BDM Capstone Project

Final Submission

Expiry/Breakage management by a wholesale pharmacy

Submitted By-

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Roll- 22f3003063

Contents

Declaration Statement

I am working on a Project titled "**Expiry/ breakage management for wholesale pharmacy**". I extend my appreciation to [**R. P. Medical Agency**], for providing the necessary resources that enabled me to conduct my project.
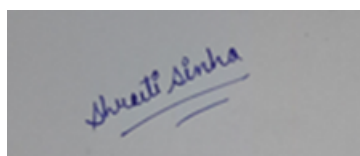
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.

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 principles 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfilment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate: (**Digital Signature**)

Name: SHRUTI SINHA

Date: 15-04-2024

Executive Summary and Title

This project focuses on a pharmacy located in wholesale marketplace of Gaya. The marketplace serves the retail demand of Gaya as well as the demand of neighbouring towns of Bihar and Jharkhand like Aurangabad, Giridih, Nawada etc. The pharmacy name is R.P. Medical Agency and it was established in the year 1997. Established for more than 25 years the shop is well known name in the entire customer base. The entity is B2B and serves retail pharmacy stores.

While visiting the entity the owner expressed his concern of high amount of capital blockage due to returns being received from customers (retail pharmacy) which is transferred to supplier (Clearing and forwarding agent) in the case. This capital blockage indirectly impacts the profits and it is required to look for a way to decrease the return so that freed capital can be better utilized in the entity.

The problem will be addressed by doing a demand forecast of every SKU and proposing a plan of product procurement as well as effort will be made to optimize the return transport and handling cost.

With the demand forecast we will be able to predict the SKU that will fetch maximum revenue and will help in minimizing the purchase of SKU that are not in demand and that could reduce the no. of units becoming redundant till expiry. This way the probability of returns happening will reduce and eventually it won't block capital with the supplier which will indirectly increase the profits.

With the recognition of high demand SKU we expect to increase the sales as well as decrease the no. of returns which will release capital that gets stuck with the supplier as well as the handling and transportation cost of returns. We are expecting a 10% growth in annual revenue based on insights of the analysis done on the data received from the business.

