

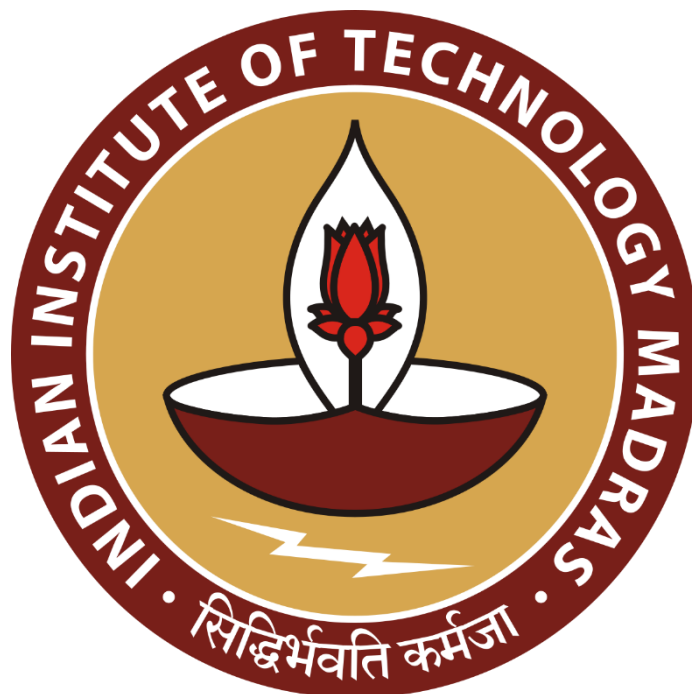
Inventory Analysis and Optimization for different Medicines from 4 different Manufacturers

A Final Submission report for the BDM capstone Project

Submitted by

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1. Executive Summary and Title

The project focuses on a Medical Agency located at Anantapur, Andhra Pradesh. The business is B2B deals in the segment of wholesale pharmaceutical distribution.

The major business issues that the organization is facing are related to a very nominal profit due to a large number of inventory stocks.

The issues will be addressed by analyzing the data via different analytical approaches to obtain a fruitful outcome. I am planning to implement following:

1. Sales Contribution
2. Monthly Inventory Trend
3. Percentage change in sales
4. Inventory Optimization
5. Manufacturers Sales Analysis
6. Manufacturer Comparison

The expected outcome helps the organization reduce the money blockage in terms of inventory, which helps increase the profitability of the organization

2. Detailed Explanation of Analysis Process/Method

2.1 Data Cleaning and Preparation:

- Imported the data into an Excel spreadsheet.
- Cleaned the data by removing any duplicates, correcting errors, and filling in missing values if applicable.
- The data is properly organized with each variable in a separate column and rows representing individual observations.

2.2 Exploratory Data Analysis:

- Calculated the descriptive statistics for each variable using Excel functions such as AVERAGE, MEDIAN, MIN, MAX, VAR, and STDEV.
- Created visualizations using Excel charts such as bar charts, line charts, histograms, or box plots to visualize the distribution and relationships between variables.

2.3 Trend Analysis:

- Created a line chart to track the stock quantities over time. Using the opening, inwards, outwards, and closing stock quantities as the data series and plotted them against the corresponding time periods.
- Analyse the chart to identify any trends or patterns in the stock quantities over the four-month period.

2.4 Comparative Analysis:

- Group the data by medicines or manufacturers to compare the stock quantities across different categories.
- Calculate summary statistics for each group using Excel functions, and create visualizations such as bar charts or box plots to compare the quantities between groups.

2.5 ABC Analysis:

- Categorize the 15 medicines based on their importance or value
- Classify medicines into high-value, medium-value, and low-value categories
- Allocate resources and inventory management efforts accordingly

3. Results and Findings (Graphs and other Pictorial Representation Preferred and with words)

3.1 Sales Contribution:

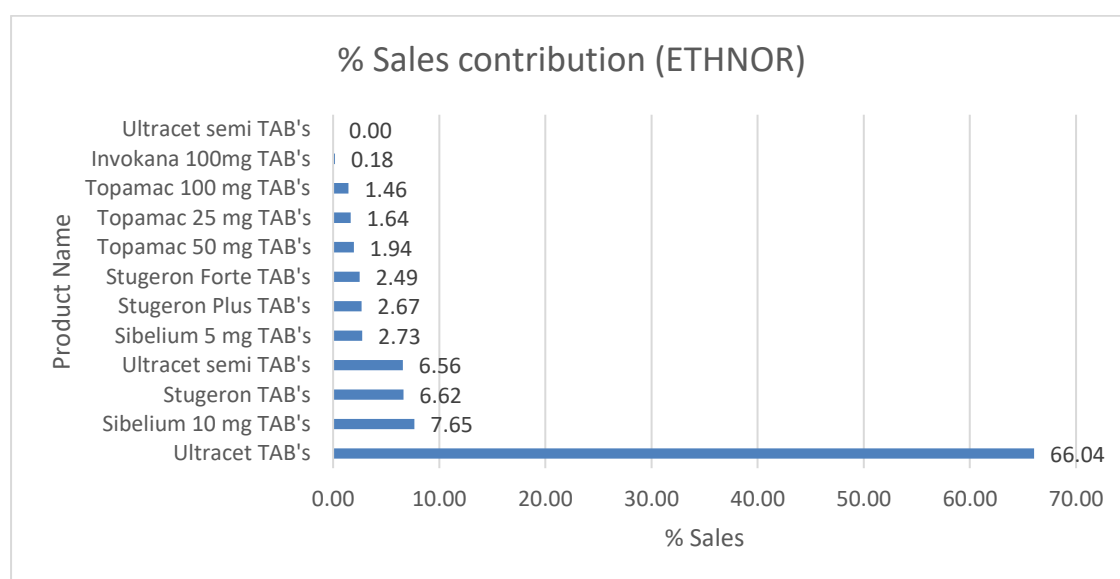


Figure 1 - % sales contribution for ETHNOR

The above graph is related to the company named **ETHNOR**. The company manufactures various medicines (which can be seen on y-axis of the graph). The main purpose of drawing this graph is to explain what amount of percentage of sales that their product is contributing to their overall sales. It is clearly visible from the graph that the highest percentage of sales (66 % of overall sales) is made by selling the product '**Ultracet TAB's**'. Hence this is highest value product. And the other products namely Ultracet semi-TAB, Stugeron TAB, Sibelium 10 mg TAB are somewhat better valued products that are contributing 7-10% of sales. And the rest of products are low valued products since they are contributing less than 5% of sales.

