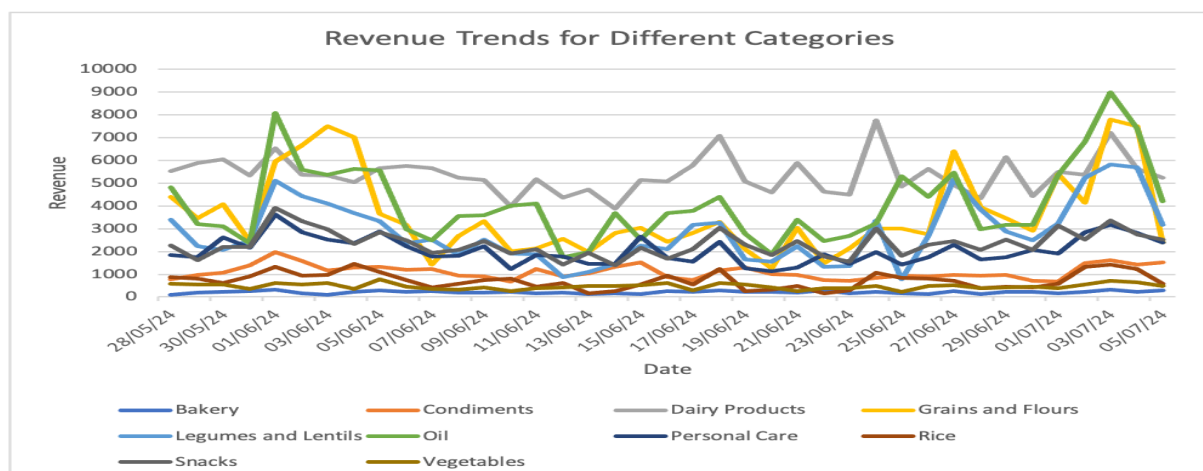
Figure 4.4: Revenue Trends for Different categories

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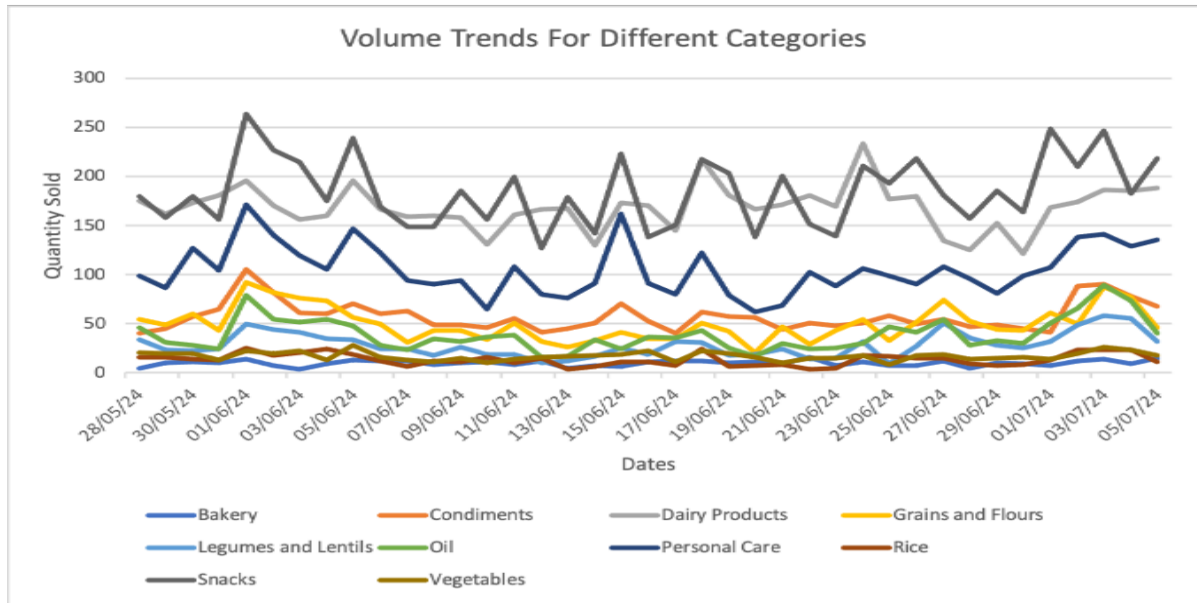
Figure 4.5: Volume Trends for Different categories

In revenue Trends we can see that the categories like oil, grain and flour and dairy products are generating high revenue each day. So, we need to focus more on these categories of items.

