A Final Report for the BDM Capstone Project

Strategic Capital and Inventory Optimization to Drive Business Performance

Submitted by

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1. Executive Summary and Title:

This project aims to address the challenges faced by Sadhana Electrical, a leading retailer of electrical components, by analyzing sales and purchase data from October 2024 to November 2024. The primary focus is on understanding sales trends, customer behavior, and inventory performance to optimize operations and improve profitability. The analysis identifies key issues such as fluctuating sales patterns, overstocking of slow-moving products, and stockouts of highdemand items, which result in inefficient capital allocation and operational bottlenecks.

The study highlights that inconsistent sales trends—characterized by sharp peaks and troughs—create difficulties in demand forecasting and inventory planning. Overstocking of products like Pipe and Wire ties up capital in unsold inventory, while stockouts of fast-selling items lead to missed sales opportunities and reduced customer satisfaction.

Additionally, reliance on a few high-performing products and brands poses risks to longterm sustainability if market conditions shift. By leveraging customer behavior analysis and datadriven insights, this project seeks to provide actionable recommendations for stabilizing sales trends, optimizing inventory levels, improving customer engagement, and diversifying revenue streams.

Through visual representations such as graphs and detailed data analysis, the project identifies inefficiencies in inventory management and their impact on revenue generation. The recommendations focus on implementing targeted promotions during low-performing periods, enhancing demand forecasting tools, prioritizing high-performing products while addressing low-performing ones, and introducing strategies to engage customers more effectively.

By addressing these challenges, the analysis aims to enhance operational efficiency, improve financial performance, and ensure a steady supply of essential products while minimizing risks associated with excess inventory or stockouts.

2. Detailed Explanation of Analysis Process/Method

The analysis process/method for the Sathana Electricals project involves several steps to extract insights from the collected sales data. Here is a detailed explanation of the analysis process:

❖ **Data Collection:**

The electrical shop possessed sales data primarily in the form of invoice bill PDFs. To ensure a comprehensive analysis, the collected data was converted into a spreadsheet format. This standardization has enabled seamless integration and facilitated a unified analysis process, ensuring an accurate representation of sales information.

❖ **Data Cleaning:**

The initial focus was on data cleaning to ensure accuracy and consistency in the dataset extracted from invoice PDFs. Regular Expression (regex) patterns were applied to efficiently identify and extract key fields such as invoice numbers, dates, item descriptions, quantities, prices, and total amounts. These patterns helped in filtering out unwanted characters, correcting formatting issues, and isolating structured information from the unstructured text.

❖ **Descriptive Statistics:**

Descriptive statistics were calculated to summarize the dataset and gain a clearer understanding of its characteristics. Key statistical measures such as **mean**, **median**, **mode**, **standard deviation**, and **range** were computed for variables like item quantity sold, unit price, and total sales amount. These metrics offered valuable insights into overall sales trends, variations in purchasing patterns, and the performance of different product categories over time.

❖ **Data Visualization:**

To make the data more accessible and interpretable, various visual representations were created. These included **bar charts** to compare product-wise sales, **line graphs** to track sales over time,

pie charts to illustrate category-wise sales distribution, and **heat maps** to highlight periods of high or low sales activity. The choice of visualization technique was guided by the nature of the data and the specific insights being targeted. These visuals helped in communicating findings effectively and supported data-driven decision-making for the business.

❖ Sales Analysis:

The sales data was thoroughly analyzed to uncover patterns, trends, and relationships between different variables. This included evaluating the performance of individual product items over a defined time period to identify **best-selling** and **least-selling** products. The analysis also explored **seasonal trends**, **repeat purchase behavior**, and **sales volume fluctuations**. Furthermore, potential **correlations or dependencies** between different product categories were examined—for instance, whether the sale of one item often influenced the sale of another.

❖ Data Interpretation:

The insights gained from the analysis were then interpreted in the context of the project's goals and the operational challenges faced by Sathana Electricals. This phase focused on translating analytical results into **meaningful conclusions** and **actionable recommendations**. For example, identifying consistently underperforming items could inform stock reduction or replacement strategies, while recognizing high-demand products might lead to inventory expansion or promotional focus.

❖ Recommendations:

Based on the insights gained from the analysis, key recommendations have been proposed to address the challenges faced by Sathana Electricals. These include:

- **Optimizing the product catalogue** by focusing on high-performing items and reducing low-demand inventory.
- **Targeting specific customer segments** with tailored promotions to increase sales and customer retention.

- **Enhancing customer engagement** through improved service, follow-ups, and seasonal offers.