Detailed Explanation of Analysis Process/Method
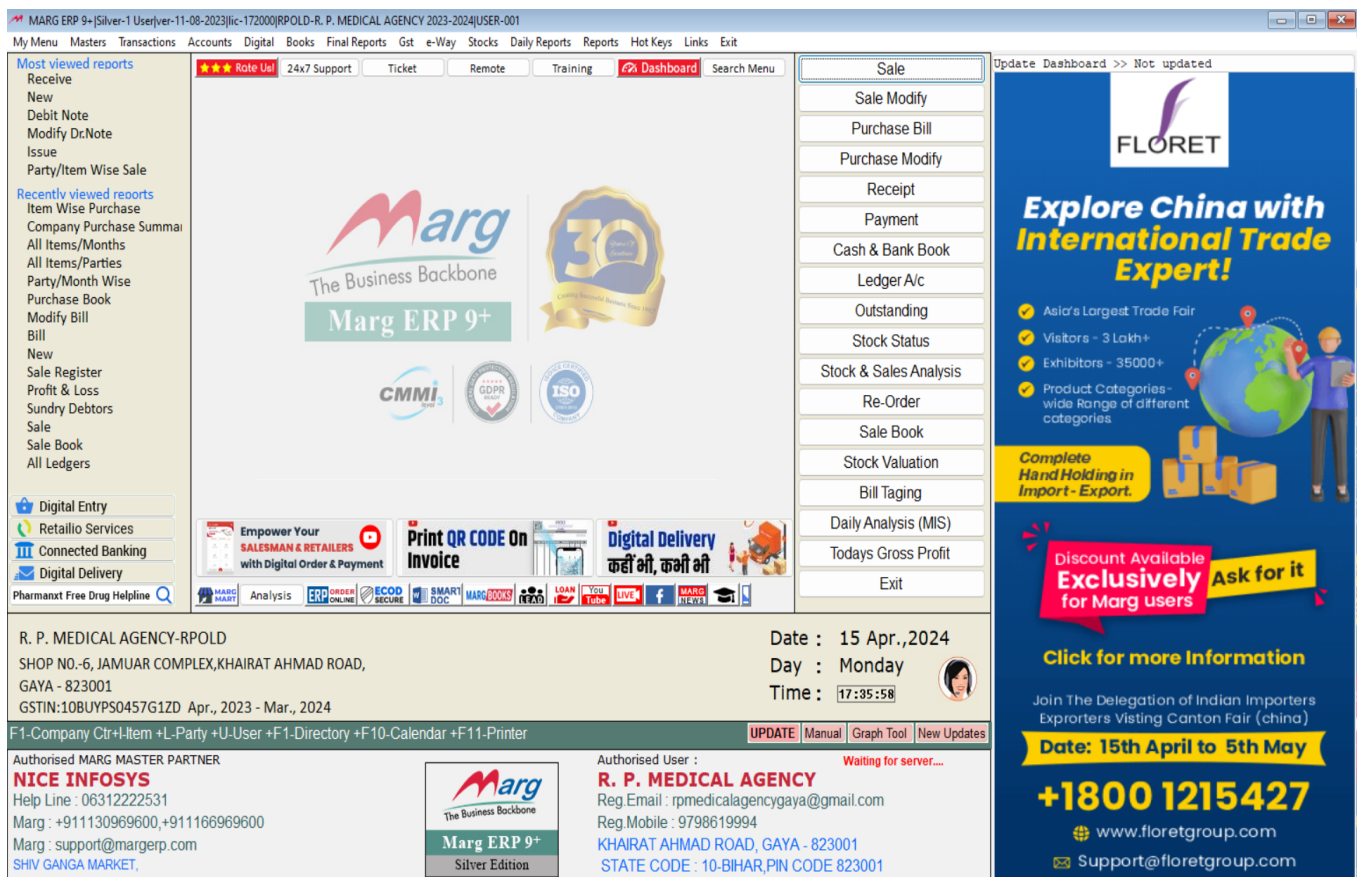
- **Process/ Method for Data Collection and cleaning**

Figure 1Landing page for billing software

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Figure 2. Report Screenshot

For collection of data available with electronic billing system is used. This is an offline software that provides limited no. of features and most of these features are not used frequently by owner and his staff. The reports generated in the system are generated in PDF format of which was then converted to Excel after copy pasting. In the process of data cleaning it was observed that there are a few entries with negative quantity in both sales and purchased when asked about this, the owner proposed that it may be an erroneous entry. Hence, it was converted to its positive entry. The same is reported to software vendor to get the validation put in place.

CUSTOMER	MEDICINE	QTY	FREE	RATE	AMOUNT
ADARSH MEDICO-GAYA	ACENAC-MR TAB	100		144.97	14497.00
AGRAWAL MEDICAL AGENCY-KURTHA	ACENAC-MR TAB	15		139.49	2092.37
AMIT MEDICAL HALL-TEHTA	ACENAC-MR TAB	50		122.20	6110.10
ASHA MEDICAL HALL-DAUDNAGAR	ACENAC-MR TAB	6		128.93	773.56
ASHA MEDICAL HALL-DAUDNAGAR	ADONIA CREAM	1		125.95	125.95
ADARSH MEDICAL HALL-CHANKAND	ALKAPYRIN SYP	6		58.28	349.69
ALKA MEDICAL STORES-DELHA GAYA	ALLESTINE COLD SYP	13		36.94	480.27

Figure 3. Sample of sales data.