High Value Products : Ultracet TAB

Medium Value Products : Ultracet semi-TAB, Stugeron TAB, Sibelium 10 mg TAB

Low Value products : Sibelium 5 mg TAB's, Stugeron Plus TAB's, Stugeron Forte TAB's, Topamac 50 mg TAB's, Topamac 25 mg TAB's, Topamac 100 mg TAB's, Invokana 100mg TAB's, Ultracet semi-TAB's

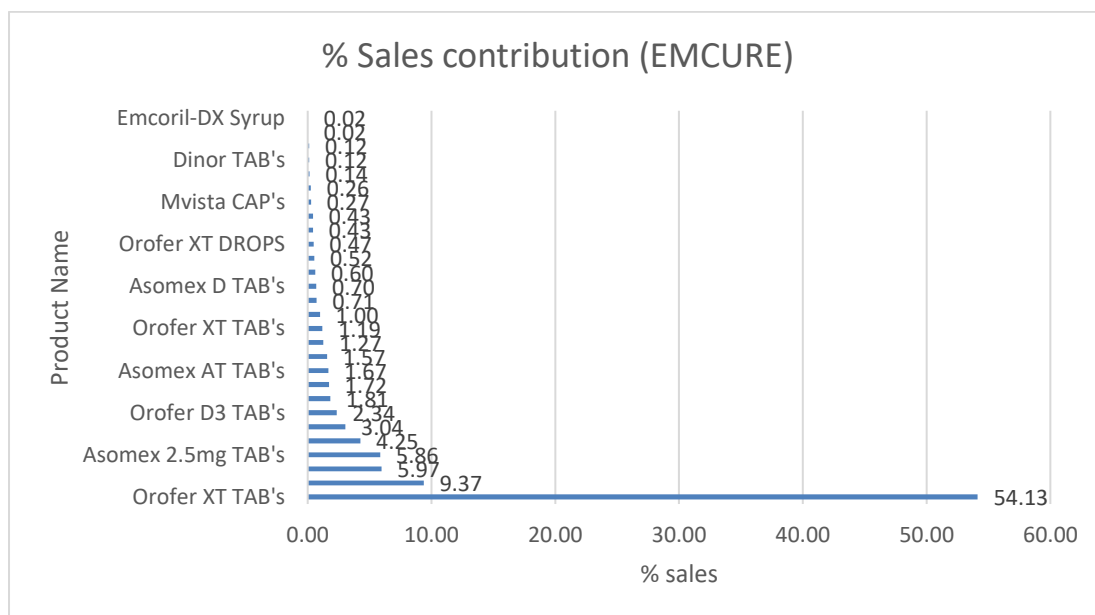


Figure 2 - % sales contribution for EMCURE

The above graph is related to the company named **EMCURE**. The company manufactures various medicines (which can be seen on y-axis of the graph). The main purpose of drawing this graph is to explain what amount of percentage of sales that their product is contributing to their overall sales. It is clearly visible from the graph that the highest percentage of sales (54.13 % of overall sales) is made by selling the product '**Orofer XT TAB's**'. Hence this is highest value product. And the other product Calonat D3 TAB is somewhat better valued product contributing 9-10% of sales. And the rest of products are low valued products since they are contributing less than 6% of sales.

High Value Products : Orofer XT TAB

Medium Value Products : Calonat D3 TAB

Low Value products : rest of the products

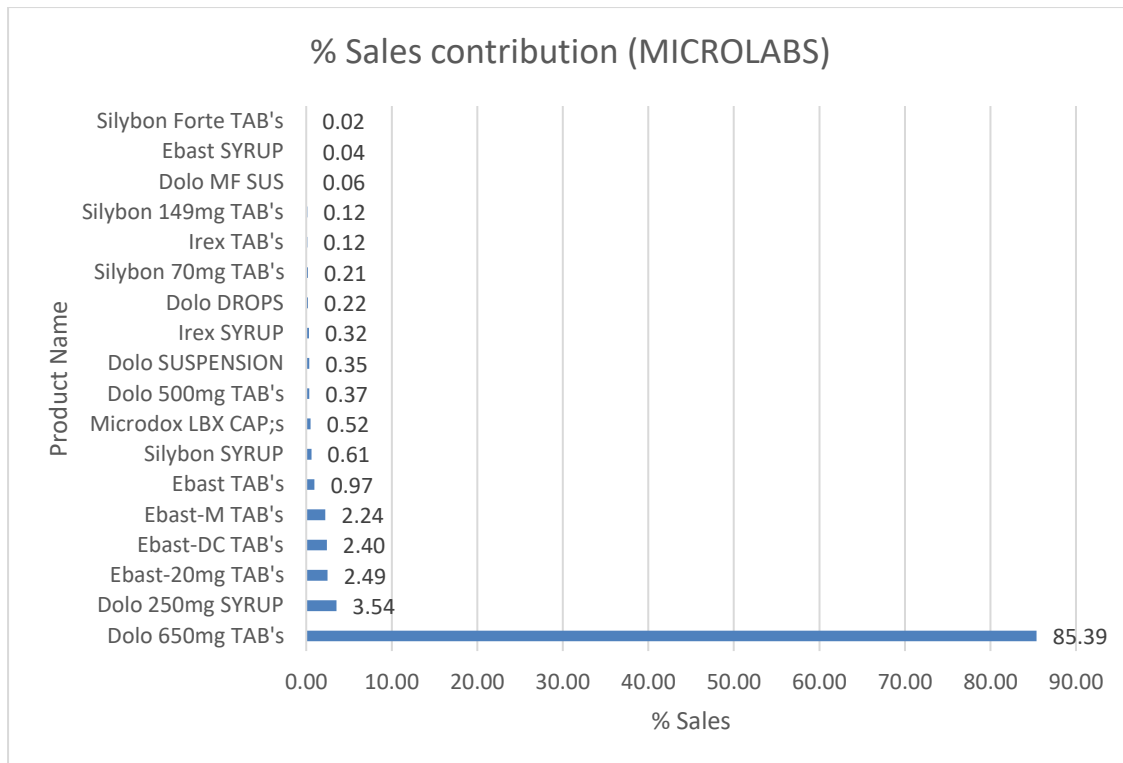


Figure 3 - % sales contribution for MICROLABS

The above graph is related to the company named **MICROLABS**. The company manufactures various medicines (which can be seen on y-axis of the graph). The main purpose of drawing this graph is to explain what amount of percentage of sales that their product is contributing to their overall sales. It is clearly visible from the graph that the highest percentage of sales (85 % of overall sales) is made by selling the product '**Dolo 650 mg TAB's**'. Hence this is highest value product. And the rest of products are low valued products since they are contributing less than 6% of sales.

