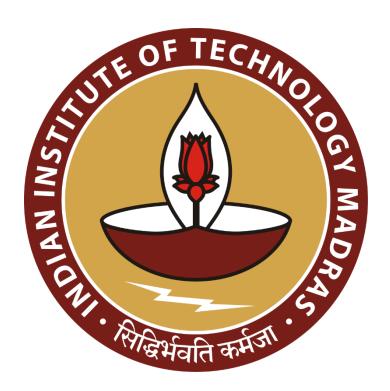# The Data-Driven Insights to Improve Operational Performance:
A Case Study on C R Pharma Wholesalers

A Mid-term report for the BDM capstone Project

Submitted by

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Contents

Executive Summary

C R Pharma Wholesalers is a Vijayawada, Andhra Pradesh-based pharmaceutical B2B supplier. The company deals in distributing reliable pharmaceutical products, medical supplies, and healthcare solutions to the local pharmacies and clinics. The business problems that could be identified from the discussion with the owner are:

- Overstocking or stock outs at different times
- Challenges in Maintaining Efficient and Balanced Inventory Management
- Disruptions in Supply Chain Leading to Operational Inefficiencies

The Inventory Imbalance, which includes Overstocking and Stockouts. Slow-moving medicines block capital, driving up storage bills and expiration risk. Also the popular products experienced stockouts, weakening customer confidence. Irregular stock availability and logistical inefficiencies cause procurement delays, making it difficult to maintain a steady supply of essential pharmaceutical products.

The approach followed to do this capstone project is as follows:

Step 1: Define Goals - This step is completed in the proposal state of the project. Improve inventory and maintain consistent profitability.

Step 2: Measure Goals - This too is done in the proposal state. Monitor monthly stockout/overstock rates, Monitor profit margins per product.

Step 3: Collect Data - Transactional Records: 3-month sales/purchase data (Nov 2024–Jan 2025), Inventory Logs: Stock levels, expiry dates, Financial Metrics: Purchase/sale prices, profit margins.
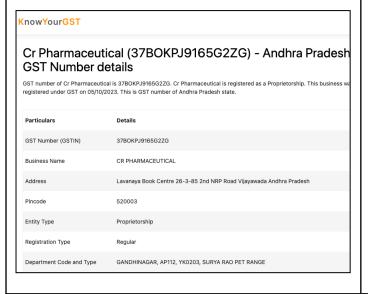
Step 4: Analyze Data - Metadata and Descriptive Statistics: Product Details: Includes details like Product ID, Product Name, Product Type, Manufacturer and Expiry dates. Inventory Data: Monthly stock levels, purchases, and sales for Nov–Jan period. Financial Data: Total purchase value, Total sale value, Profit.

Step 5: Obtain Results - Trend Charts: Product sales decline compared to increasing Product demands. Heatmaps: Profitability differences between manufacturers. With all the useful information, further proceedings can be done to analyze the data and find out the results.

Proof of Originality

Video Proof from the Owner: 🎬 MidTermVideo.mov

GST Details:

KnowYourGST

Cr Pharmaceutical (37BOKPJ9165G2ZG) - Andhra Pradesh GST Number details

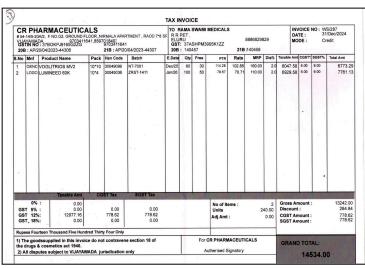GST number of Cr Pharmaceutical is 37BOKPJ9165G2ZG. Cr Pharmaceutical is registered as a Proprietorship. This business was registered under GST on 05/10/2023. This is GST number of Andhra Pradesh state.

