Optimizing Business Efficiency with Inventory Management Proficiency

A MID TERM Report for the BDM Capstone Project

Submitted by

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Contents

Declaration Statement

I am working on a Project Title **"OPTIMIZING BUSINESS EFFICIENCY WITH INVENTORY MANAGEMENT PROFICIENCY"**. I extend my appreciation to TVS - Anjana Motors, for providing the necessary resources that enabled me to conduct my project.

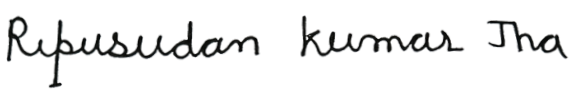
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analyzed to assure its reliability.

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 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: (**Digital Signature**)

Name: Ripusudan Kumar Jha

Date: 30 November 2024

1. Executive Summary

The project **"Optimizing Business Efficiency with Inventory Management Proficiency"** focuses on addressing TVS Anjana Motors' inventory management challenges. The goal is to improve operational efficiency, lower holding costs, and increase customer satisfaction through an integrated, data-driven strategy. By examining sales and purchase data from April to August 2024, the study recognized patterns and provided actionable insights to improve inventory management.

The methodology included collecting historical sales and purchase data, which was then manually entered into Excel and processed using broad analytical tools. ABC analysis, predictive analysis, and regression analysis were used to categorize inventory, forecast future demand, and investigate variable linkages that influence demand. Visualizations were employed to effectively explain findings and facilitate informed decision-making.

The TVS Apache-160 is the highest revenue generator, accounting for ₹97,361.91 (mean sales price, including GST). Its high demand highlights the necessity for prioritized replenishment. The TVS Raider-125 comes next, with slightly smaller contributions but great potential for revenue creation. Models like the TVS Sport and Jupiter-125 had reduced average sales prices of ₹57,695.00 and ₹76,064.50, indicating limited demand and a reappraisal of their feasibility.

The data shows that sales continually outpaced purchases, indicating good stock management. However, a declining trend in sales was noticed, with a negative slope (R^2 = 0.889) during the time. This highlights the need to study explanations such as competition or seasonal changes. August showed a minor recovery, presumably due to seasonal demand, giving a case study for successful strategies.

To solve these issues, the analysis suggests prioritizing high-demand models such as the Apache-160 and rethinking the inventory strategy for underperforming models. Predictive analysis can help with demand forecasting, while data process automation can improve accuracy and efficiency.

In Conclusion, the project provides a plan for TVS Anjana Motors to use data-driven strategies to improve inventory management. By focusing on high-priority models and eliminating inefficiencies, the dealership may improve operational performance, generate revenue, and maintain a competitive advantage in the market.

2. Proof of Originality

2.1 Letter from Organization Head

TVS Anjana Motors
Dekuli Mirzapur,
Bahadurpur,
Darbhanga Dist, Bihar - 846002

Date: 25-11-24

To Whom It May Concern,

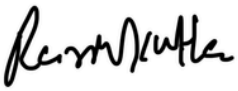
This is to formally grant consent to Ripusudan Kumar Jha, a student enrolled in the IIT Madras BS degree program, for using TVS Anjana Motors' sales and purchase data for the purpose of completing their BDM (Business Data Management) project as required by the curriculum.

We accept that the data will only be used for academic reasons, and that suitable precautions will be taken to maintain confidentiality and protect sensitive information.

If you have any further requests or need clarification, please do not hesitate to contact us.

We wish Ripusudan Kumar Jha well in their academic efforts.

Yours sincerely.



Rajiv Jha
Owner of TVS Anjana Motors.
Email: rajeevjha853@gmail.com

2.2 Video & Images

Video with Owner: *Anjana_Motor_Owner.mp4*
Image with Owner: *Anj_Motor.jpg*
More Images: *img.jpg*

3. Metadata & Descriptive Statistics

From 6th April to 31st August 2024, I collected monthly data from TVS Anjana Motors, which included vehicle purchases and sales data. This data was initially entered manually in traditional ledgers before being inputted into Excel for further analysis. Because the dealership uses traditional techniques for data entry, some values may be not precise due to manual computation restrictions. This project will analyze their inventory and sales management methods and identify areas for improvement using data-driven insights.