And in Volume Trend we can see that sales of the categories like dairy products, snacks and personal care are high in terms of quantity sold, so we need to keep more of these items in inventory, so that we don't face any stockouts.
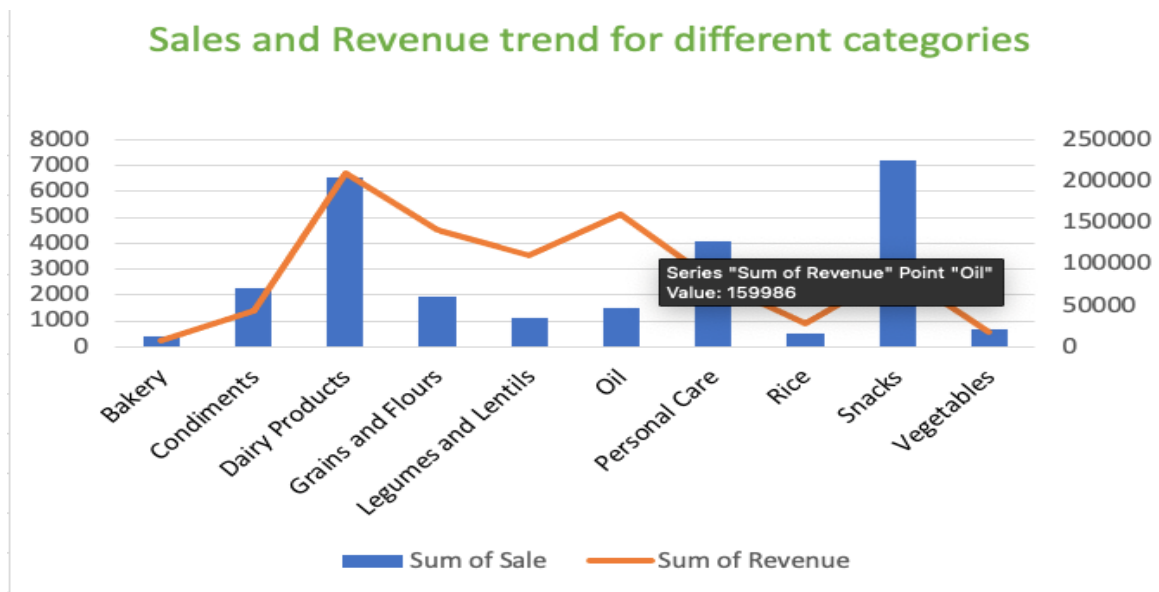
Figure 4.6: Sales and Revenue Trends for Different categories

From this chart we can see that Dairy products have both high-volume sales and also have high revenue, so these are the important products in our inventory, so need to focus more on it and

also expand it. Also, some categories like oil, grain, flour, legumes and lentils are generating high revenue and but quantity sold is less. It is usually high price items. We need to maintain its stock in right level so as we don't face stock out. Like this with less capital, we can generate more revenue.
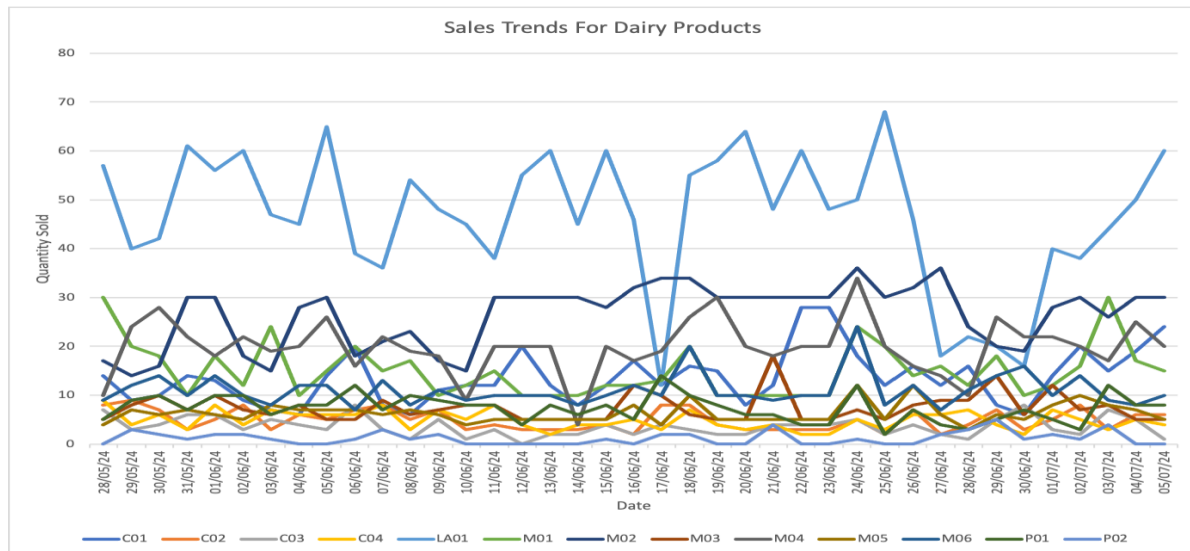
Figure 4.7: Sales Trends for Dairy Products