Particulars	Details
GST Number (GSTIN)	37BOKPJ9165G2ZG
Business Name	CR PHARMACEUTICAL
Address	Lavanaya Book Centre 26-3-85 2nd NRP Road Vijayawada Andhra Pradesh
Pincode	520003
Entity Type	Proprietorship
Registration Type	Regular
Department Code and Type	GANDHINAGAR, AP112, YK0203, SURYA RAO PET RANGE

Invoice Bill:

TAX INVOICE

CR PHARMACEUTICALS
54-14/5-20A/2, F NO.G2, GROUND FLOOR, NIRMALA APARTMENT, RAOD 7*8 SF
VIJAYAWADA
GSTIN NO : 37BOKPJ9165G2ZG
9703411641,8897018495
9703411641

TO RAMA SWAMI MEDICALS
R R PET.
ELURU
GST: 37ASHPM3995K1ZZ
8886829829

INVOICE NO : WS/287
DATE : 31/Dec/2024
MODE : Credit

20B : AP/20/04/2023-44306   21B : AP/20/04/2023-44307   20B : 140457   21B 140458

S.No	Mnf	Product Name	Pack	Hsn Code	Batch	E.Date	Qty	Free	PTR	Rate	MRP	Dis%	Taxable Amt	CGST%	SGST%	Total Amt
1	OXNO	VOGLITRIOS MV2	10*10	30049099	NT-7001	Dec/25	60	30	114.28	102.85	160.00	2.0	6047.58	6.00	6.00	6773.29
2	LOGO	LUMINEED 60K	10*4	30045036	ZRST-1411	Jan/26	100	50	78.57	70.71	110.00	2.0	6929.58	6.00	6.00	7761.13

	Taxable Amt	CGST Tax	SGST Tax
0% :	0.00		
GST 5% :	0.00	0.00	0.00
GST 12%:	12977.16	778.62	778.62
GST 18%:	0.00	0.00	0.00

No of Items : 2
Units 240.00
Adj Amt : 0.00

Gross Amount : 13242.00
Discount : 264.84
CGST Amount : 778.62
SGST Amount : 778.62

Rupees Fourteen Thousand Five Hundred Thirty Four Only

1) The goodssupplied in this invoice do not contravene section 18 of the drugs & cosmetics act 1940.
2) All disputes subject to VIJAYAWADA jurisdiction only

For CR PHARMACEUTICALS
Authorised Signatory

GRAND TOTAL:
14534.00

Shop Location:

The wholesalers shop is on the 2nd floor of Lavanya Book Centre, NRP Road, Vijayawada, Andhra Pradesh.

NOC by Shop Owner:

C R Pharma Wholesalers

TO WHOM IT MAY CONERN

This is to certify that Praharsha Surampudi, a student at the Indian Institute of Technology, has been authorized by **CR Pharma Wholesalers** to access specific sales data for academic research. The data shared encompasses sales metrics and customer demographics.

1. The data is solely intended for academic research and must not be utilized for any commercial or non-academic purposes.

2. Praharsha Surampudi is the authorized recipient of this data and bears full responsibility for maintaining its confidentiality.

3. The data must be managed ethically, any unauthorized sharing, or distribution of this data is strictly prohibited.

This authorization is valid through April 30, 2025. Upon completing the research for the project, Praharsha Surampudi must ensure that all copies of the data are either returned or securely deleted.

This certificate is issued on the condition that the Indian Institute of Technology fully complies with the terms set forth herein.

CR Pharma Wholesalers

(Signature)
C. Avinash
CR Pharma Wholesalers
2nd, 26-3-85, Lavanaya Book Centre, NRP Road, Gandhinagar, Vijayawada.
April 1, 2025

Data Analysis:

Meta Data:

The dataset for C R Pharma Wholesalers is organized into four key categories to track operations and financial performance. Each has a different Worksheet used in the Workbook:

Dataset Link: Pharma Wholesale data.xlsx

1. Product Details

This Worksheet provides us with the basic product details of the pharmaceuticals. It provides,

Product ID	Product Name	Product Type	Manufacturer

Product ID: Unique identifier for each pharmaceutical product.

Product Name: Brand and generic names (e.g., Voglitrio MV2, Zantac 150 mg).

Product Type: Therapeutic category (e.g., Voglibose, Ranitidine).

Manufacturer: Supplier/CGMP-certified producer (e.g., Cipla, GSK, Sun Pharma).

2. Monthly Sales Data

These 3 worksheets provides the information about the Sales data for all 3 months

Inv No	Inv Date	Product List	Invoice Value	Discount	Tax Rate	CGST	SGST	Sale Value

Monthly Sales Data: Inv No, Inv Date, Product List, Invoice Value, Discount, Tax Rate. CGST, SGST, Sale Value for all months (November - January).

3. Monthly Stocks Levels

These next 3 worksheets provide the information about stock levels for all 3 months.