Item Description	Quanti	Free	Av.Rat	Amou
ACENAC SP TAB	10	0	70.01	700.11
ACENAC-MR TAB	400	0	124.63	49853.10
ACENAC-P TAB	50	0	54.09	2704.70
ACIDOSEAL-40	125	0	47.14	5892.70
ACIDOSEAL-D 40 TAB	19	5	81.97	1967.20
ADONIA CREAM	32	4	131.43	4731.39
ADP-5 TAB	20	0	25.63	512.62
ADP-AT TAB	430	0	48.14	20702.09
ADP-H TAB	56	0	44.17	2473.27
AFDERM MN OINT.	7	0	46.67	-326.69
ALACT-MR	10	2	147.33	1767.90
ALGO OD TAB	44	4	53.03	2545.60
ALKAPYRIN SYP	200	0	58.50	11700.00
ALLENZA TAB	220	0	3.30	725.56
ALLESTINE COLD SYP	183	17	31.63	6325.45

Figure 4 Purchase data

- **Descriptive Statistics**

In order to understand the business better, we did the descriptive statistics. We calculated the central tendency namely mean, also analysed the std. deviation and quartiles of data. This helped understand the performance of different metrics in the business. We understood the average sales, average value in terms of quantity as well as price.

- **Trend analysis**

After that we tried understanding the trend for party/customer wise sales figure. As well as SKU/medicine was sales figure that helped us understand the which customer and which SKU is contributing most towards revenue. Next, we did a time series trend analysis doing tracking a month-on-month sales tracking. For doing this trend analysis we have used figures directly available on the software. We have noted every – month sales manually from the software and entered in excel to find the trend. Data for trend analysis

Month	Items Sold
Apr	19506
May	18239
Jun	15004
Jul	19564
Aug	21554
Sep	21380
Oct	16747
Nov	9183
Dec	15814
Jan	13087
Feb	15574
Mar	17848

Figure 5 Data for trend analysis

Profitability Analysis

From the purchase data we have added the Average Rate to the sales data. We have calculated the unit wise profit, profit percentage, Total profit columns and did a SKU wise profitability analysis of entire SKU.

CUSTOMER	MEDICINE	QTY	FREE	RATE	AMOUNT	Av.Rate	Profit	Total Pr	Profit %
ADARSH MEDICO-GAYA	ACENAC-MR TAB	100		144.97	14497.00	124.63	20.34	2034	14%
AGRAWAL MEDICAL AGENCY-KURTHA	ACENAC-MR TAB	15		139.49	2092.37	124.63	14.86	222.9	11%
AMIT MEDICAL HALL-TEHTA	ACENAC-MR TAB	50		122.20	6110.10	124.63	-2.43	-121.5	-2%
ASHA MEDICAL HALL-DAUDNAGAR	ACENAC-MR TAB	6		128.93	773.56	124.63	4.30	25.8	3%
ASHA MEDICAL HALL-DAUDNAGAR	ADONIA CREAM	1		125.95	125.95	131.43	-5.48	-5.48	-4%
ADARSH MEDICAL HALL-CHANKAND	ALKAPYRIN SYP	6		58.28	349.69	58.5	-0.22	-1.32	0%
ALKA MEDICAL STORES-DELHA GAYA	ALLESTINE COLD SYP	13		36.94	480.27	31.63	5.31	69.03	14%
ARCHANA MEDICAL HALL-BARACHATI	ALOMINE LOTION	6		70.26	421.55	67.6	2.66	15.96	4%
ARCHANA MEDICAL HALL-BARACHATI	AMBULAX ET TAB	2		60.71	121.42	58.56	2.15	4.3	4%
ASHA MEDICAL HALL-DAUDNAGAR	AMBULAX ET TAB	18		59.42	1069.50	58.56	0.86	15.48	1%
AZAD MEDICAL STORES-PARAIYA GAYA	AMBULAX ET TAB	5		64.87	324.34	58.56	6.31	31.55	10%
BHARAT MEDICAL AGENCY-IMAMGANJ	AMBULAX ET TAB	12		60.71	728.50	58.56	2.15	25.8	4%
ANURAG MEDICAL HALL-KHIZARSARAI	AMBULAX-ETM	10		46.28	462.82	39.05	7.23	72.3	16%
ANURAG MEDICAL HALL-KHIZARSARAI	AMICILINE PLUS	2		57.95	115.89	60.12	-2.17	-4.34	-4%
CHAINPUR MEDICAL HALL-G.B.ROAD GAYA	AMICILINE PLUS	11		62.77	690.43	60.12	2.65	29.15	4%
ARCHANA MEDICAL HALL-BARACHATI	ATORIN 10MG	3		32.90	98.70	33.4	-0.50	-1.5	-2%
AASHISH MEDICAL HALL-MOHANIA	ATORIN 20	5		81.91	409.53	85.67	-3.76	-18.8	-5%