In sales trends of dairy product, can see that Lassi is sold in high quantity than the other items like Paneer and some type of curds. So, need to stock more Lassi so that it doesn't stock out.
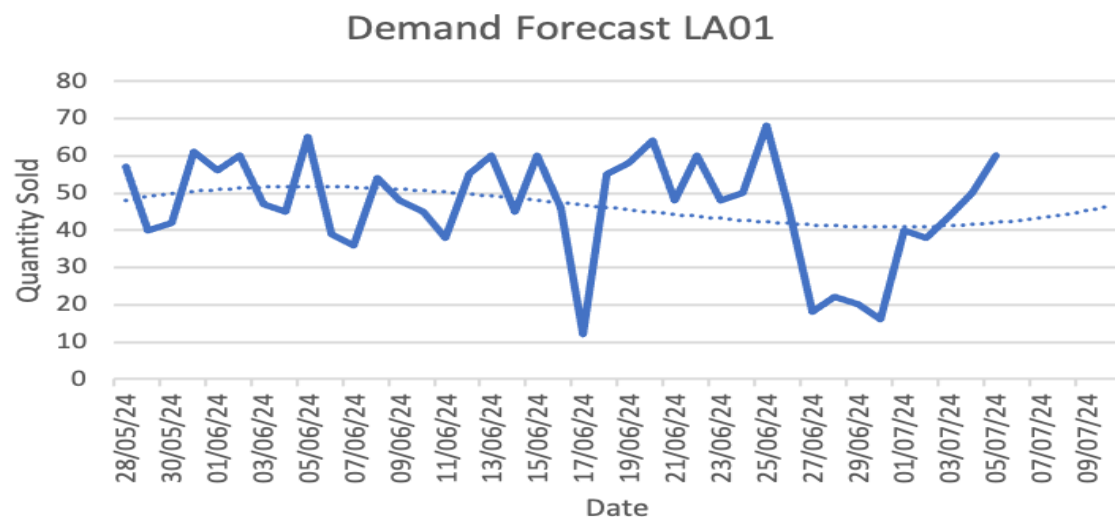
Figure 4.8: Demand Forecast of LA01