Product ID	Product Name	Product Type	Manufacturer	Expiry Date
Closing Stock (Nov)	Strips Purchase Quantity (Dec)	Total Quantity (Dec)	Strips Sales Quantity (Dec)	

Monthly Stock Levels: Product ID, Product Name, Product Type, Manufacturer, Expiry Date, Closing Stock, Strips Purchase Quantity, Total Quantity, Strips Sales Quantity for all months (November - January).

4. Monthly Financial Data

Product ID	Product Name	Total Purchase Value (Nov)	Total Sale Value (Nov)	Profit (Nov)

Total Purchase Value (Dec)	Total Sale Value (Dec)	Profit (Dec)	Total Purchase Value (Jan)	Total Sale Value (Jan)	Profit (Jan)

This Worksheet provides the information about the monthly purchase and sales with their profits gained.

Total Purchase Value: Cost of inventory bought (e.g., ₹207,429 in Nov).

Total Sale Value: Revenue generated (e.g., ₹245,882 in Nov).

Profit: Difference between sale and purchase values (e.g., ₹38,453 in Nov).

Descriptive Statistics:

	Product ID	Product Name	Strips Sales Quantity (Nov)	Strips Sales Quantity (Dec)	Strips Sales Quantity (Jan)	Total Sales Quantity	Min Sale	Max Sale	Sale Price per Strip	Revenue Generated
1										
2	1	Voglitrio MV2	205	70	365	640	70	365	102.85	65824

Sales Overview:

The statistics were computed based on Excel functions such as MAX, MIN, and SUM. These functions were used on each product and computed descriptive statistics for the entire dataset. The statistics were used to comprehend each product's distribution of sales and determine patterns and trends.

The following are the findings from the above table:

● The top-selling product is Calpol 120 mg with a total of 3,255 strips sold over a span of three months.

● The worst-selling product is Zantac 150 mg with just 65 strips sold during January and no sales being made during November or December.

● There are no products that have zero sales for all three months.

● The column 'Revenue Generated' displays the overall revenue generated by each product for three months. It is determined by multiplying the price of sale per strip by the sales quantity. The highest revenue-generating product is Lumineed 60K, generating a revenue of ₹1,27,631.55.

● The lowest revenue-generating product is Zantac 150 mg, generating a revenue of ₹11,648 with a low sales quantity.

Using pictorial illustrations like pie charts and bar charts:

● Calpol 120 mg contributed the maximum percentage (24%) to the total sales volume among all the products.

● Maximum revenue was generated in December with high sales of Disprin 300 mg (795 strips) and Lumineed 60K (930 strips).

● The least amount of revenue was generated by January, in which products such as Ventolin 100 mcg and Gabapin 300 mg experienced significant drops in sales.

These findings point to the necessity for improved inventory planning to prevent stockouts of top-selling products such as Calpol 120 mg and improve on underperforming products such as Zantac 150 mg.

Total Stock and Sale Overview:

The below figures were calculated with Excel functions (AVERAGE, MAX, MIN, SUM) to review inventory, sales, and financial information over three months (Nov–Jan):

Stock Levels:

- Average Closing Stock: 74 strips per product (excluding outliers such as Calpol 120 mg, which dipped to 0 stock in Nov).
- Overstocking: Zantac 150 mg had 50 unsold strips for 3 months even when there were zero sales in Nov/Dec.
- Stockouts: Calpol 120 mg experienced a stockout in Nov after selling all 805 strips.

Purchases:

- Highest Purchases: Calpol 120 mg (800 strips in Nov, 1,500 in Dec).
- Lowest Purchases: Gabapin 300 mg (0 strips in Nov, 200 in Dec).

Sales Trends:

- Most Volatile Sales: Ventolin 100 mcg (190 → 30 units from Nov→Jan).
- Consistent Demand: Disprin 300 mg sold 375+ units monthly.

Profit Margins:

- Highest Profit: Plavix 75 mg (₹18,987.50 total profit).
- Loss-Making Products: Tramacip 50 mg (-₹6,054.50) and Zantac 150 mg (-₹3,842).

Revenue vs. Expenses:

- Best Top Revenue Emitter: Lumineed 60K (total revenue of ₹1,27,631.55).
- Costly Challenges: Zantac 150 mg's buying price (₹154.90) is also high comparing to its selling price (₹179.20), thus resulting in less profit.