Figure 6 Sales data for profitability analysis

Results and Findings

Descriptive Statistics for Sales data

	QTY.	FREE	RATE	AMOUNT
Count	677	0	677	677
Mean	40	-	78	2505
Std	130.8817	-	69.49984	9375.472
Min	1	-	3	32
0.25	5	-	36.655	267.19
0.5	10	-	66.43	575.77
0.75	27	-	98.815	1523.59
Max	2000	-	857	143276

Note that there are no medicines sold on free scheme basis.

Descriptive statistics for Purchase data

	Quantity	Free	Av.Rate	Amount
Count	717	717	717	717
mean	331	8	76.72	15322.97
std	982.3785	29.61168	69.24103	33188.27
min	0	0	0.00	0.00
0.25	30.5	0	37.955	2320.56
0.5	95	0	61.52	5809.32
0.75	269.5	5	94.58	14522.61
max	16627	560	771	479306

Note that the minimum in quantity is 0. On checking data there were 2 entries with 0 quantity when enquired with the owner, he said this is a free medicine on some other medicine of the same company.

Profitability Analysis

We have 300 odd medicines being sold by R.P. medical agency. We have graded the medicines as High (>10% profit), Standard(5%-10%) profitability, Below standard (1%-5%) and loss making (0% and below). Below is the distribution of the same.

Grading	MEDICINES
Below Standard	81
High	71
Loss Making	54
Standard	93
Grand Total	**299**

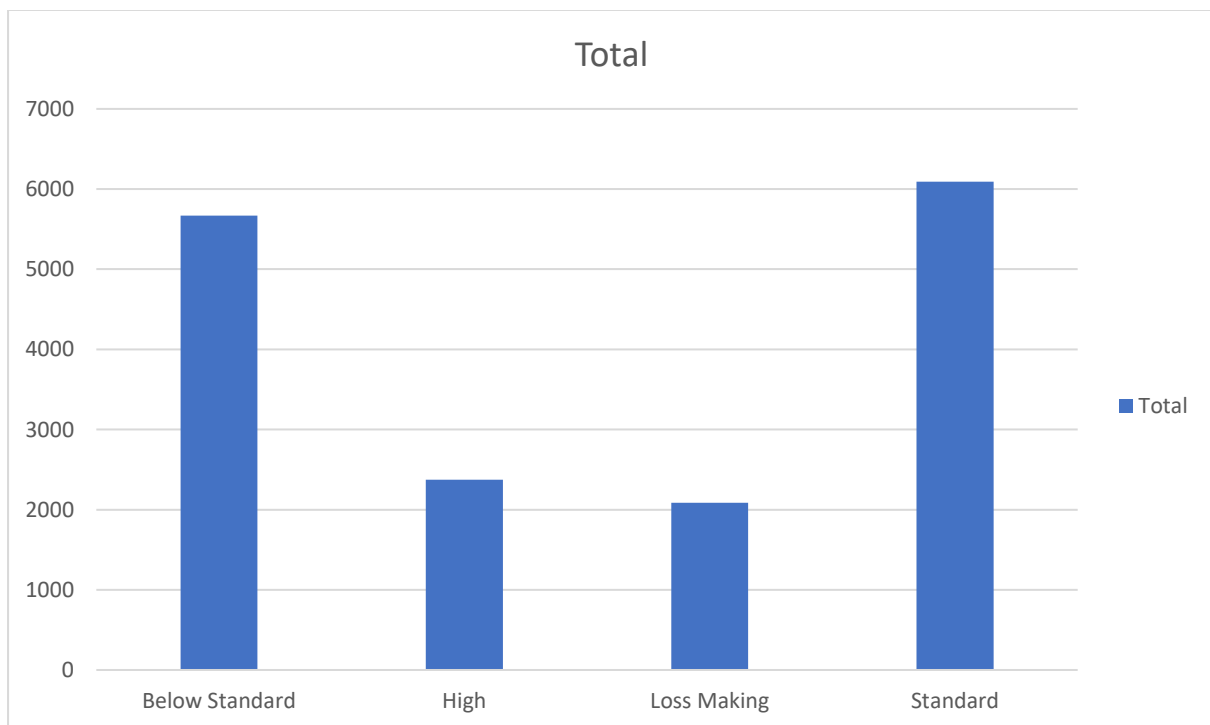Same information is depicted in graph below.