❖ **Report Presentation:**

The final step involves compiling the results, findings, and recommendations into a comprehensive report. This report clearly outlines the **analysis process**, **methodology**, and **key insights** in a well-structured format. To improve clarity and impact, **visual aids** such as graphs, tables, and charts are incorporated throughout the report. These visuals help in effectively communicating complex data, making the report more accessible and insightful for stakeholders and decision-makers.

3 Results and Findings:

❖ **Analysis of Sales Quantity:**

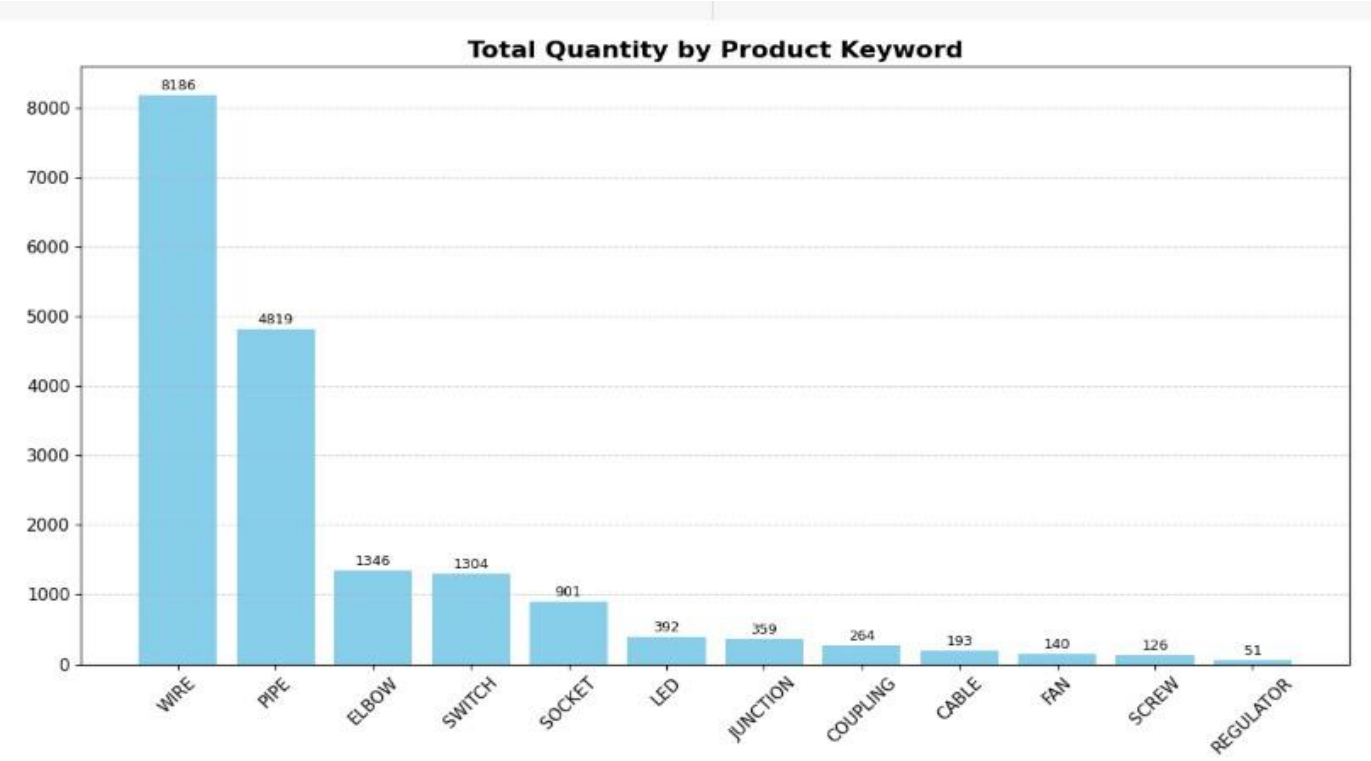

Fig-3.1

The examination of total quantity yields valuable insights into the popularity and effectiveness of various product segments within Sathana Electrical. Graph Fig-3.1 illustrates the sales quantity attributed to each product segment throughout the duration of the analysis.

Findings:

- **High Dominance:**The **Wire** (8,186 units) and **Pipe** (4,819 units) segments are the topperforming product categories, with significantly high sales, demonstrating strong demand and market presence.
- **Mid-Level Performance:** The **Elbow** (1,346 units), **Switch** (1,304 units), and **Socket** (901 units) categories show moderate sales quantities, indicating steady, but not overwhelming, demand.
- **Low Performance:** The **Cable** (193 units), **Fan** (140 units), **Screw** (126 units), and **Regulator** (51 units) segments report minimal sales, indicating low demand throughout the analyzed timeframe.