Data Summary:

- 44 Purchase records.
- 80 Sales records.

3.1 Metadata

The Excel Workbook contains 2 Sheets which include:

Figure 1: Excel sheets Snapshot

1. ***Purchase Sheet:***

Sr. No	Particulars	Qty	Rate (₹)	Discount (₹)	Taxable (₹)	HSN	SGST (%)	SGST (₹)	CGST (%)	CGST (₹)	Total (₹)

Figure 2: Purchase sheets Snapshot

- Purchase details, which include product specifications (for example, TVS bikes models), Quantity, HSN, Rate, Discounts, Taxes, and the Total cost.
- Examples of models are the TVS Sport, TVS XL 100, and TVS Raider 125.
- The tax breakdown consists of SGST, CGST, and total amounts.

2. ***Sales Sheet:***

Date	Inovoice no	Model	Engine No	Frame No	Total Amount (without GST) (₹)	CGST 14% (₹)	SGST 14% (₹)	Total GST (₹)	Total Amount (with GST) (₹)

Figure 3: Sales sheets Snapshot

- Records of sales transactions, including the Date, Invoice number, Models sold, Engine and Frame numbers, Amounts (with and without GST), and tax information.
- Examples of sold models include the TVS Apache 160 and the TVS Jupiter 125.

3.1.1 Purchase Sheet Metadata

- **Particulars:** Lists the names of TVS bike models.
- **Quantity:** The number of items purchased.
- **Rate (₹):** The unit price of each item.
- **Discount (₹):** The amount of discount applied to the item.
- **Taxable (₹):** The value of the item after discount, subject to taxation.
- **HSN:** The Harmonized System of Nomenclature code for the item's classification.
- **SGST (%)/SGST (₹):** The State GST rate applied and its corresponding monetary value.
- **Total (₹):** The final cost of the item, including taxes.

3.1.2 Sales Sheet Metadata

- **Date:** The date on which the sales transaction occurred.
- **Invoice no:** A unique identifier assigned to the sales invoice.
- **Model:** The name or identifier of the sold item's model.
- **Engine No:** The unique engine number of the sold vehicle.
- **Frame No:** The unique frame number of the sold vehicle.
- **Total Amount (without GST) (₹):** The sale price of the item before GST is applied.
- **CGST 14% (₹)/SGST 14% (₹):** The amounts charged for Central and State GST, each at 14%.
- **Total GST (₹):** The total GST amount, combining CGST and SGST.
- **Total Amount (with GST) (₹):** The final sale price after including GST.

* Link to the Data : ***BDM Project data***

3.2 Descriptive Statistics

Purchasing Sheet:

1. Sr. No is sequentially numbered (min: 1, max: 44).
2. Quantity (Qty): The mean is 1.20 indicating that the majority of purchases are single units.
3. The average rate is ₹69,730.51 with a range of ₹44,129.69 to ₹100,171.88.
4. Taxable Amount (₹):
    - Mean: ₹86,336.52
    - The maximum amount is ₹284,610.93, which is likely for bulk or high-value purchases.
5. SGST and CGST are fixed at 14%, with an average of ₹12,087.11 for each.
6. Total (₹):
    - Mean: ₹93,904.74
    - Range: ₹56,486.00 to ₹174,561.37

Sales Sheet:

1. Total amount (without GST):
    - Mean = ₹76,064.50
    - Range = ₹45,075.00 to ₹105,714.00
2. CGST and SGST:
    - Both fixed at 14% with an average of ₹10,648.70 each.
3. Total GST (₹):
    - The mean price is ₹21,297.41 with a range of ₹12,620.00 to ₹29,600.00
4. Total amount (including GST):
    - The mean price is ₹97,361.91 with a range of ₹57,695.00 to ₹135,314.00

4. Detailed Explanation of Analysis Process/Method

The strategy starts with collecting data over period of five months, then categorizes information based on relevant characteristics including value, utilization, and frequency. Advanced analytical approaches are used to gain understanding. The insights are used to inform decision-making, assuring efficiency, cost-effectiveness, and strategy alignment. This thorough strategy ensures actionable results that improve business performance.