High Value Products : Dolo 650 mg TAB

Low Value products : rest of the products

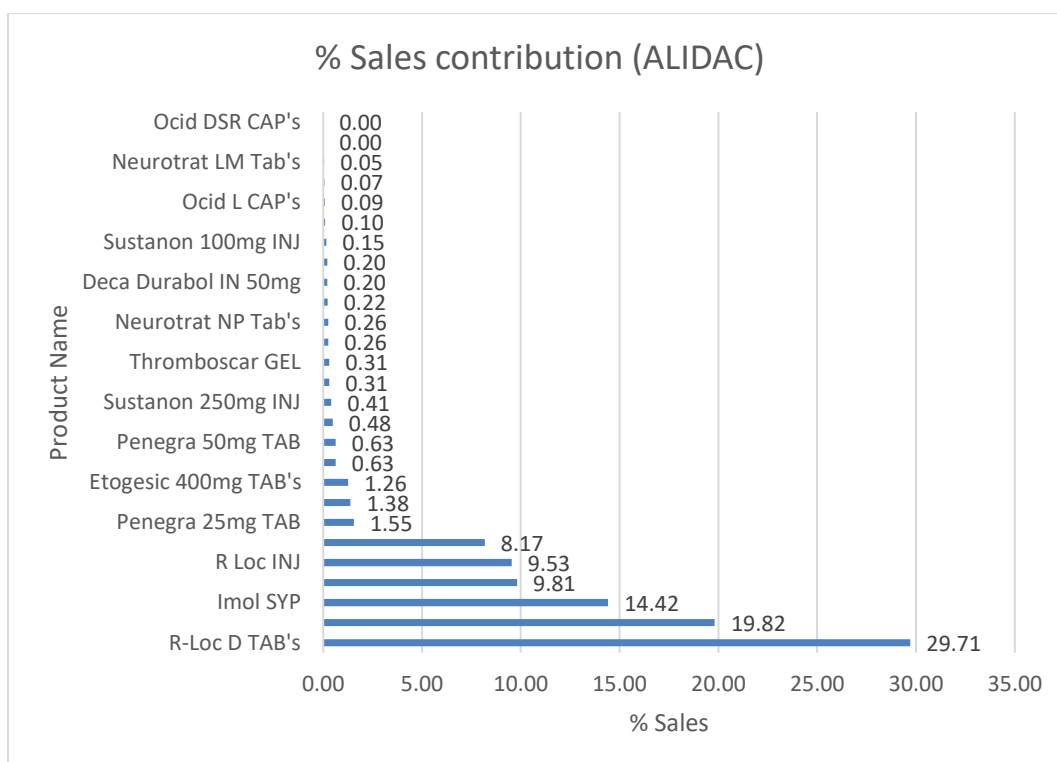


Figure 4 - % sales contribution for ALIDAC

The above graph is related to the company named **ALIDAC**. The company manufactures various medicines (which can be seen on y-axis of the graph). The main purpose of drawing this graph is to explain what amount of percentage of sales that their product is contributing to their overall sales. It is clearly visible from the graph that the highest percentage of sales (30 % of overall sales) is made by selling the product '**R-Loc D TAB's**'. Hence this is highest value product. And the other products namely Imol SYP and Imol Plus TAB are somewhat better valued products that are contributing 15-20% of sales. And the rest of products are low valued products since they are contributing less than 5% of sales.

High Value Products : R-Loc D TAB

Medium Value Products : Imol SYP, Imol Plus TAB, Etogesic ER TAB, R-Loc INJ, Thrombophob OINT

Low Value products : rest of the products

3.2 Monthly Inventory Trend

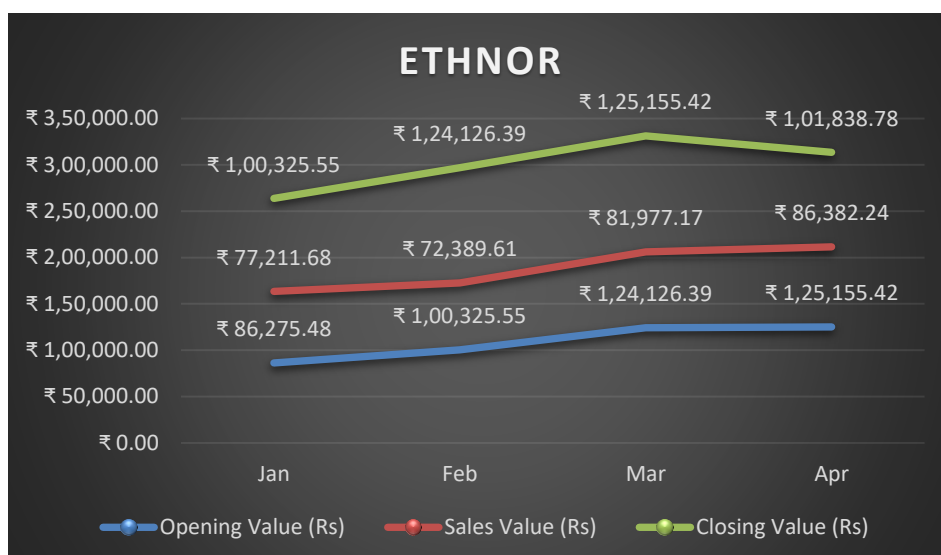


Figure 5 - Monthly Inventory Trend for ETHNOR

For ETHNOR, the opening value of the inventory increased consistently from January to April. However, the sales value showed some fluctuations, with a decrease in February followed by increases in March and April. The closing value of the inventory remained relatively stable throughout the period. This suggests that ETHNOR experienced some variability in sales performance but managed to maintain a stable closing value.

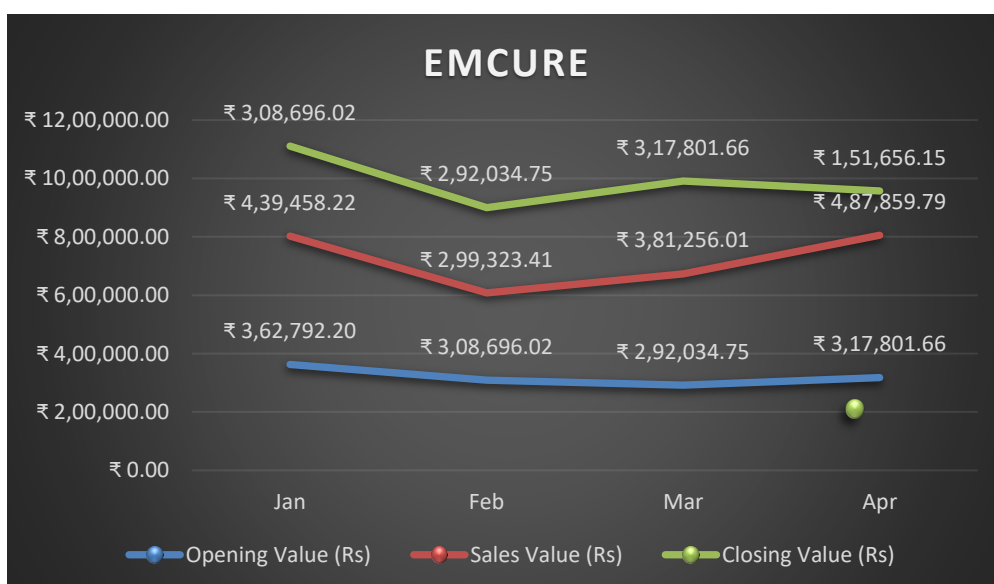


Figure 6 - Monthly Inventory Trend for EMCURE

For EMCURE, the opening value of the inventory decreased from January to March but increased slightly in April. The sales value showed fluctuations throughout the period, with a significant decrease in February followed by increases in March and April. The closing value of

the inventory also fluctuated, with a significant decrease in April compared to the previous months. Overall, EMCURE experienced variability in both sales and closing value of inventory.