❖ Analysis of Top Products:

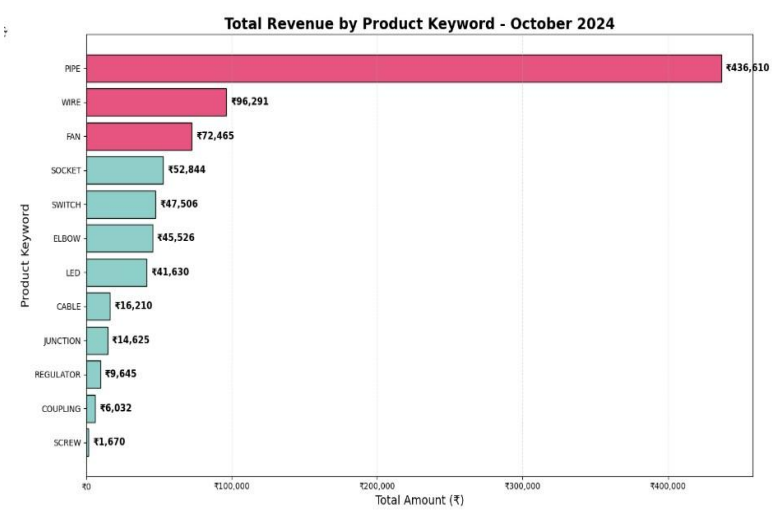

Fig-3.2.1

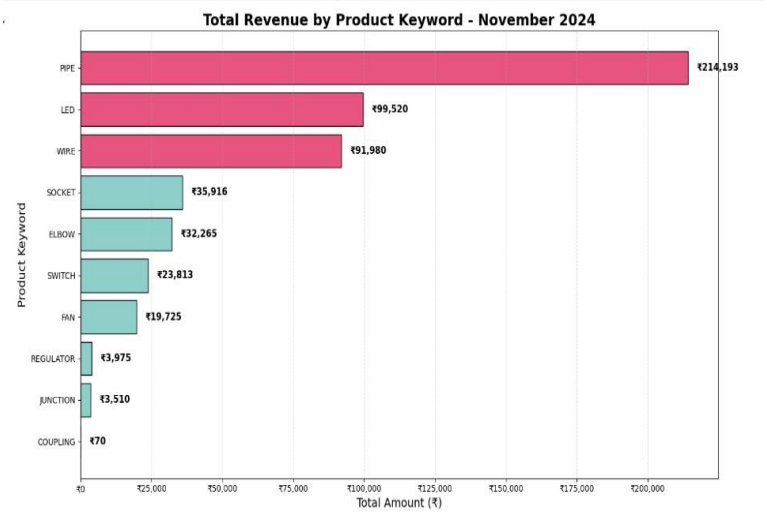

Fig-3.2.1

The examination of top-performing product items entails an assessment of each item's sales contribution throughout the analysis duration. Figure 3.2.1 presents the ten highest

revenuegenerating products for the month of October, while Figure 3.2.2 showcases the ten most revenue-generating products for the subsequent month of November.

Key Observations:

- Pipe consistently dominates as the highest revenue-generating product across both months, contributing ₹436,510 in October and ₹214,193 in November.
- Wire maintains strong performance, ranking second in revenue generation (₹96,291 in October and ₹91,980 in November), highlighting steady customer demand.
- LED exhibits a significant upswing in November revenue (₹99,520) compared to October (₹41,630), reflecting increased sales contribution.
- Fan shows notable revenue in October (₹72,465) but declines sharply in November (₹19,725), indicating fluctuating demand.
- Socket, Switch, and Elbow maintain moderate revenue contributions across both months with slight variations.
- Regulator, Junction, and Coupling consistently report minimal revenue figures throughout the analyzed period, suggesting limited customer interest.