Figure 7 Graph showing no. of medicines in different grading

In the below chart, we have shown the contribution of different grading of medicine to revenue.
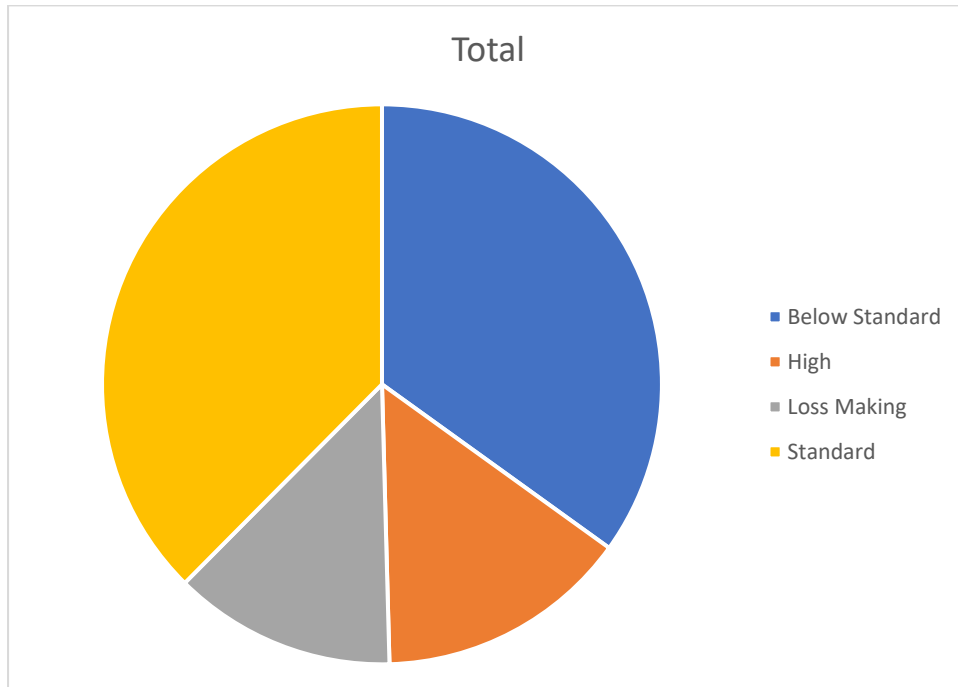

Figure 8 Pie chart showing revenue contribution

We can observe that below standard have high contribution towards the revenue. While the loss making and high revenue medicines have same contribution.