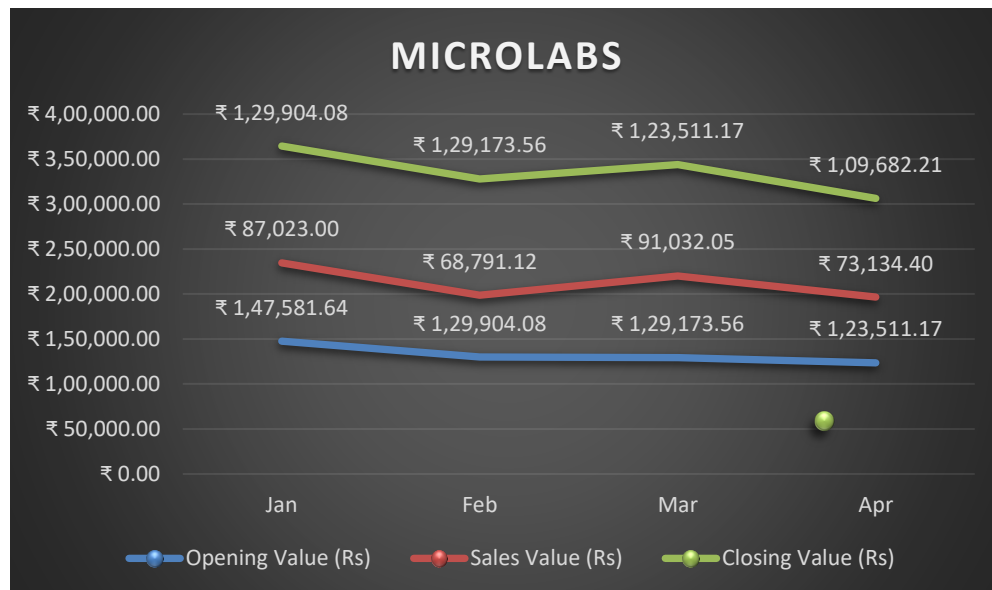


Figure 7 - Monthly Inventory Trend for MICROLABS

For MICRO LABS, the opening value of the inventory remained relatively stable from January to March but decreased in April. The sales value showed fluctuations throughout the period, with a decrease in February, an increase in March, and a decrease again in April. The closing value of the inventory followed a similar trend as the opening value, decreasing from March to April. Overall, MICRO LABS experienced variability in sales and a decrease in the closing value of inventory towards the end of the period

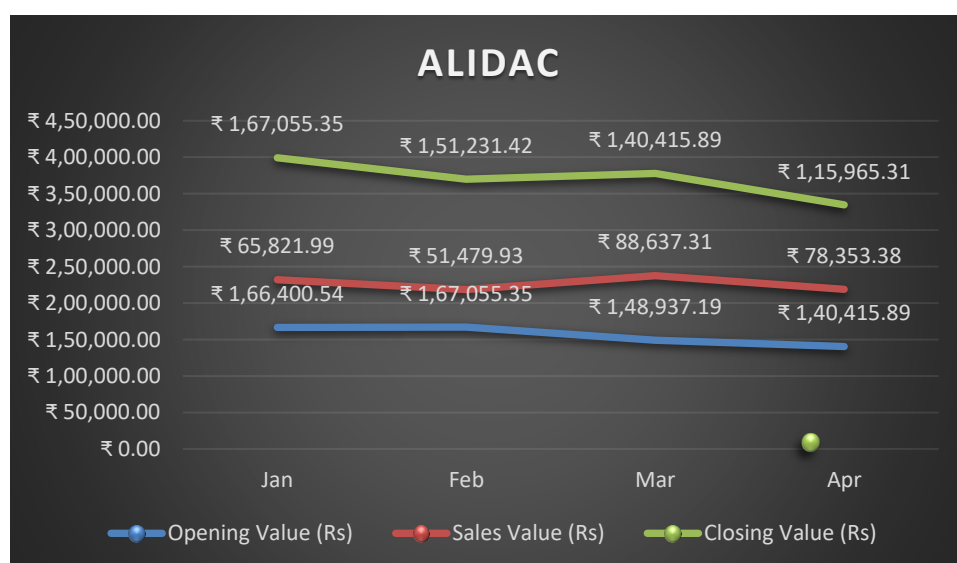


Figure 8 - Monthly Inventory Trend for ALIDAC

For ALIDAC, the opening value of the inventory remained relatively stable from January to March but decreased in April. The sales value showed fluctuations throughout the period, with a decrease in February, an increase in March, and a slight decrease again in April. The closing value of the inventory followed a similar trend as the opening value, decreasing from March to April. Overall, ALIDAC experienced variability in sales and a decrease in the closing value of inventory towards the end of the periods.

3.3 Percentage change in sales

The analysis of calculating the percentage change and visualizing it through a line chart provides valuable insights into the growth or decline of total sales value over the months. Here are the insights that can be gained from this analysis:

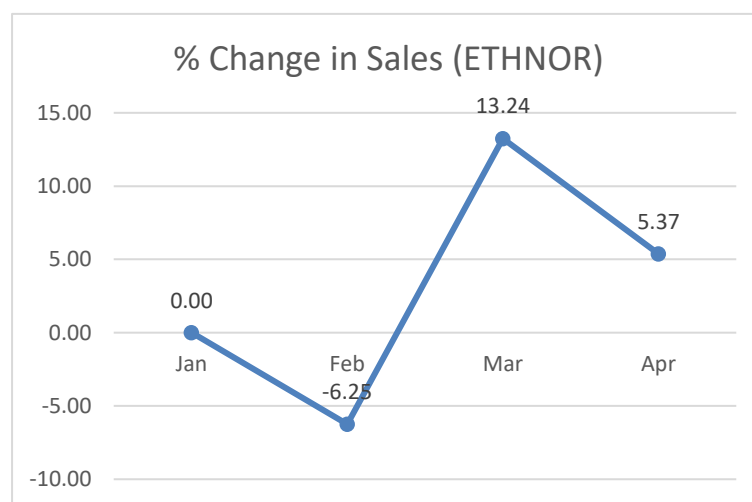


Figure 9 - % Change in Sales for ETHNOR

The above line chart is related to the company named ETHNOR. It contains the trend line of % change in sales. The formula used is $\text{Percentage Change} = \left[\frac{(\text{Current Month Sales} - \text{Previous Month Sales})}{\text{Previous Month Sales}} \right] * 100$. By analyzing the graph, we can say

- In February, there was a decline in sales with a percentage change of -6.25%. This indicates that the sales for the ETHNOR decreased compared to the previous month. It is important to investigate the possible reasons for this decline and take appropriate actions to address any issues or challenges.
- In March, there was a significant increase in sales with a percentage change of 13.24%. This indicates a notable growth in sales for the ETHNOR category compared to the previous month. It is crucial to analyze the factors contributing to this growth and consider leveraging them in future marketing strategies or product offerings.

- In April, there was a moderate increase in sales with a percentage change of 5.37%. Although the growth rate was lower than in March, it still indicates a positive trend and continued sales improvement for the ETHNOR category. This suggests that the efforts made in March to boost sales might have had a lasting impact.