From demand forecast Chart of the Lassi for 5 days. Can see that lassi are sold somewhere around 50 unit per day. So can order these items with the help of forecasted demand from past data. This will minimize the spoilage of these type of products which has a short shelf life.
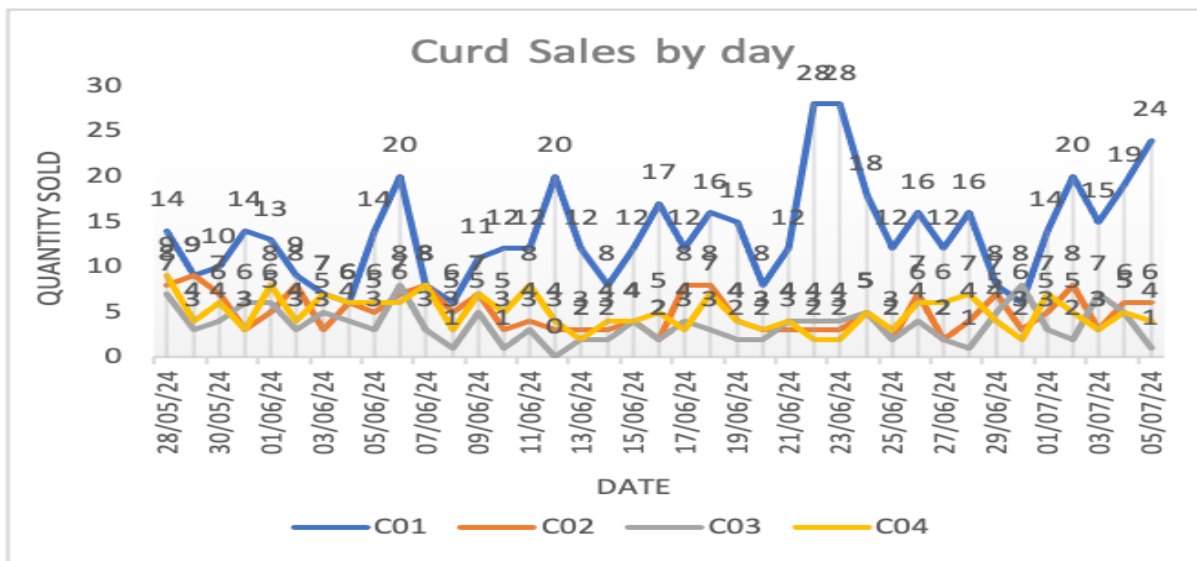
Figure 4.9: Curd Sales by day
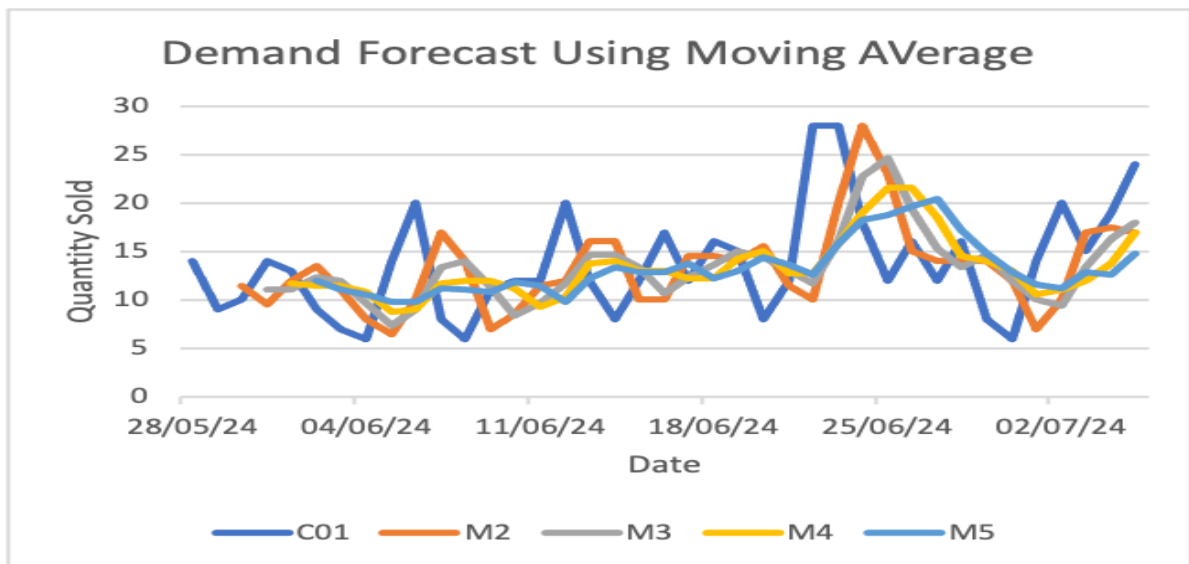
Figure 4.10: Demand Forecast using Moving Average