❖ **Analysis of Daily Sales:**

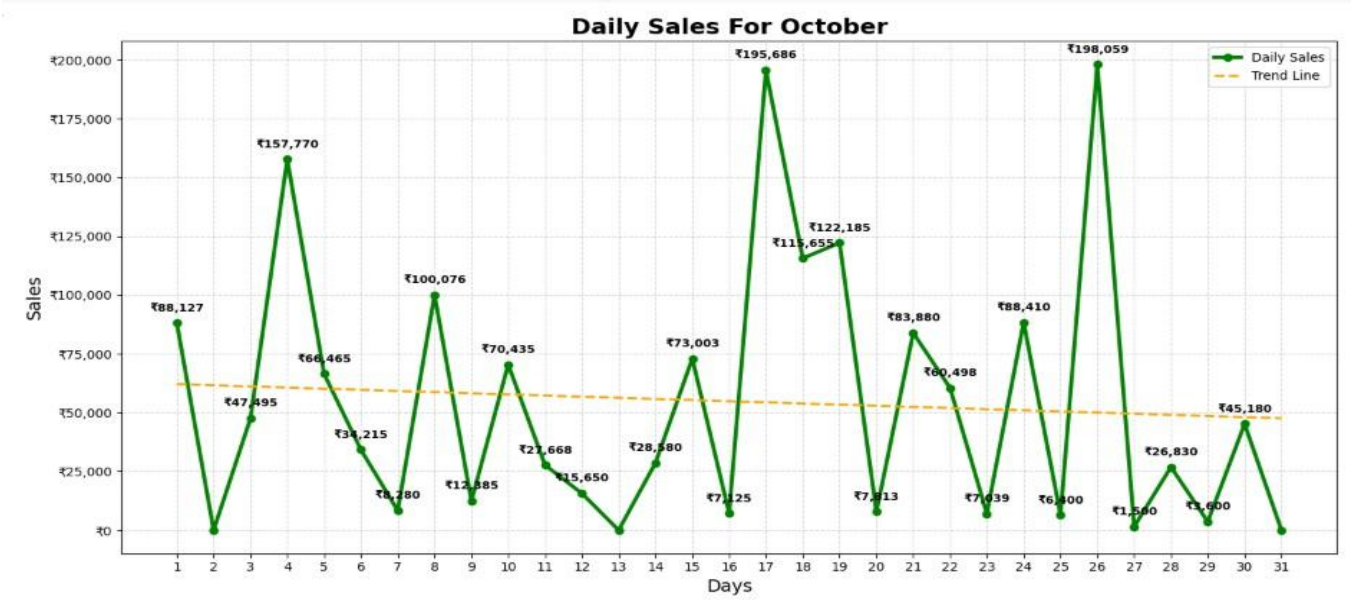

Fig-3.3.1

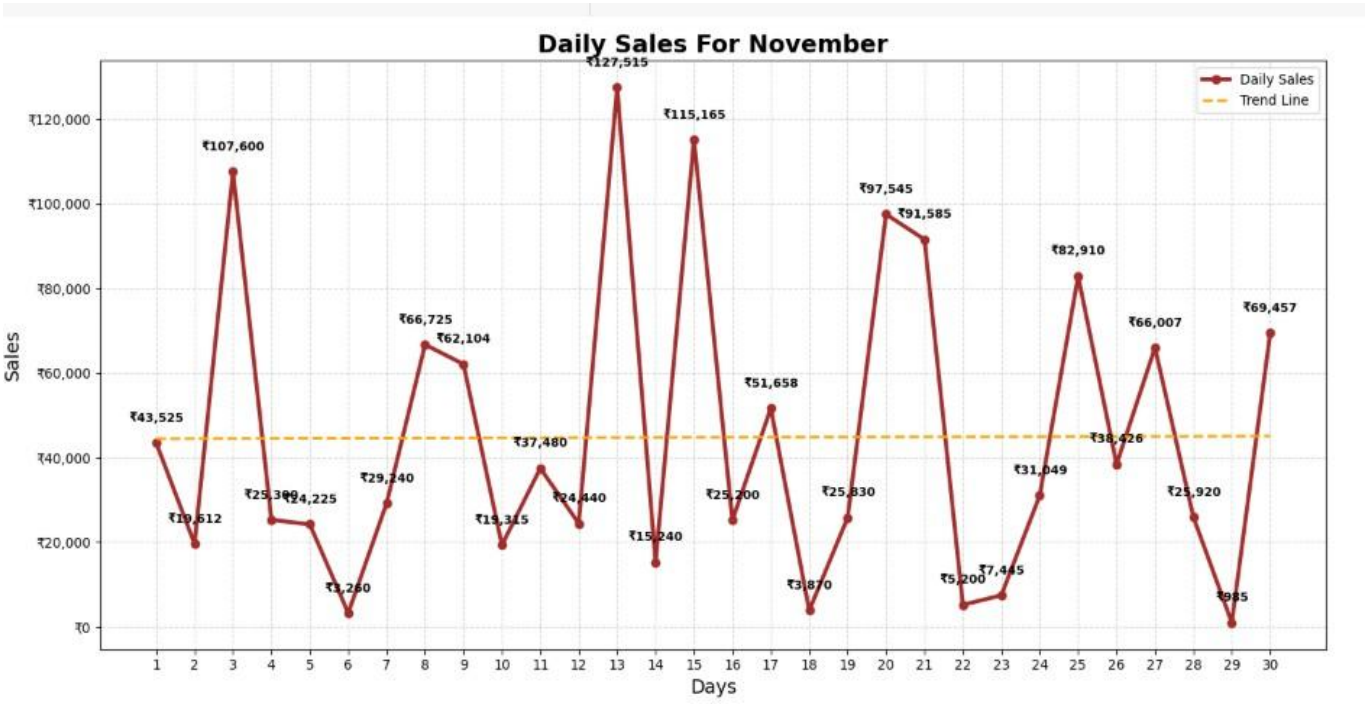

Fig-3.3.2

Figure 3.3.1 illustrates the daily sales performance throughout October, while Figure 3.3.2 portrays the daily sales performance for the subsequent month of November.

Key Insights:

- Upon analyzing the daily sales patterns in both months, it is evident that the shop experiences sharp fluctuations in sales. These sporadic peaks and valleys indicate an inconsistent daily sales trend, although notable high-performing days contribute positively to the overall revenue.
- The **trend line for October** shows a **slightly declining slope**, suggesting a gradual drop in sales as the month progresses. Despite this, October featured **multiple highperforming days**, including spikes on the 4th, 17th, and 26th, where sales soared well above ₹150,000—demonstrating a relatively strong overall performance.

- In contrast, the **trend line for November** remains almost **flat or slightly lower**, implying **lower average performance** compared to October. The sales were **comparatively subdued**, with only a few significant spikes (notably on the 3rd, 12th, and 14th), and several days reporting figures well below ₹50,000.
- Significantly, there were **frequent instances in both months** where daily sales dropped **below the shop's average trend line**. This is particularly pronounced in **November**, pointing to potential issues in customer demand, promotional effectiveness, or stock availability that warrant further investigation.

❖ **Analysis of Weekday Customer Footfall Patterns:**

The analysis of weekday customer visits provides key insights into foot traffic patterns for the hardware shop during October and November, as depicted in Figure 3.4.

Fig-3.4

Key Discoveries:

- **October showed highly variable footfall**, with sharp peaks on **Tuesdays (156 visits)** and **Thursdays (143 visits)**, and significant drops on **Wednesdays (40)** and **Sundays (25)** —

indicating inconsistent customer turnout likely driven by specific weekday events or promotions.

- **November exhibited a more balanced and consistent pattern**, with visits ranging from **33 to 108** across weekdays, reflecting steadier customer engagement without major spikes.
- **Saturdays stood out as peak days in both months** (127 in October, 108 in November), suggesting strong weekend shopping activity, while **Sundays consistently had the lowest footfall**, potentially due to limited hours or closures.
- **Friday visits were nearly identical** across both months (72–73), indicating a **stable and reliable day** for customer engagement, possibly tied to end-of-week shopping habits.