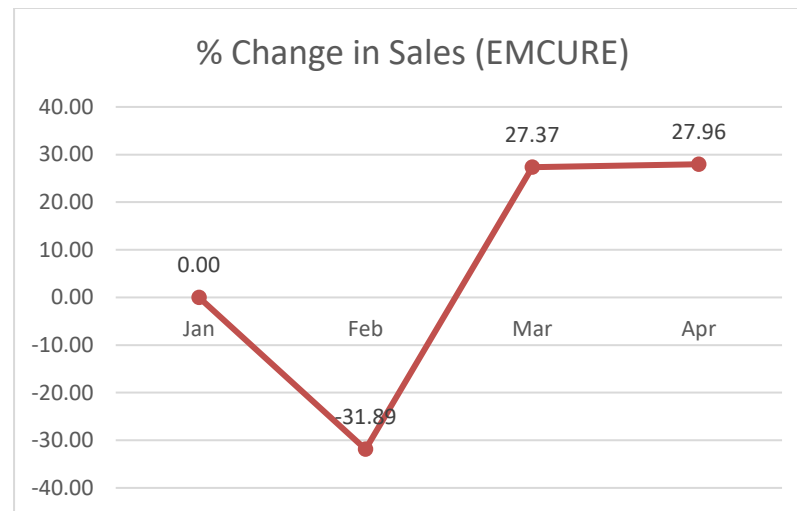


Figure 10 - % Change in Sales for EMCURE

The above line chart is related to the company named EMCURE. It contains the trend line of % change in sales.

- In February, there was a significant decline in sales with a percentage change of -31.89%. This indicates a sharp decrease in sales compared to the previous month. It is important to investigate the reasons behind this decline and identify any potential issues affecting sales performance. This could include factors such as changes in market demand, competition, or internal challenges.
- In March, there was a significant recovery in sales with a percentage change of 27.37%. This indicates a substantial increase in sales compared to the previous month. It appears that the sales performance has rebounded strongly, potentially due to corrective actions taken or improvements in market conditions. It is crucial to analyze the factors that contributed to this growth and assess their sustainability.
- In April, there was further growth in sales with a percentage change of 27.96%. This indicates continued positive momentum in sales performance. The consecutive month-on-month growth suggests a sustained improvement in sales for the period. It is essential to monitor this trend and identify the factors driving this growth to leverage them for future success.

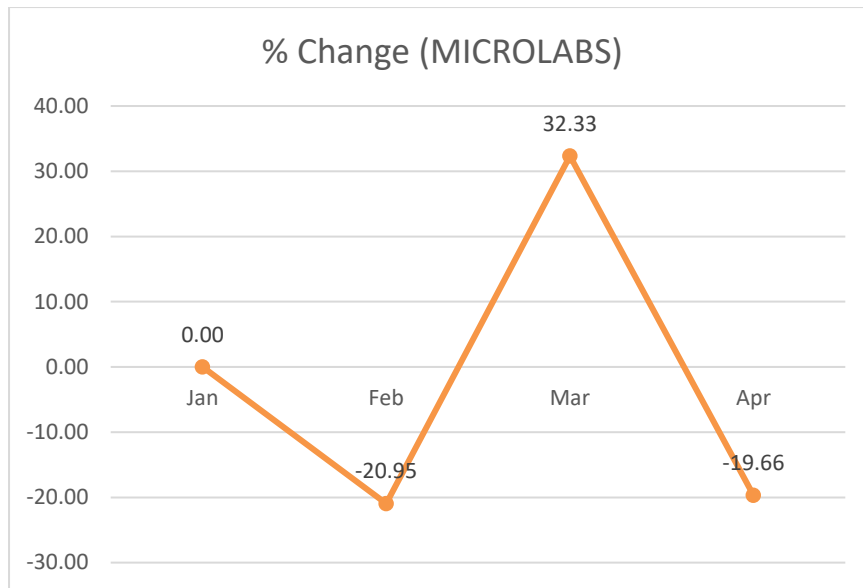


Figure 11 - % Change in Sales for MICROLABS

The above line chart is related to the company named MICROLABS. It contains the trend line of % change in sales.

- There was a decrease in sales from January to February, with a percentage change of -20.95%. This indicates a decline in sales compared to the previous month. It is important to investigate the reasons behind this decline and identify any potential issues affecting sales performance.
- There was a significant increase in sales from February to March, with a percentage change of 32.33%. This indicates a strong growth in sales compared to the previous month. It is important to understand the factors contributing to this increase and leverage them to sustain sales growth in the future.
- There was a further increase in sales from March to April, with a percentage change of 19.66%. This indicates continued growth in sales compared to the previous month. It is essential to analyze the factors driving this growth and determine strategies to maintain and further enhance sales performance.

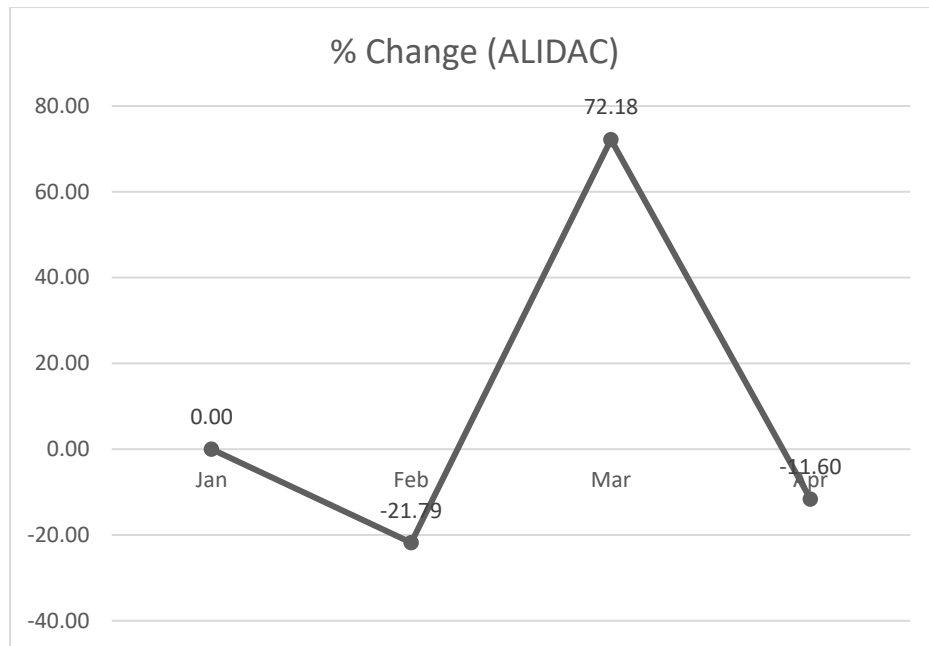


Figure 12 - % Change in Sales for ALIDAC

The above line chart is related to the company named ALIDAC. It contains the trend line of % change in sales. By analyzing the graph, we can say that

- There was a decrease in sales from January to February, with a percentage change of -21.79%. This indicates a decline in sales compared to the previous month. It is important to investigate the reasons behind this decrease and identify any factors that may have contributed to the decline.
- There was a significant increase in sales from February to March, with a percentage change of 72.18%. This indicates a substantial growth in sales compared to the previous month. It is crucial to analyze the factors driving this significant increase and identify strategies to sustain and further enhance sales growth.
- There was a decrease in sales from March to April, with a percentage change of -11.60%. This indicates a decline in sales compared to the previous month. It is important to examine the reasons behind this decline and identify any factors that may have affected sales performance.