From Curd Sales Chart we can see that the SKUs C01 demands are very high in number than the other curds which are somewhat similar. So, need to maintain its stock level in right quantity, for that also demand forecasting is done using moving average. And from the figure 4.9, can see that Moving average of 2 period is performing very well than the others. So, the shop owner can use these simple techniques to know the future demand about this type of SKUs, which comes every day and have a short shelf life.
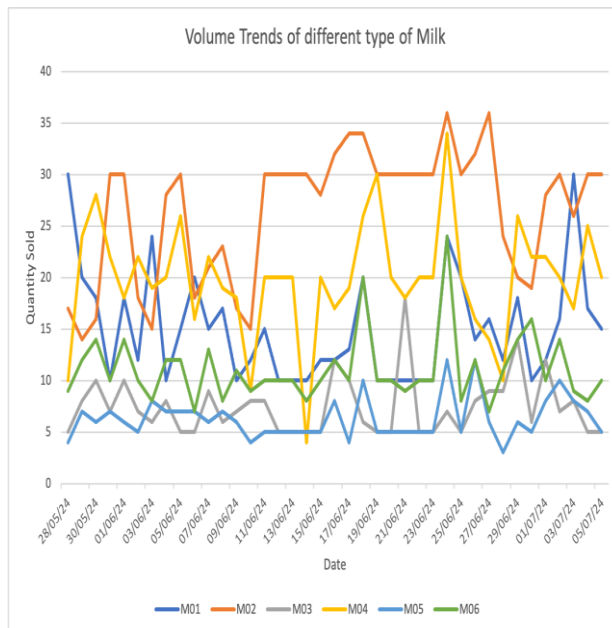
Figure 4.11.1: Volume Trends of different types of Milk   Figure 4.11.2: Volume Trends of different types of Milk
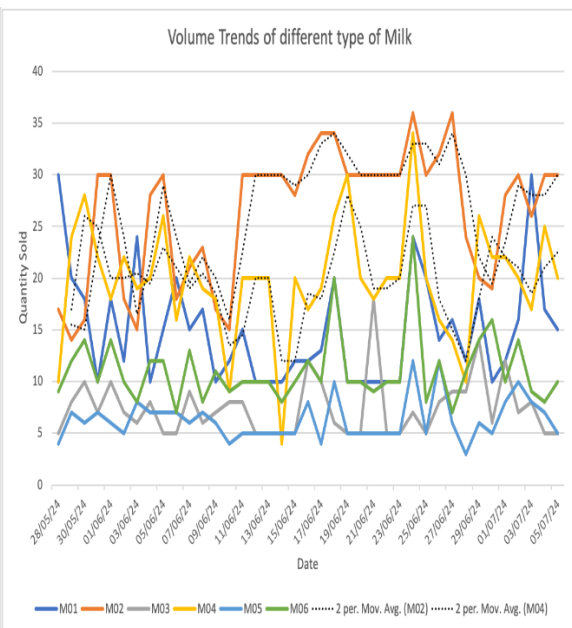
From Figure 4.11.1 Can see the trends of milk sold over the month. Here the Type M02 and M04 are sold in very high quantity. So, need to order this, more in quantity that others. In figure 4.11.2 also, shown the trend lines to predict the future demand of these two types of milk with 2 days moving average, which looks goods. And also, shopkeeper can use this simple calculation to order the milk quantity for the next days.
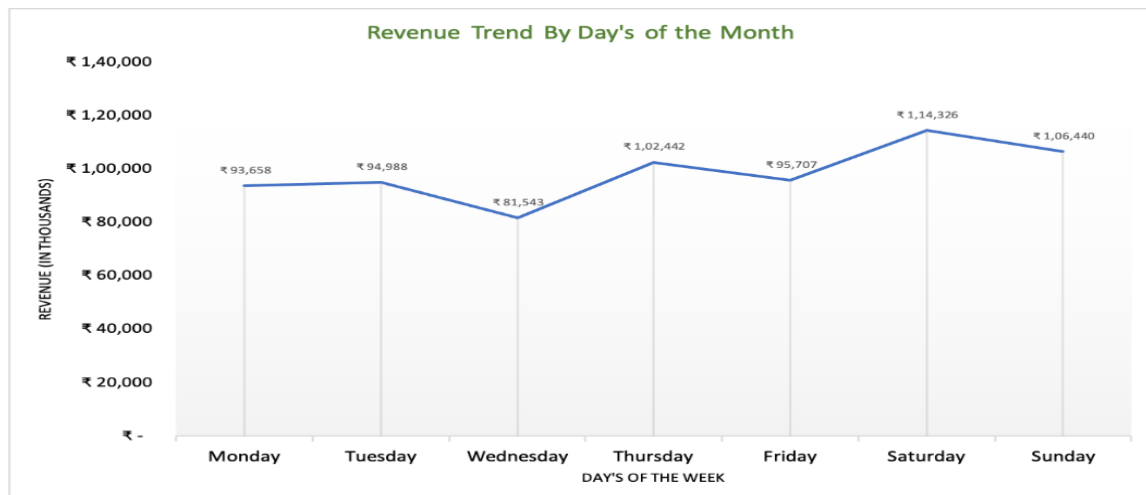
Figure 4.12: Revenue Trends by Days of the month

With the day trends we can see that revenue are generating high in the weekends than the weekdays. This will help in replenishment of SKUs if some SKU's getting out of stock. Need to make sure that it comes before the weekends, so as in weekends due to high demand product don't get stock out.