❖ **Analysis of Product-wise Purchases vs Sales:**

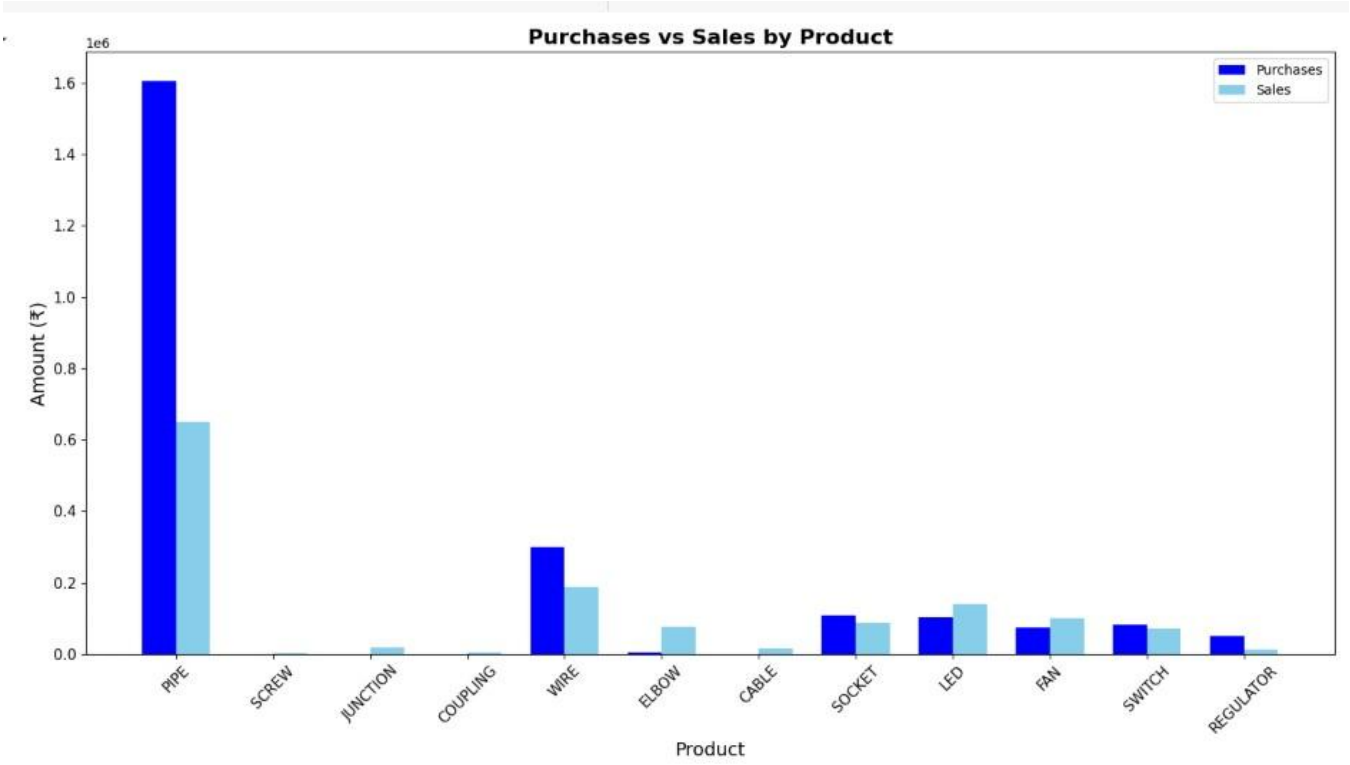

Fig-3.5

The analysis of product-wise purchases and sales offers valuable insights into inventory investment and sales performance across various product categories, as illustrated in **Figure 3.5**

Key Discoveries:

- **Pipes dominate in both purchases and sales**, with purchase costs exceeding ₹1.6 million and sales around ₹0.67 million. This large gap suggests a **high investment** in inventory that may not yet have converted into proportional sales—indicating either overstocking or slower movement.
- Products like **Wire, Socket, and LED** show a **healthier balance** between purchases and sales, with LEDs slightly outperforming purchases—highlighting **strong demand and efficient turnover**.
- **Elbow and Junction** products, while showing relatively low purchase amounts, have **notable sales figures**, especially Elbow—suggesting **high sales efficiency** despite minimal investment.