So, we can conclude that below standard and standard profitability medicines have higher contribution when it comes to revenue or sales.
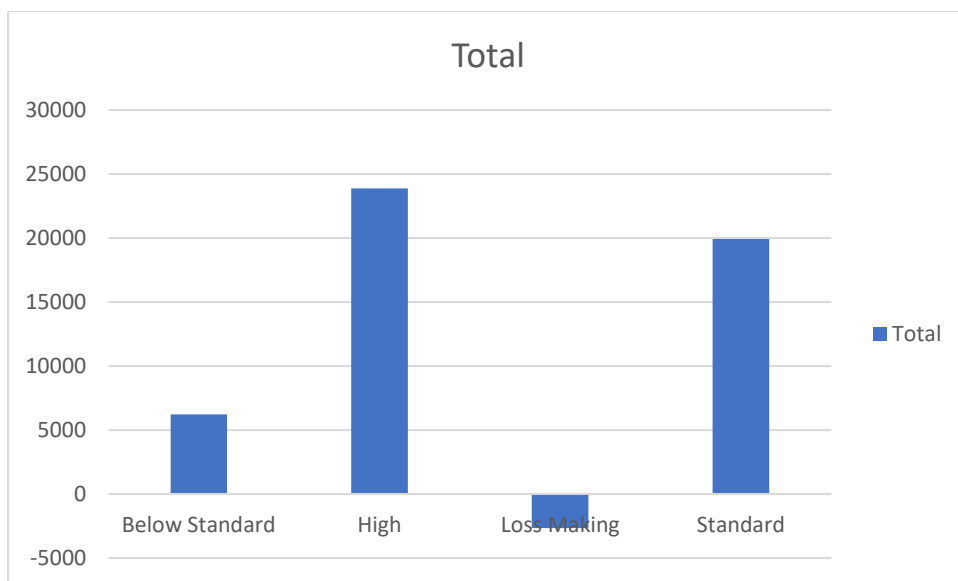
Figure 9Profit contribution of medicines of different grades

Here the high profitability medicines can be seen contributing more towards profit even though they are being sold in lesser no. and generating less revenue. We can conclude from the graph that high profitability medicines contribute more towards profit even when contribution is less while standard profitability medicines contribute similar to its contribution in sales. While the below standard participate significantly in revenue but is only a small contributor in profit. Same information can be visualised below.
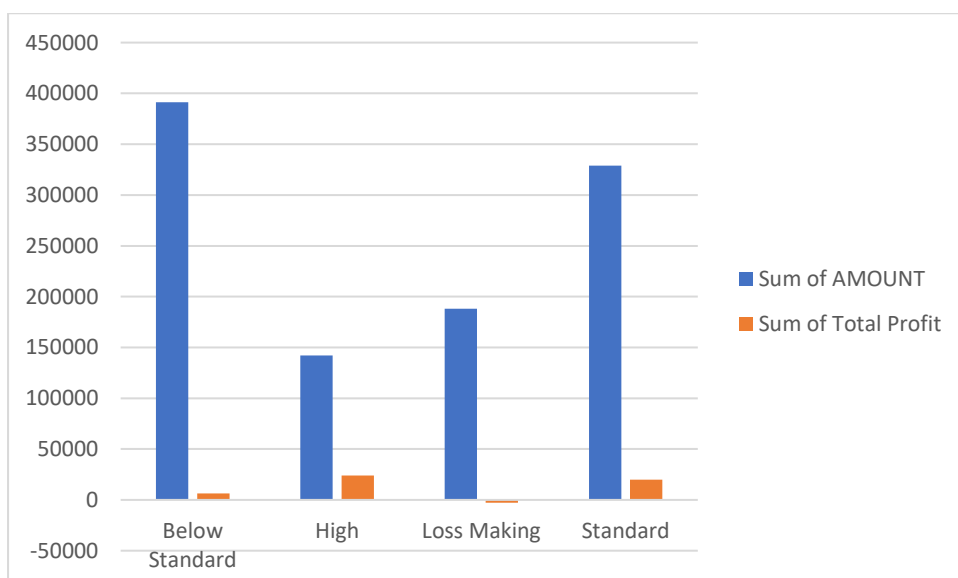
Month on month trend analysis