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- **Calculated Safety stock and Reorder Point for each SKU's:**

Safety Stock and Reorder Point

SKU's	Standard Deviation	Service Level	Z-Score	Safety Stock	Lead Time Demand	Reorder Point
B01	1.70	90%	1.28	2	8	10
B02	2.48	85%	1.04	3	11	14
BI01	5.16	85%	1.04	8	18	25
BI02	3.66	85%	1.04	5	20	25
BI03	2.68	85%	1.04	4	18	22
BI04	4.93	85%	1.04	7	24	31
BI05	2.77	85%	1.04	4	15	19
BI06	3.60	90%	1.28	7	9	16
C01	5.51	90%	1.28	7	27	34
C02	2.13	90%	1.28	3	10	13
C03	1.97	90%	1.28	3	7	10
C04	1.90	90%	1.28	2	10	12
D01	2.36	98%	2.05	7	9	16
D02	2.68	90%	1.28	5	12	17
D03	2.59	98%	2.05	8	12	19
D04	2.92	85%	1.04	4	13	18
D05	3.11	90%	1.28	6	16	22
F01	4.39	98%	2.05	13	20	32
F02	3.21	98%	2.05	9	9	19
F03	2.08	98%	2.05	6	6	12
FM01	4.38	98%	2.05	13	20	33
FM02	1.61	85%	1.04	2	4	7
FM03	1.68	85%	1.04	2	7	9
FM04	1.75	85%	1.04	3	7	10
FM05	3.19	90%	1.28	6	11	17
FM06	2.30	90%	1.28	4	9	13
GC01	1.80	85%	1.04	3	6	9
I01	7.02	90%	1.28	9	46	55
I02	5.76	90%	1.28	7	32	40
I03	10.14	90%	1.28	13	39	52
I04	4.87	90%	1.28	6	18	25
I05	2.45	85%	1.04	3	11	14
I06	2.79	90%	1.28	4	12	15
L01	1.77	90%	1.28	3	9	12
L02	1.91	98%	2.05	6	8	13
L03	2.08	98%	2.05	6	6	12
L04	1.81	98%	2.05	5	6	11
L05	1.57	90%	1.28	3	4	7
L06	1.07	85%	1.04	2	3	4
LA01	14.01	98%	2.05	41	93	134
LE01	1.29	90%	1.28	2	4	6
LE02	1.81	98%	2.05	5	7	13
LE03	1.57	90%	1.28	3	6	9
LE04	1.72	90%	1.28	3	4	7
M01	5.40	98%	2.05	11	30	41

M02	6.41	98%	2.05	13	53	66
M03	2.89	98%	2.05	6	15	21
M04	5.63	98%	2.05	12	40	51
M05	2.04	98%	2.05	4	13	17
M06	3.35	98%	2.05	7	22	29
MI01	1.70	90%	1.28	3	5	8
MI02	1.76	90%	1.28	3	7	10
N01	7.54	90%	1.28	14	41	54
N02	6.04	90%	1.28	11	23	34
N03	2.33	90%	1.28	4	8	12
N04	4.49	85%	1.04	7	25	32
O01	1.56	98%	2.05	5	6	11
O02	1.63	98%	2.05	5	5	10
O03	1.83	98%	2.05	5	7	13
O04	1.45	98%	2.05	4	6	11
O05	1.85	98%	2.05	5	7	12
O06	2.20	90%	1.28	4	8	12
O07	2.37	98%	2.05	7	7	14
O08	2.63	90%	1.28	5	9	14
O09	1.96	98%	2.05	6	8	13
O10	1.87	90%	1.28	3	7	10
O11	1.65	90%	1.28	3	4	7
O12	1.70	85%	1.04	2	3	6
P01	2.78	98%	2.05	6	15	20
P02	1.35	90%	1.28	2	2	4
R01	2.95	90%	1.28	5	11	17
R02	3.42	98%	2.05	10	12	22
R03	1.60	90%	1.28	3	4	6
S01	4.70	98%	2.05	14	22	35
SA01	2.07	90%	1.28	4	10	14
SA02	2.54	85%	1.04	4	14	18
SA03	2.65	85%	1.04	4	12	16
SA04	2.77	85%	1.04	4	8	12
SA05	2.08	85%	1.04	3	8	11
SO01	5.33	85%	1.04	8	25	33
SO02	5.42	85%	1.04	8	18	26
SO03	3.31	85%	1.04	5	15	20
SO04	3.29	85%	1.04	5	18	23
SO05	3.80	85%	1.04	6	21	26
SO06	3.41	85%	1.04	5	19	24
T01	2.46	85%	1.04	4	14	18
T02	3.28	85%	1.04	5	15	20
T03	3.32	90%	1.28	6	13	19
TP01	3.39	85%	1.04	5	12	17
TP02	2.24	85%	1.04	3	9	12
TP03	2.37	85%	1.04	3	9	13
V01	3.37	90%	1.28	6	22	29
V02	2.46	90%	1.28	4	12	16