- **ABC analysis**, which focuses on classifying products according to their value and usage frequency, is crucial for improving inventory management. It guarantees high-priority things (A) receive the most consideration, while medium (B) and low-priority (C) items are managed accordingly. This approach is unique because it enhances operating efficiency, reduces expenses, and permits efficient use of resources. When it comes to determining focus areas, ABC is more straightforward than others but still quite successful, which helps organizations make better decisions.
- **Predictive analysis,** in order to spot patterns, making good decisions, and enhance business operations tactics, predictive analysis is required. Its application reduces risks, improves customer happiness, and enables precise demand forecasting. Predictive analysis offers practical insights to manage uncertainty and optimize possibilities by utilizing historical data. It is better than other approaches because it anticipates future events, allowing for proactive decision-making beyond descriptive analytics. Because of its capacity for forward-thinking, it is essential in dynamic sectors seeking to gain a competitive edge and increase operational efficiency.
- **Regression analysis** is ideal for forecasting results and examining patterns because it is crucial for determining the connections between dependent and independent variables. It is unique because it can determine cause-and-effect linkages and quantify the effects of several elements at once. Regression is more flexible than other techniques and offers useful information for making decisions, particularly when working with numerical and categorical data.
- **Clustered column chart:** When comparing several categories across various groups, a clustered column chart functions effective. Making it possible to compare data side by side and visualize each category clearly. Compared to other chart types, clustered column charts are visually straightforward, making it easy for audiences to understand variations in values at a glance. . They work especially well for presenting data in a limited number of groupings and categories, guaranteeing clarity and strengthening data-driven choices.

In conclusion, a comprehensive approach of data-driven decision-making is offered by combining powerful analytical tools. By leveraging these strategies, TVS Anjana Motors can increase operational effectiveness, minimize expenses and apply well-informed decisions by utilizing these tactics.

5. Results and Findings

The findings and insights derived from the data analysis, utilizing methods such as ABC Analysis and Regression Analysis, are summarized as follows:

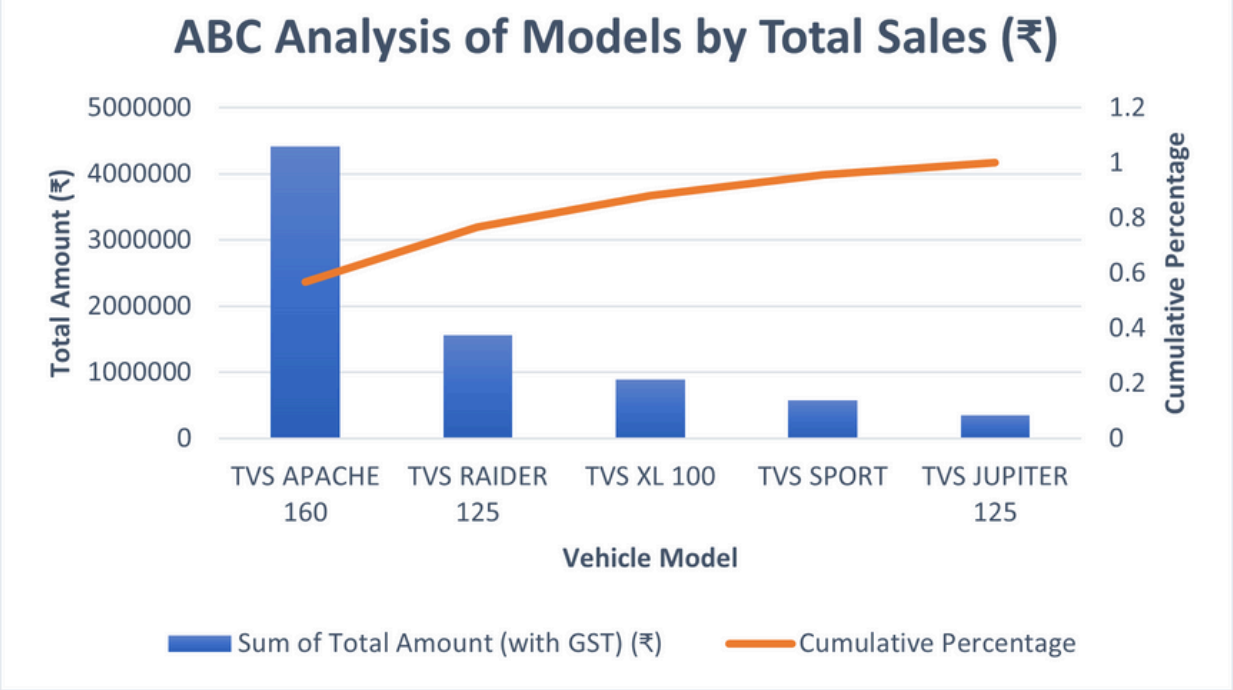


Figure 4: ABC Analysis of Models by Total Sales (₹)

- TVS Apache-160 is the single largest contribution to total sales revenue, accounting for a significant part. This makes it an essential product for the business.
- TVS Raider-125 is the second-largest contributor, while generating significantly less revenue than Apache-160.
- Models such as the TVS XL-100, TVS Sport, and TVS Jupiter-125 generate smaller revenue contributions. These can be classified as "B" or "C" items in the ABC categorization based on their cumulative percentage.

Actionable Insight:

- To increase revenue, focus sales and marketing strategies on high-performing models such as Apache and Raider.
- Analyze the profitability and inventory turnover of underperforming models (e.g., Sport and Jupiter) to determine whether to maintain or reduce stock levels.

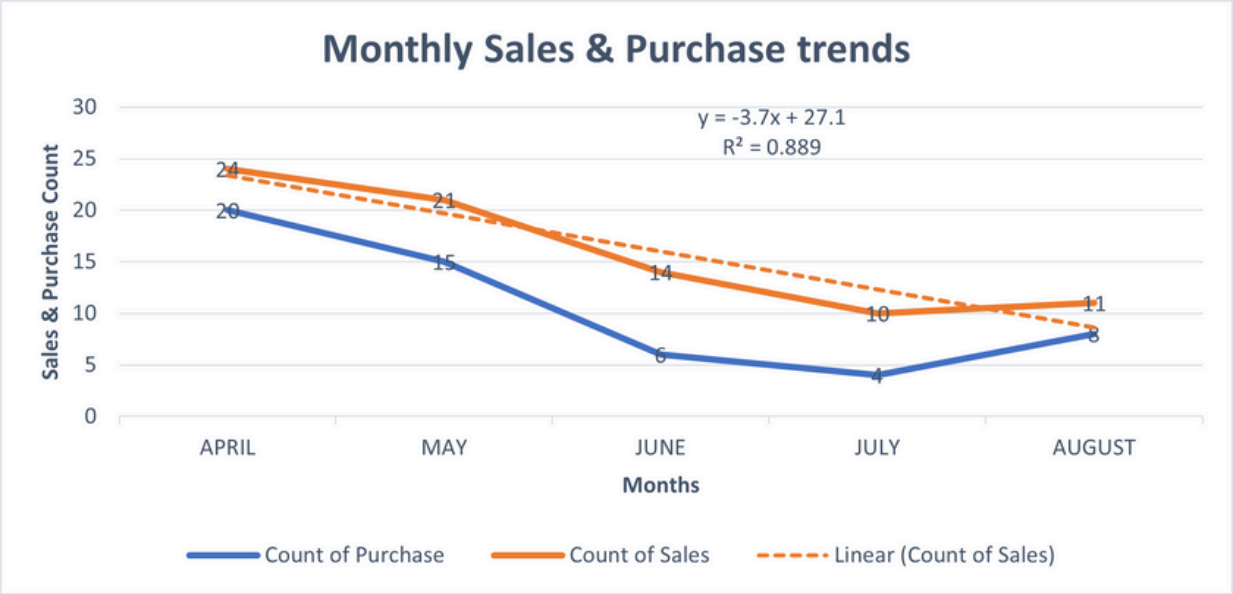


Figure 5: Monthly Sales & Purchase Trends (April to August)

- From April to July, both sales and purchases declined, with a minor improvement in August.
- Sales continuously exceed purchases over time, indicating a well-managed inventory or increased sales efficiency.
- Sales have a considerable downward trend, as indicated by the large negative slope of the linear trend line ($R^2 = 0.889$).
- August shows an increase in both sales and purchases, indicating a possible recovery or seasonal demand.