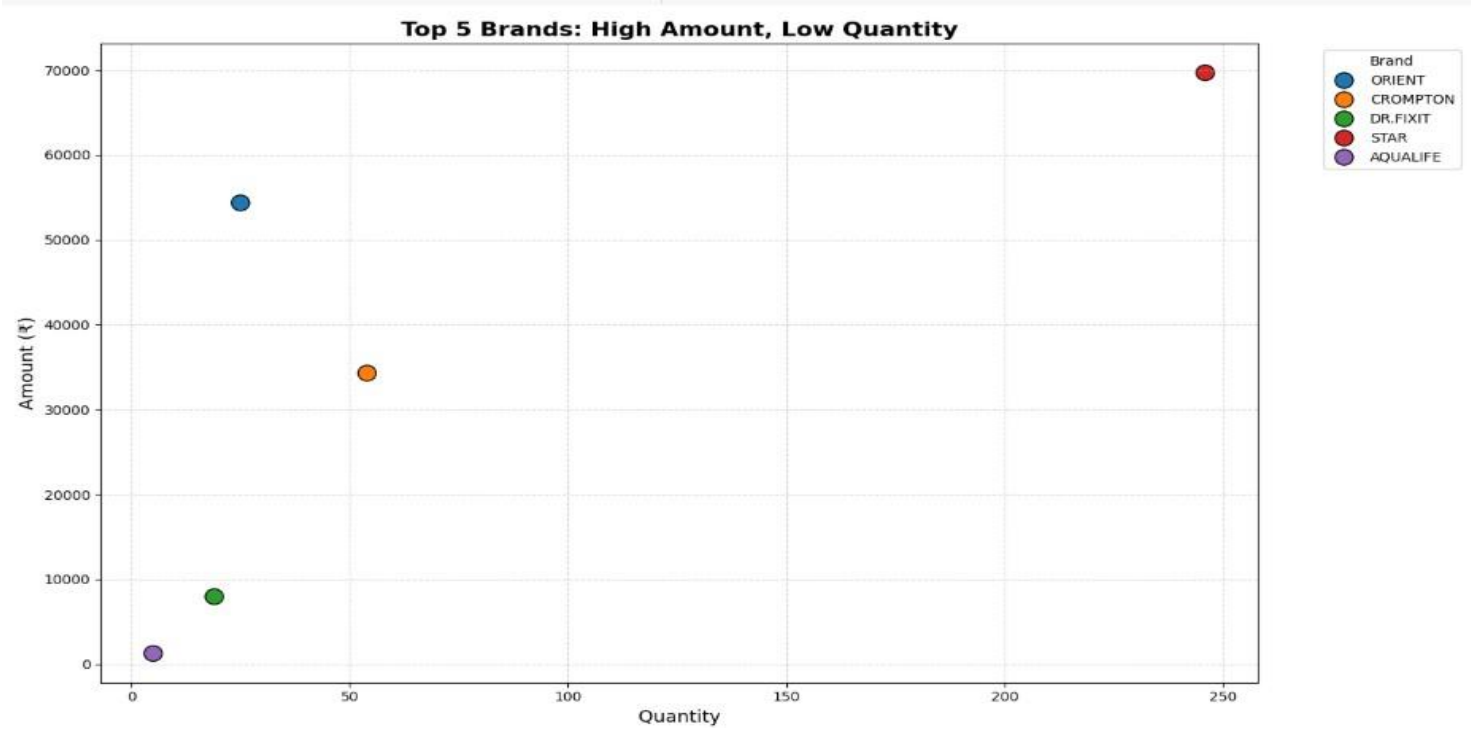

FIG:3.5.1

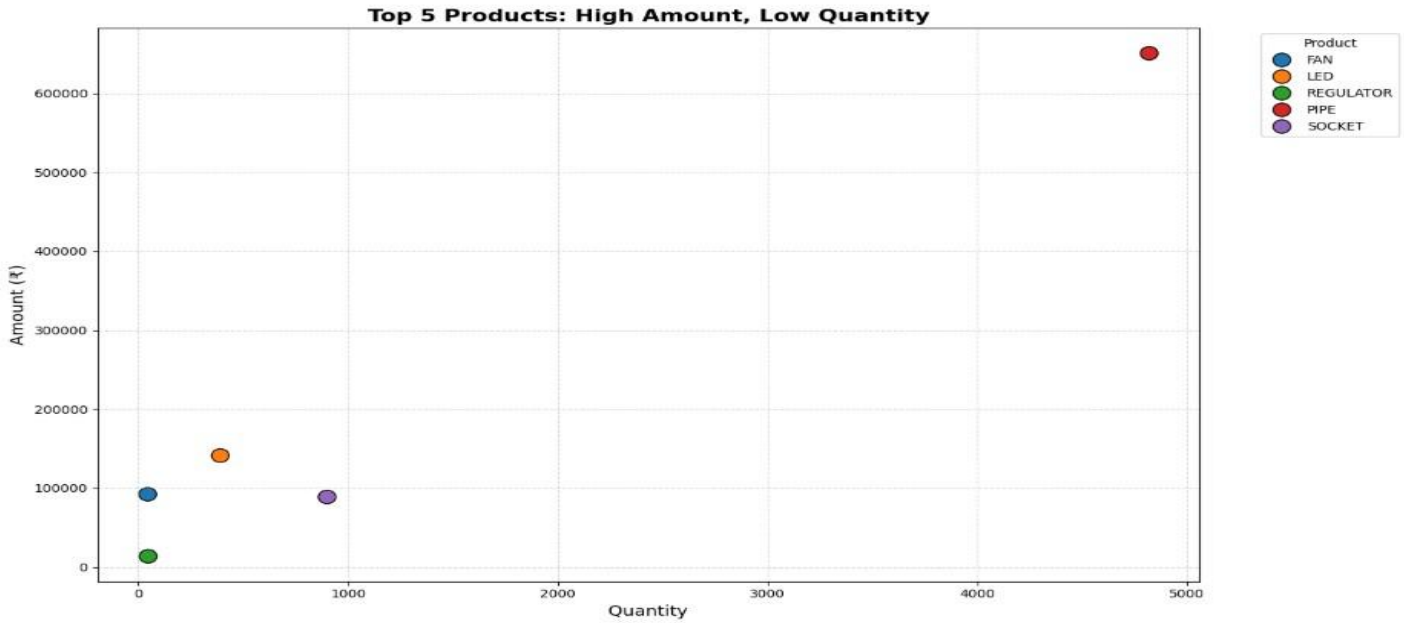

Fig-3.5.2

The analysis of high-amount, low-quantity products and brands provides strategic insights into procurement patterns and spending focus, as illustrated in Figures 3.5.1 and 3.5.2

Key Discoveries:

- **High-Value, Low-Volume Products:** The product "PIPE" significantly stands out with the highest purchase amount (over ₹6,50,000) despite relatively lower quantity, suggesting it is a high-value item, possibly due to bulk pricing or essential utility. Other products like "FAN", "REGULATOR", and "LED" also appear in the top five for high monetary investment with comparatively lower quantities.