Figure 4.13: Reorder point and Safety Stock Table

From the above Figure 4.13 we can see the Standard deviation, Service level, Safety Stock, Lead Time demand and Reorder Points.

Stock with high service level is usually of Type A, which is high performing SKUs. So, safety Stock for these SKUs like (F01, F02, O01 etc.) are high in number. So, need a careful inventory planning for these items.

Safety Stock For each SKUs will help to manage the surge demand of SKUs and it also ensures that at any point of time Shop can serve its customers.

Reorder Point for each SKUs Will help the Shop owner to place an order of each SKUs when it reaches the certain numbers. So that it gets refill on time and no customers should face any stock out.

- **Calculated optimal order quantity And Replenishment Timing:**

This calculated values for all the SKU's will help to minimize the total ordering and holding cost and these EOQ will give the most cost-effective order size. So that shop owner doesn't place high quantity order which can get stock up.

Here we can see that for some SKUs, the EOQ is so high like for NA01 EOQ is 483 and for N01 it is 418, as sales volume of these SKUs is also high. And for the SKUs having less sale volume their EOQ is also less.

Replenishment Timing ensure that SKUs BI01 whose replenishment time is 26 means it need to be reorder before 26 days. The goal of replenishment is to ensure there is enough stock in hand to meet customer demand without running out of stock. This will also help in avoiding overstocking, which can lead to high holding cost.

Optimal Order Quantity and the Time between Replenishments(In Days)

SKU's	Average 15th Days demand	Holding Cost		EOQ	Time between Replishment	In Days
BI01	132	₹	0.50	230	1.74	26
BI02	150	₹	0.25	346	2.31	35
BI03	134	₹	0.50	232	1.73	26
BI04	177	₹	0.25	376	2.13	32
BI05	112	₹	0.50	211	1.89	28
BI06	71	₹	1.75	90	1.27	19
D01	71	₹	3.25	66	0.93	14
D02	91	₹	1.75	102	1.12	17
D03	90	₹	3.40	73	0.81	12
D04	100	₹	0.50	200	2.00	30
D05	123	₹	1.75	119	0.96	14
F01	147	₹	1.60	135	0.92	14
F02	70	₹	11.25	35	0.50	8
F03	45	₹	21.50	20	0.46	7
FM01	153	₹	1.60	138	0.90	14
FM02	32	₹	2.00	57	1.77	27
FM03	51	₹	0.60	131	2.55	38
FM04	56	₹	1.40	89	1.60	24
FM05	86	₹	1.60	104	1.21	18
FM06	65	₹	1.90	82	1.28	19
GC01	45	₹	1.25	85	1.88	28
L01	70	₹	3.20	66	0.95	14
L02	57	₹	4.40	51	0.90	13
L03	45	₹	6.00	39	0.86	13
L04	43	₹	8.20	32	0.75	11
L05	32	₹	7.00	30	0.95	14
L06	21	₹	4.00	33	1.54	23
LA01	698	₹	0.60	483	0.69	10
LE01	30	₹	7.00	29	0.97	15
LE02	56	₹	4.00	53	0.95	14
LE03	46	₹	4.00	48	1.05	16
LE04	27	₹	4.00	36	1.37	21
MI01	36	₹	5.00	38	1.06	16
MI02	54	₹	1.80	78	1.43	21
N01	305	₹	0.35	418	1.37	21
N02	169	₹	0.70	220	1.30	19
N03	59	₹	2.00	77	1.30	20
N04	190	₹	0.25	390	2.05	31
O01	45	₹	7.00	36	0.80	12
O02	41	₹	8.00	32	0.78	12