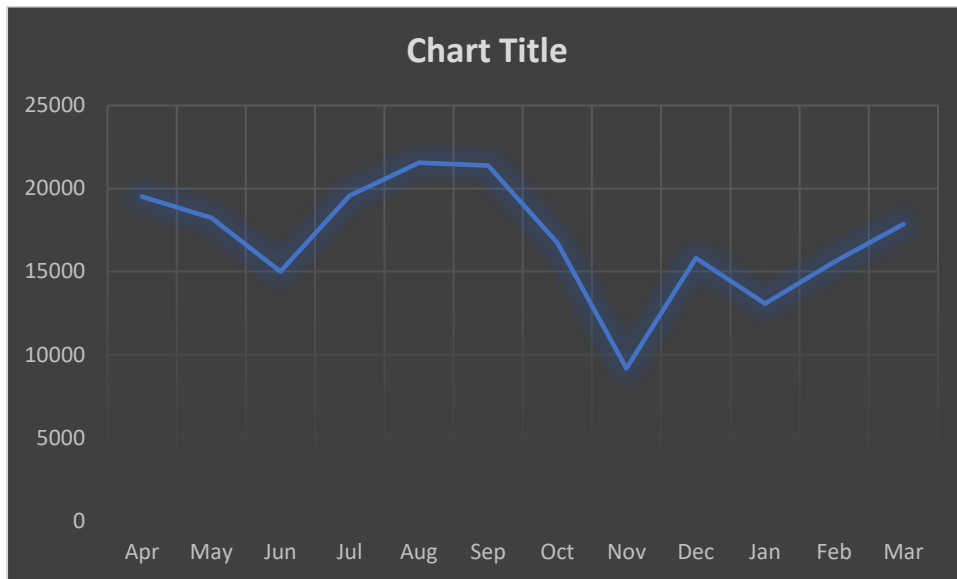The sales trend is based on data available on the software. The year wise trend is present below.

Figure 10 Month on Total Sales

The image shows a constant decrease in sales in first quarter. In the second quarter there is a jump in sales dips in third quarter. The third quarter shows. Lowest sales record in November followed by uniform increase in from December. With slight decrease in February the closing happens at almost same sales figure.

We are unable to prepare the SKU wise demand forecast as the report available in the software do not have bill date of sale date. Hence this forecast can't be done. We only have total sales figure. On which we could study the trend based on which November seem to be generally low sales period.

Party Wise Revenue analysis
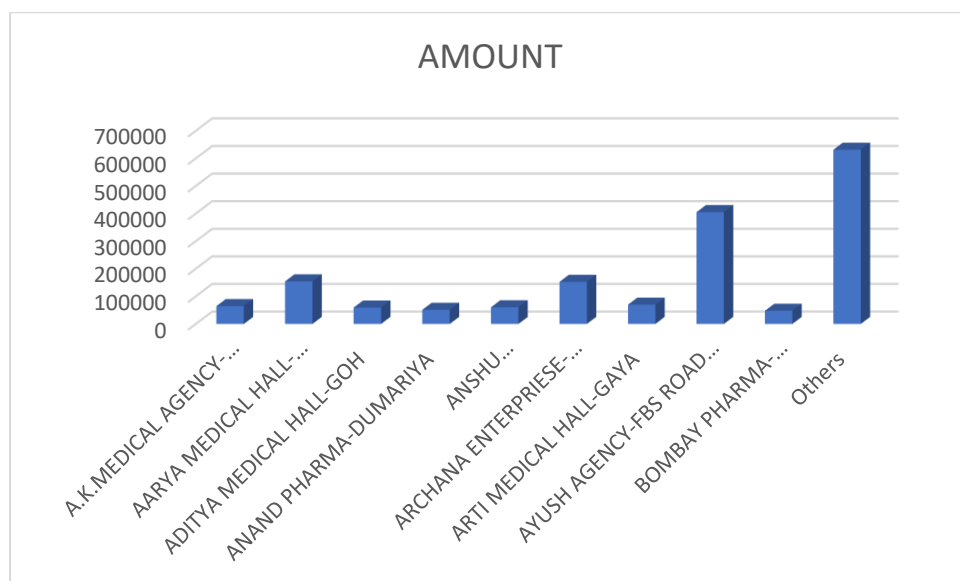
There are some 76 customers that have purchased from RP medical enterprises. Out of which 9 accounts for maximum sales which are presented above. These 9 customers happen to account for 63% sales and can be clubbed as prime customers. AYUSH AGENCY-FBS ROAD GAYA happens to be biggest purchaser for the entity accounting for Rs. 405170.5 which is 24% of total sales. While 67 customers are very small customers who account for only 0-1% of sales and cumulatively account for 37% sales.