3.4 Manufacturers Sales Analysis

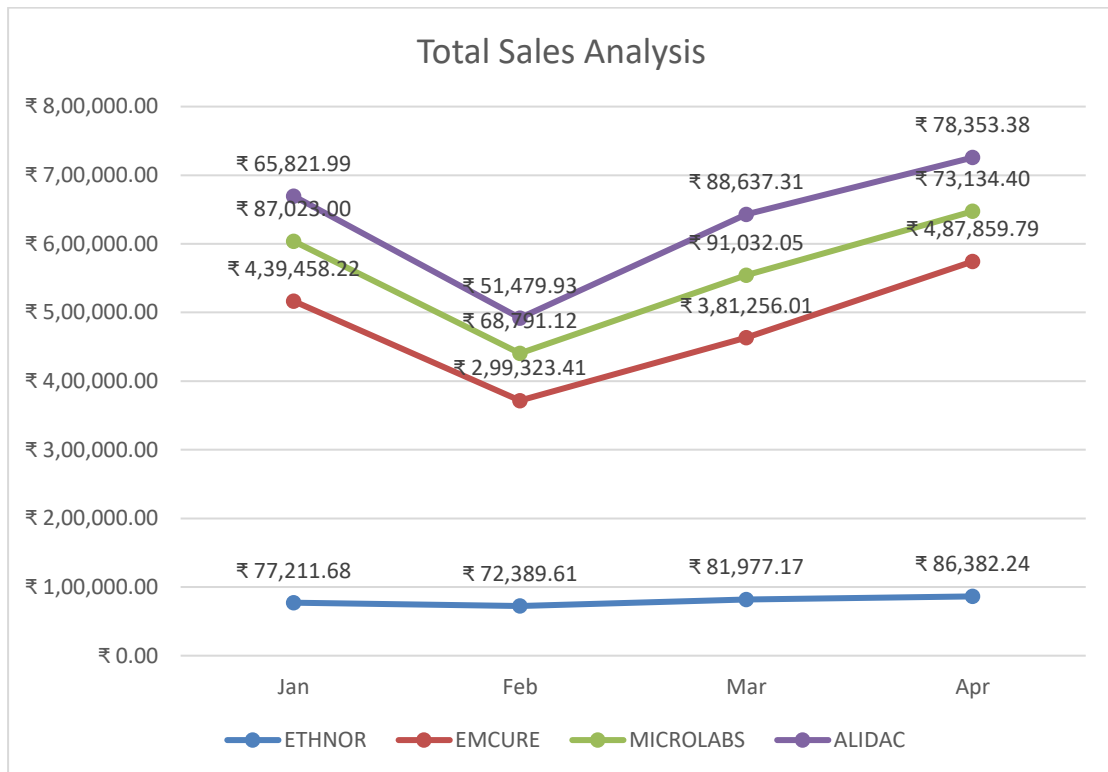


Figure 13 - Manufacturer Sales Analysis

- Sales Comparison:** Among the four manufacturers (ETHNOR, EMCURE, MICROLABS, ALIDAC), EMCURE consistently has the highest sales value in all four months. This indicates that EMCURE is a strong performer in terms of sales compared to the other manufacturers.
- Seasonal Trends:** The total sales values for each manufacturer may show seasonal trends or fluctuations. All companies experienced an decrease in sales from January to February but increase in February. Understanding seasonal patterns can help in planning inventory management and marketing strategies accordingly.
- Comparative Analysis:** Comparing the sales values of different manufacturers can provide insights into their market share or sales contribution. EMCURE consistently has the highest sales value, suggesting a strong market position. Analyzing the sales performance of each manufacturer can help identify areas for improvement or strategies to enhance market share.
- Growth Opportunities:** Identifying manufacturers with significant sales growth from month to month can highlight potential growth opportunities. For example, EMCURE shows substantial growth in sales from February to April, indicating positive market response or successful sales strategies.

3.5 Inventory Optimization

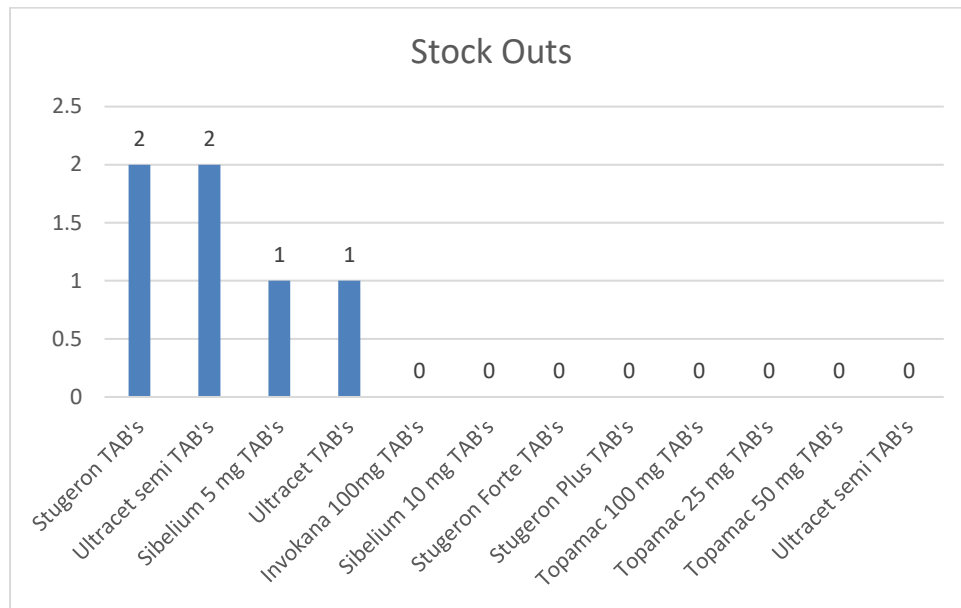


Figure 14 - Stock Outs for ETHNOR

The above graph is related to Stock out occurrences of various products of a company named ETHNOR. Here are the insights that can be gained from this analysis:

- **Stockout Occurrences:** The data shows the number of times each product name experienced stockouts. From the given information, we can observe the following:
 - Stugeron TAB's had 2 stockouts, Ultracet semi TAB's had 1 stockout, Sibelium 5 mg TAB's had 1 stockout.
 - Ultracet TAB's, Invokana 100mg TAB's, Sibelium 10 mg TAB's, Stugeron Forte TAB's, Stugeron Plus TAB's, Topamac 100 mg TAB's, Topamac 25 mg TAB's, Topamac 50 mg TAB's, and Ultracet semi TAB's had no stockouts.
- **Identifying Stockout Prone Products:** Based on the occurrence of stockouts, we can identify products that are more prone to stockouts compared to others. In this case, Stugeron TAB's had the highest number of stockouts, indicating a potential issue with maintaining sufficient stock levels for this product.