O03	56	₹	6.75	41	0.73	11
O04	48	₹	7.00	37	0.77	12
O05	53	₹	6.20	41	0.78	12
O06	62	₹	3.20	62	1.01	15
O07	53	₹	5.00	46	0.87	13
O08	66	₹	2.60	71	1.08	16
O09	58	₹	6.00	44	0.76	11
O10	50	₹	3.20	56	1.11	17
O11	27	₹	6.10	29	1.11	17
O12	25	₹	3.25	40	1.56	23
R01	84	₹	1.90	94	1.12	17
R02	90	₹	2.50	85	0.94	14
R03	27	₹	6.00	30	1.12	17
S01	162	₹	2.25	120	0.74	11
SA01	78	₹	1.40	106	1.35	20
SA02	106	₹	0.75	168	1.59	24
SA03	88	₹	0.40	209	2.39	36
SA04	59	₹	0.50	153	2.61	39
SA05	57	₹	0.50	150	2.66	40
SO01	190	₹	0.25	389	2.05	31
SO02	136	₹	0.50	233	1.71	26
SO03	116	₹	0.50	216	1.86	28
SO04	137	₹	0.50	234	1.71	26
SO05	156	₹	0.50	250	1.60	24
SO06	143	₹	0.50	239	1.67	25
T01	106	₹	0.25	291	2.75	41
T02	111	₹	0.50	210	1.90	29
T03	97	₹	1.00	139	1.44	22
TP01	90	₹	0.50	190	2.11	32
TP02	64	₹	1.00	113	1.77	27
TP03	71	₹	1.00	119	1.68	25
V01	168	₹	1.30	161	0.96	14
V02	89	₹	1.50	109	1.23	18

Figure 4.14: Optimal Order Quantity and the Time Between Replenishment (in days)

5 Recommendations

- Focus more on A category item, as it is generating high revenue and then on B category and then on C category. This will help in prioritizing the working capital to invest in different Segments.

- As dairy product belongs to high revenue generating Category, but it has short shelf life and also get spoiled easily. So, to maintain its stock at right level we will use naive techniques like 2 days moving average which fits quite well. It will help to meet the demand and also introduce more of the dairy products by removing excess inventory and investing in new items as its revenue is growing.

- Maintain the Safety stock for each item as given in Fig. no 4.13. So that none of the item get stock out, neither in surge demand.

- Keep An eye on Reorder point to place new order if the SKUs hit that level. Take idea of the reorder point from Fig 4.13. It will ensure that the inventory gets refilled.

- Place Optimal order quantity of SKUs which will save the working capital. Take look on Fig 4.14 for the order quantity of different SKUs.

- With the help of Time between Replenishment, I have made a table giving some idea of how to place order in a month for different SKUs, such that it get refilled on time without any headache of placing order every day.

Date	SKU's
5th of Month	F03, F02, LA01, L04, N09, O03, D03, O01, O02, O04, O05, L02, L03, O07
10th of Month	D01, D05, F01, FM01, L01, LE02, R02, V01, LE01, O06, LE03, MI01, O08
20th of Month	D02, O10, O11, R01, R03, FM05, V02, BI06, FM06, N02, N03, SA01, LE04, MI02, N01
25th of Month	T03, L06, O12, FM04, SA02, SO05, SO06, TP03, BI01, BI03, SO02, SO04, FM02, TP02, BI05, GC01, SO03, T02, D04, N04, SO01

Figure 5.1: Shows how to place order in a month for different SKUs

(for 5th of the month, order placed every week, for 10th thrice, for 20th twice and for 25th Once)

These are the date in which he can place order 4 times a month, placing Economic order quantity for different SKUs or take idea from this.

- Setup a proper Inventory Management System which will help to track all the inventory. And give much more accurate detail and will remove the burden of doing it manually (as it is continuous process).

6 Limitations and Caveats

- As one month sales data is very less, to capture the full variability of demand especially seasonal fluctuations. Also didn't able to capture long term trends or patterns.

- Inventory management problem is continuous process and it need very accurate data, but getting such data by manually asking from shopkeeper, is not possible and also its hard for owner to remember each and everything accurately, what he sold in a day. There might be errors which can lead to wrong calculations of EOQ, Safety Stock etc.

- Optimal Inventory management requires proper system which capture all the business data and find patterns, and gives us the demand forecast trigger reorder point for replenishment.

7 References

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