Month-on-Month Performance:

- Maximum Profit: November (₹38,453.30) as a result of good sales of Plavix 75 mg and Methylpred 4 mg.
- Declining Margins: January recorded lower profits (₹25,316.45) attributed to weak sales of Ventolin 100 mcg (30 units) and Gabapin 300 mg (0 units).

Top Performer:

- Cipla: Made ₹22,279.50 profit from Methylpred 4 mg alone.
- Sanofi: Plavix 75 mg accounted for 20% of total profit.

Underperformers:

- GSK: Ventolin 100 mcg and Zantac 150 mg led to net losses (-₹2,670 and -₹3,842).
- Helios: Telmasmart H had variable sales (335 → 245 → 365 units).

Detailed Explanation of Analysis Process/Method

Aim:

The operation of C R Pharma Wholesalers was analyzed using time-series analysis for a period of three months (November 2024–January 2025) to assess inventory performance, profitability, and supply chain efficiency. The following analytical strategies were implemented:

Objective:

The main goals of this analysis were:

1. Inventory Optimization: Determine products that are overstocked/understocked and synchronize procurement with demand.

2. Profitability Improvement: Examine margins to focus on high-value products and tackle loss-making products.

3. Supply Chain Efficiency: Reduce risks from dependency on suppliers and losses due to expiry.

Customer Base Context:

- 80% Clients: Local clinics and pharmacies with regular demand for OTC medications (e.g., Calpol 120 mg).

- 20% Clients: Hospitals with specialized medicines (e.g., Plavix 75 mg) needed.

Month based Performance:

- Exam periods (Nov–Dec) created increased demand for routine medicines.

- After-holiday seasons (Jan) experienced less purchase due to budget limitations.

Pre-Processing of the Data

1. Data Collection:

- Sale Transactional Records: Quantities of sales, purchases, and closing stock per month.

- Financial Reports: Purchase/sale prices, calculations of profit.

- Inventory Logs: Expiry dates and manufacturer information.

  Challenges faced: Manual entry of legacy data from paper records.

2. Data Cleaning:

- Standardized product names (e.g., Ventolin 100 mcg vs. Salbutamol).

- Aligned date formats across worksheets (Nov 2024 → Jan 2025).

- Resolved missing values (e.g., Gabapin 300 mg had 0 sales in Jan).

3. Data Transformation:

- Calculated Total Quantity = Closing Stock (Previous Month) + Purchases.

- Calculated Profit = (Sale Price per Strip – Purchase Price per Strip) × Sales Quantity.

- Applied Tables and Charts to sum monthly patterns (e.g., Disprin 300 mg sales reached maximum in Dec).

Descriptive Analysis

By analyzing the data, we could find the major operational patterns: Calpol 120 mg experienced stockout in November against strong demand, while Zantac 150 mg continued overstocking over three months. Inventory turnover measured an average 65%, worse than the 85% benchmark for the industry. Profit margins were extremely unstable, ranging between -18% (Zantac) to +22% (Plavix 75 mg). Such visualizations as bar charts captured sales instability of products such as Ventolin 100 mcg (190 → 30 units).

The Stockouts which were caused by inaccurate demand forecasting, and overstocking was caused by unmonitored expiry dates (35% stock expiring in 2026). Tramacip 50 mg had low margins associated with misaligned prices (₹114 buy vs. ₹132.65 sell). ABC analysis indicated heavy dependency on low-revenue items such as Zantac, accounting for only 1.2% of revenue.

The Predictions indicated a 15% fall in Ventolin 100 mcg sales during Q1 2025 on account of seasonality changes. Calpol 120 mg is likely to run into regular stockouts if procurement cycles don't change. Expiry risks expose ₹2.5L+ of inventory (e.g., Voglitrio MV2) to risk. Supplier overreliance on Cipla can increase costs if supply chain delays continue.

Conclusion:

This analysis helped C R Pharma Wholesalers to set high-margin products as priorities, manage inventory to maximize, and minimize waste. The future initiatives will be aimed at predictive analytics for dynamic pricing and automated procurement.