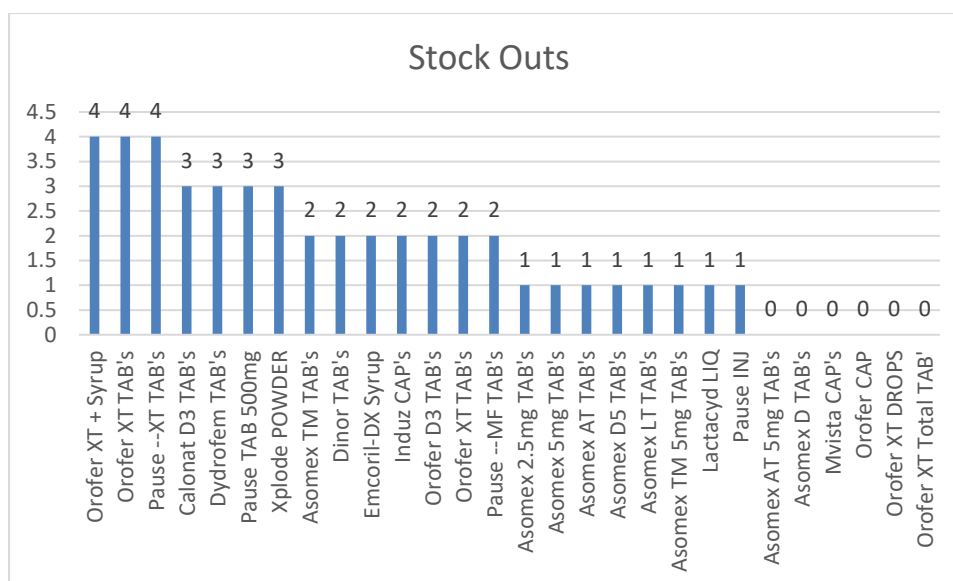


Figure 15 - Stock Outs for EMCURE

The above graph is related to Stock out occurrences of various products of a company named EMCURE. Here are the insights that can be gained from this analysis:

- **Stockout Occurrences:** The data shows the number of times each product name experienced stockouts. From the given information, we can observe the following:
- Orofer XT + Syrup, Orofer XT TAB's, and Pause --XT TAB's had the highest number of stockouts with 4 occurrences each.
 - Calonat D3 TAB's, Dydrofem TAB's, Pause TAB 500mg, and Xplode POWDER had 3 stockouts each.
 - Several other products had 2 or 1 stockouts, and some had no stockouts.

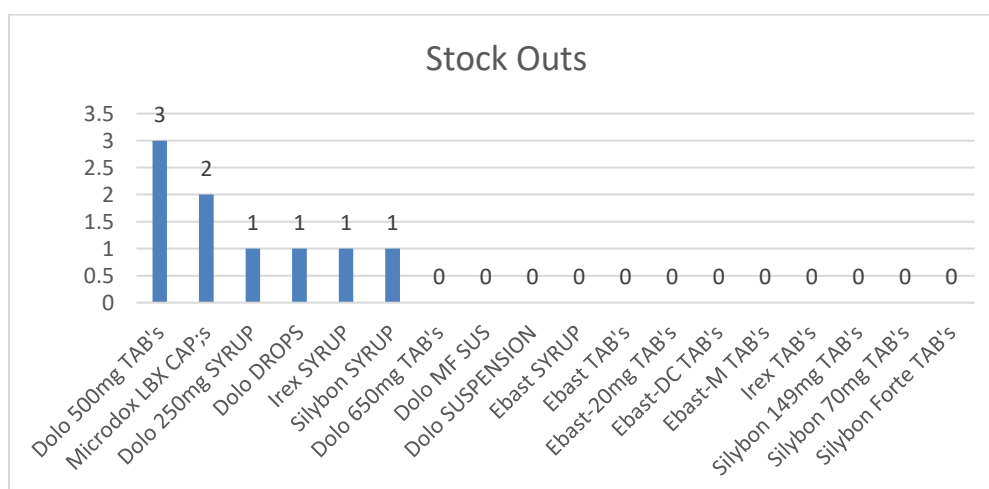


Figure 16 - Stock Outs for MICROLABS

The above graph is related to Stock out occurrences of various products of a company named MICROLABS. Here are the insights that can be gained from this analysis:

- **Stockout Occurrences:** The data shows the number of times each product name experienced stockouts. From the given information, we can observe the following:
 - Dolo 500mg TAB's had the highest number of stockouts with 3 occurrences, Microdox LBX CAP's had 2 stockouts.
 - Several other products had 1 or 0 stockouts.
- **Importance of High-Demand Products:** Products with higher stockout occurrences, such as Dolo 500mg TAB's, may indicate high customer demand. It is essential to ensure the availability of such products to meet customer needs and maintain customer satisfaction.

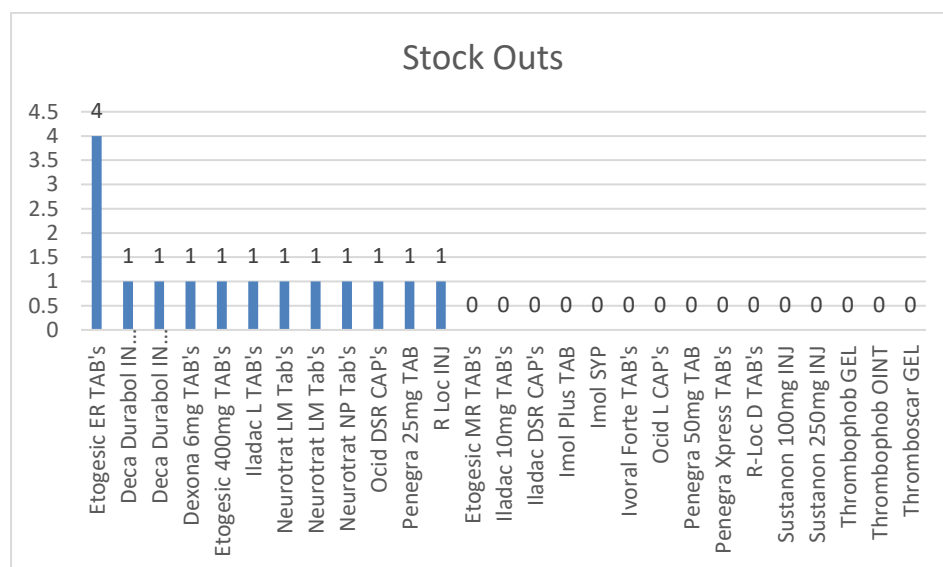


Figure 17 - Stock Outs for ALIDAC

The above graph is related to Stock out occurrences of various products of a company named ALIDAC. Here are the insights that can be gained from this analysis:

- **Stockout Occurrences:** The data shows the number of times each product name experienced stockouts. From the given information, we can observe the following:
 - Etogesic ER TAB's had the highest number of stockouts with 4 occurrences.
 - Several products had 1 stockout occurrence, including Deca Durabol IN 25mg, Deca Durabol IN 50mg, Dexona 6mg TAB's, and others.
 - Multiple products had 0 stockouts.