Actionable Insight:

- Examine into the cause of dropping sales (e.g., seasonality, competition, pricing, or marketing).
- Use the previous month's recovery as a case study to figure out which factors sparked the improvement.

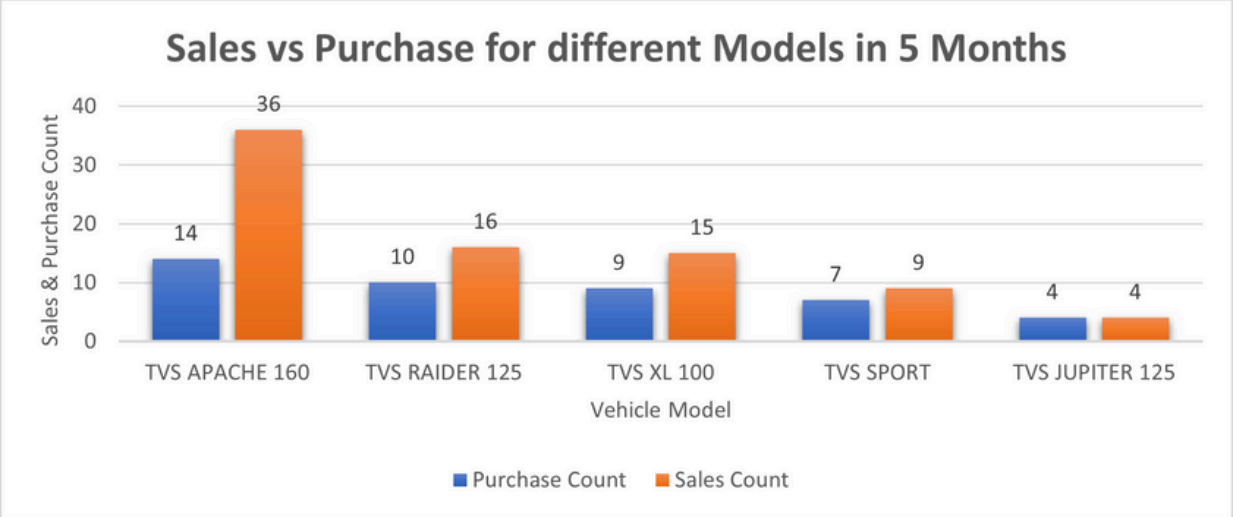


Figure 6: Sales vs Purchases Comparison for Different Models (5-Month Period)

- TVS Apache-160 dominates in sales and purchases, with both of them almost triple the amount of the latter.
- TVS Raider-125 has the second-highest sales volume, followed by TVS XL-100.
- TVS Sport and TVS Jupiter-125 have the lowest sales and purchases, indicating a lack of demand or inventory turnover for these models.
- The wide gap between Apache's sales and purchases indicates strong market demand and rapid stock turnover.

Actionable Insight:

- To prevent the loss of sales opportunities, it is recommended that high-demand models, such as the Apache-160, be stocked more frequently.
- Evaluate marketing strategies or consumer input for underperforming models (Sport and Jupiter) to pinpoint areas for enhancement or consider discontinuation if demand persists at a low level.

Conclusion:

The analysis emphasizes that the TVS Apache-160 generates the highest revenue, demanding a concerted effort to preserve its inventory. Sales and purchase counts have demonstrated a decreasing trend over the past five months, suggesting that there is a decrease in demand or problems with operational efficiency. To increase market share, underperforming models such as the TVS Jupiter-125 need strategic improvement.