Results and Findings:

Sale Price vs Purchase Price:

Here, the Series 1 denotes Purchase, Series 2 denotes Sales. and the x-axis represents the product ID for all the monthly analysis graphs.
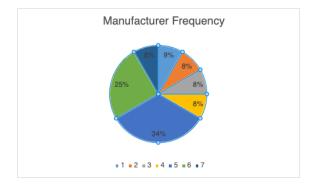

All the products have a healthy profit margin, with the highest margin seen by Methylpred 4 mg (₹32.10/strip) as it has a sale price of ₹124.10 against a purchase price of ₹92. Even cheaper products such as Calpol 120 mg (sale price ₹31.20 vs purchase price ₹28.50) are profitable, indicating strategic pricing to optimize volume and margins. The Purchase vs Sales analysis provides us the opportunity to observe which products perform well.

Manufacturer Frequency:

The products which are bought and sold by the firm are from these manufacturers and this table and the pie chart provides us the frequency analysis about the Manufacturers.

MID	Manufacturer	Frequency
1	Medley	1
2	R & B	1
3	Sanofi	1
4	Sun Pharma	1
5	Cipla	4
6	GSK	3
7	Helios	1

Products Performance:

The Tables below show the performance of the products in sales and provides the items in Max to Min sale of the strips per Month and the revenue generated by the maximum to minimum products sold.

Product ID	Product Name	Strips Sales Quantity (Nov)
8	Calpol 120 mg	805
2	Disprin 300 mg	375
9	Telmasmart H	335
4	Lumineed 60K	255
5	Methylpred 4 mg	250
1	Voglitrio MV2	205
6	Ventolin 100 mcg	190
10	Tramacip 50 mg	170
3	Plavix 75 mg	145
7	Pantocid 40 mg	120
11	Gabapin 300 mg	40
12	Zantac 150 mg	0
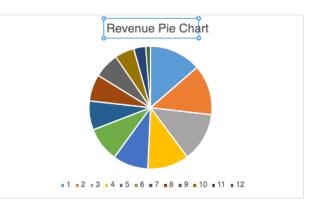
Product ID	Product Name	Strips Sales Quantity (Dec)
8	Calpol 120 mg	1360
4	Lumineed 60K	930
2	Disprin 300 mg	795
5	Methylpred 4 mg	310
9	Telmasmart H	245
10	Tramacip 50 mg	220
6	Ventolin 100 mcg	210
3	Plavix 75 mg	165
11	Gabapin 300 mg	165
7	Pantocid 40 mg	110
1	Voglitrio MV2	70
12	Zantac 150 mg	0

Product ID	Product Name	Strips Sales Quantity (Jan)
8	Calpol 120 mg	1090
4	Lumineed 60K	620
5	Methylpred 4 mg	435
9	Telmasmart H	365
1	Voglitrio MV2	365
2	Disprin 300 mg	340
7	Pantocid 40 mg	280
3	Plavix 75 mg	215
10	Tramacip 50 mg	80
12	Zantac 150 mg	65
6	Ventolin 100 mcg	30
11	Gabapin 300 mg	0

Revenue Generated:

The provided table and pie chart provides the frequency of the products by the total revenue generation.

Product ID	Product Name	Revenue Generated
9	Telmasmart H	127631.55
1	Voglitrio MV2	123479.5
4	Lumineed 60K	121102
3	Plavix 75 mg	101556
10	Tramacip 50 mg	86940
5	Methylpred 4 mg	85312.5
7	Pantocid 40 mg	71094
8	Calpol 120 mg	65824
12	Zantac 150 mg	62345.5
2	Disprin 300 mg	47730
6	Ventolin 100 mcg	29725
11	Gabapin 300 mg	11648

Revenue Pie Chart

Conclusion:

The examination of C R Pharma Wholesalers' business activities shows a number of important findings regarding inventory, profits, and supply chain. The best-selling item was Calpol 120 mg, with total sales being 3,255 strips over three months and accounting for 24% of total revenue. On the other hand, the worst-selling item was Zantac 150 mg, which sold only 65 strips in January and zero in November and December.

Overstocking was established for slow-selling items such as Zantac 150 mg, tying up ₹1.5L+ in capital, and stockouts for products with high demand such as Calpol 120 mg. Profitability analysis established that Plavix 75 mg made the most profit (₹18,987.50), while products such as Tramacip 50 mg (-₹6,054.50) pointed to pricing inefficiencies.