3.6 Manufacturer Comparison

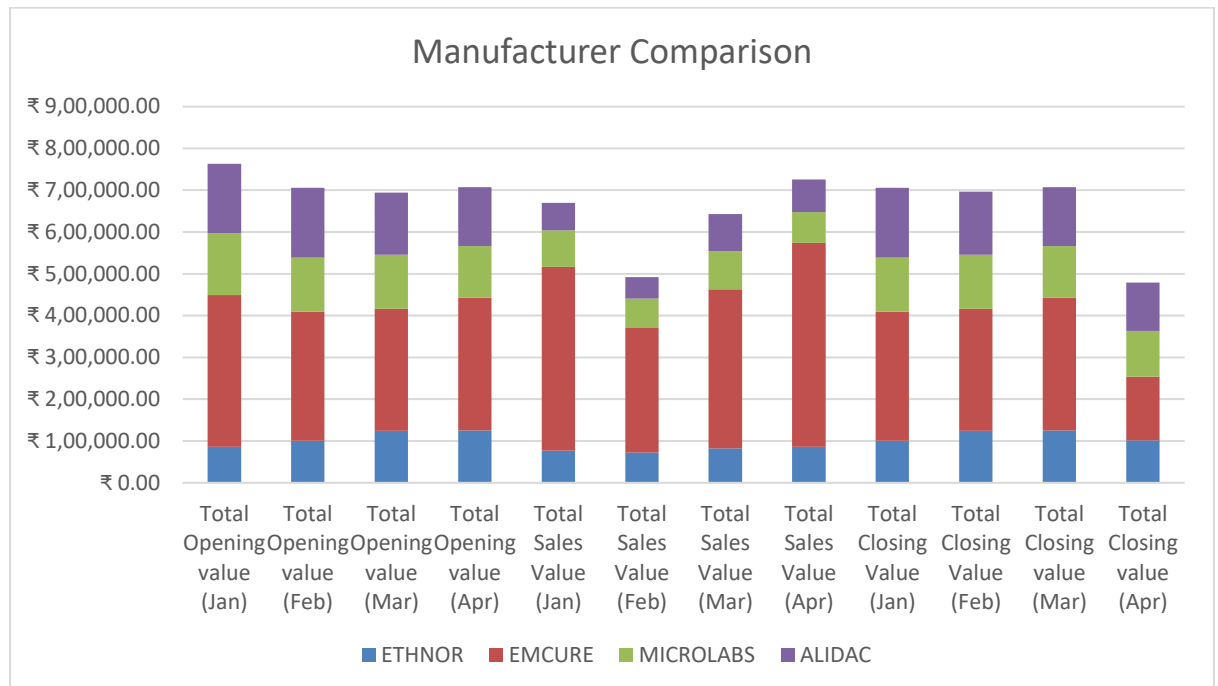


Figure 18 - Manufacturer Comparison

➤ **Revenue Trends:** The data allows us to observe the trends in revenue for each manufacturer over the months. Here are some observations:

- EMCURE had the highest total opening value in January, followed by MICROLABS and ALIDAC. However, ETHNOR had a lower total opening value compared to the other manufacturers.
- In terms of total sales value, EMCURE consistently had the highest sales in all months, followed by ETHNOR, MICROLABS, and ALIDAC.
- The total closing value in each month shows the remaining value of inventory at the end of the month after sales. EMCURE had the highest closing value in January and February, while ALIDAC had the highest closing value in March and April.

➤ **Sales Performance:** Comparing the total opening value with the total closing value gives insights into the sales performance and inventory management of each manufacturer. Here are some observations:

- EMCURE had a significant decrease in total closing value from January to February, indicating high sales and a reduction in inventory.

- MICROLABS and ALIDAC had relatively stable closing values over the months, suggesting a balanced sales and inventory management approach.
 - ETHNOR had a slight increase in total closing value from January to April, indicating a relatively slower sales pace compared to the other manufacturers.
- **Market Share:** Analyzing the total sales value for each manufacturer provides insights into their market share or sales contribution. Here are some observations:
- EMCURE consistently had the highest total sales value, indicating a significant market share compared to the other manufacturers.
 - ETHNOR and MICROLABS had comparable total sales values, suggesting a relatively similar market position.
 - ALIDAC had a lower total sales value compared to the other manufacturers, indicating a smaller market share.
- **Sales and Revenue Fluctuations:** The data allows us to observe the fluctuations in sales and revenue for each manufacturer over the months. Here are some observations:
- ETHNOR experienced a decrease in total sales value from January to February, followed by an increase in March and a slight decrease in April.
 - EMCURE had a significant decrease in total closing value from January to February, indicating a higher rate of sales. However, the closing value increased in subsequent months.
 - MICROLABS had fluctuations in total sales value, with an increase in March and a decrease in April.
 - ALIDAC had an increase in total sales value from January to March, followed by a decrease in April.

4. Interpretation of Results and Recommendation

4.1 Sales Contribution

In order to optimize sales and improve profitability, it is recommended for ETHNOR to focus on promoting and maximizing the sales of their highest-value product, "Ultracet TAB's," while considering the discontinuation of low-value products. For EMCURE, promote more "Orofer XT TAB's" and strategically marketing "Calonat D3 TAB" can drive further growth. Similarly, for MICROLABS, capitalizing on the popularity of "Dolo 650 mg TAB's," by discontinuing low-value items will enhance overall performance and resource allocation.

4.2 Monthly Inventory Trend

Based on the analysis of the sales trend for the respective companies, it is recommended for the distributor that there is some seasonal trend observed in March because highest sales % is observed in March among 4 months among all 4 manufacturers. So, give special focus on sales that happen during March.

4.3 Inventory Optimization

- ETHNOR: Address the stockout issues for Stugeron TAB's by improving inventory management and ensuring an adequate supply of this product.
- EMCURE: Focus on reducing stockout occurrences for Orofer XT + Syrup, Orofer XT TAB's, and Pause --XT TAB's by implementing a robust inventory monitoring system.
- MICROLABS: Pay special attention to managing stockouts for Dolo 500mg TAB's, considering its high customer demand. Implement effective demand forecasting techniques to ensure adequate stock availability and consider adjusting inventory levels to meet the demand for this product.
- ALIDAC: Address the stockout occurrences for Etogesic ER TAB's by improving inventory planning and replenishment strategies.

4.4 Manufacturer Comparison

- EMCURE: With consistently high sales and market share, EMCURE should continue to focus on maintaining a robust supply chain and inventory management system to meet the high customer demand.
- ETHNOR: Although ETHNOR had a lower total opening value and a relatively slower sales pace compared to other manufacturers. Identify the reasons behind the fluctuations in sales and revenue, and work closely with ETHNOR to address any challenges and improve market competitiveness.
- MICROLABS: While having a stable closing value and comparable market position, MICROLABS should focus on optimizing inventory planning to reduce fluctuations in sales and revenue.
- ALIDAC: With a smaller market share and fluctuations in total sales value, ALIDAC should prioritize strengthening its sales and distribution efforts. Collaborate closely with the manufacturer to enhance product availability and focus on targeted marketing and sales initiatives to increase market share and improve sales performance.