Medicine wise Sales Analysis
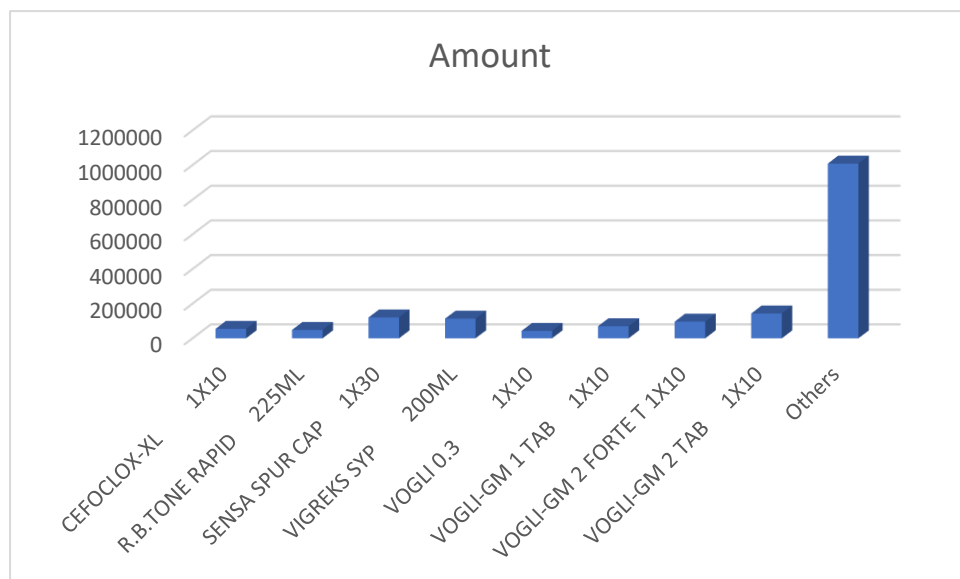
The business has dealt in 310 medicines last year out of which 8 medicines account for 41% sales which are shown above. The rest 302 account for 59% sales. There is no clear cut high performer SKU almost every SKU similar kind of performance.

Interpretation of Result and Findings

We can conclude the below points after doing the analysis:-

1. We could increase the sales of medicines having grading high and the same can be achived by below steps:
   a. We could recognise which medicine has what indication and that could help in recognising the season in which more demand for that medicine could as disease like cough etc happen in winters mostly and can attract more sales at that point in the year.
   b. Platforms like 1mg , Bluemedix which is already a customer to R.P medical agency could help in increasing sales. It should partnership with such giants to increase sales.
2. We have recognised some high ticket value customer and also noticed that R. P. medical enterprises did not used the free feature that is available in the software. The software vendor itself provides such feature means that it is being used by other entities. The R.P medical agency should provide free medicines to these recognised customers. So, that other customers also start purchasing in the same quantities that could help in increasing the sales.
3. November happens to be low sales period and rest of the months are similar sales. The reason for low sales can be looked for and if it is not systematic. The reasons could provide for more insights for increasing sales.
4. In addition the shop could also keep the most high sales medicines and near expiration medicines in the front to increase the sales.

There are a lot of fields that are being collected at the time of entry bur the same is not available in the reports. This issue is also raised with the software vendor and repot downloading etc. is explained to the owner so that, he could also download the same from the software.

Conclusion

In conclusion, the analysis of R.P. Medical Agency's sales and purchase data has provided valuable insights and recommendations for improving the shop's profitability and inventory management.

The analysis revealed there are medicines in high profit margin category represent significant opportunities for increasing sales. By implementing targeted marketing strategies, partnerships with other businesses, the shop can tap into the potential of these high-profit items. Additionally, offering free medicines can incentivize customers to purchase larger quantities, further boosting sales volume and overall profitability.

The software does not have very advanced features and a few can be asked from the vendor which can be done without increasing the price that much.