- **Premium Brands Driving High Costs:** The brand "STAR" dominates the purchase amount category, exceeding ₹68,000 with modest quantity, indicating high unit prices or premium product lines. Similarly, "ORIENT" and "CROMPTON" follow with substantial costs for limited quantities, implying potential focus on quality or niche market appeal.
- **Strategic Procurement:** Both charts reveal a strategic procurement trend focused on acquiring fewer units of high-value products and brands, potentially aligning with business needs such as durability, customer preference for premium items, or limited storage capacity.

❖ **Analysis of Brand-wise Revenue Trends:**

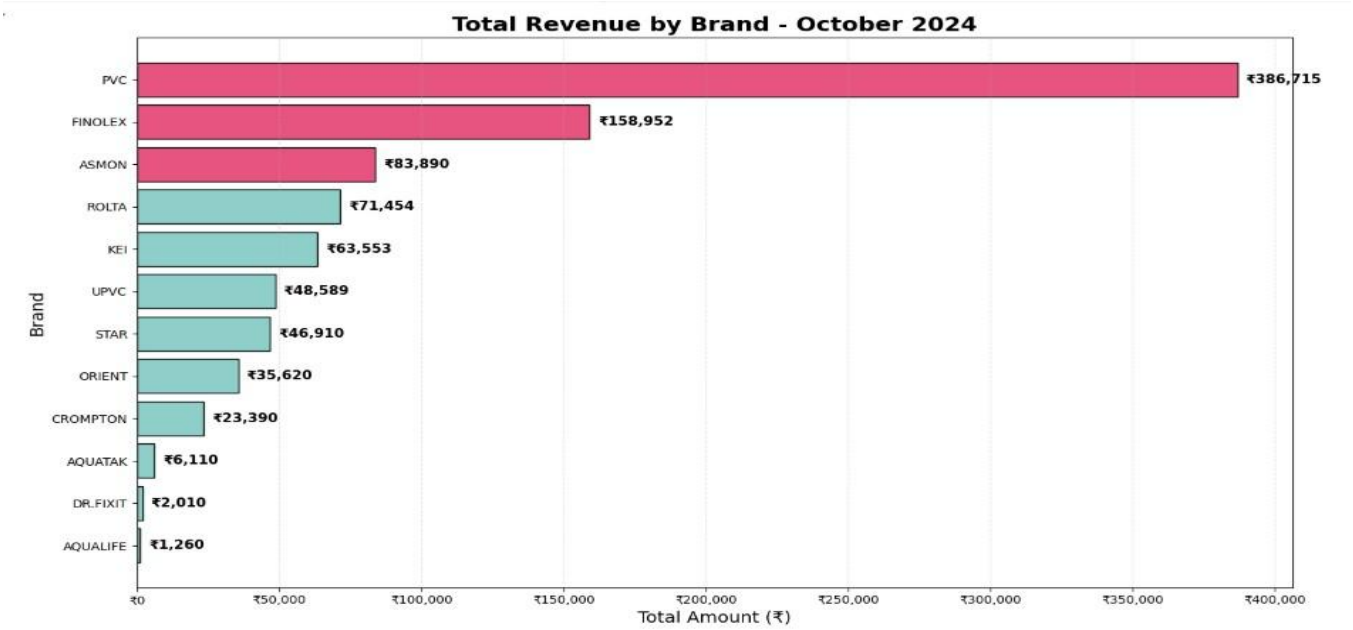

Fig-3.6.1

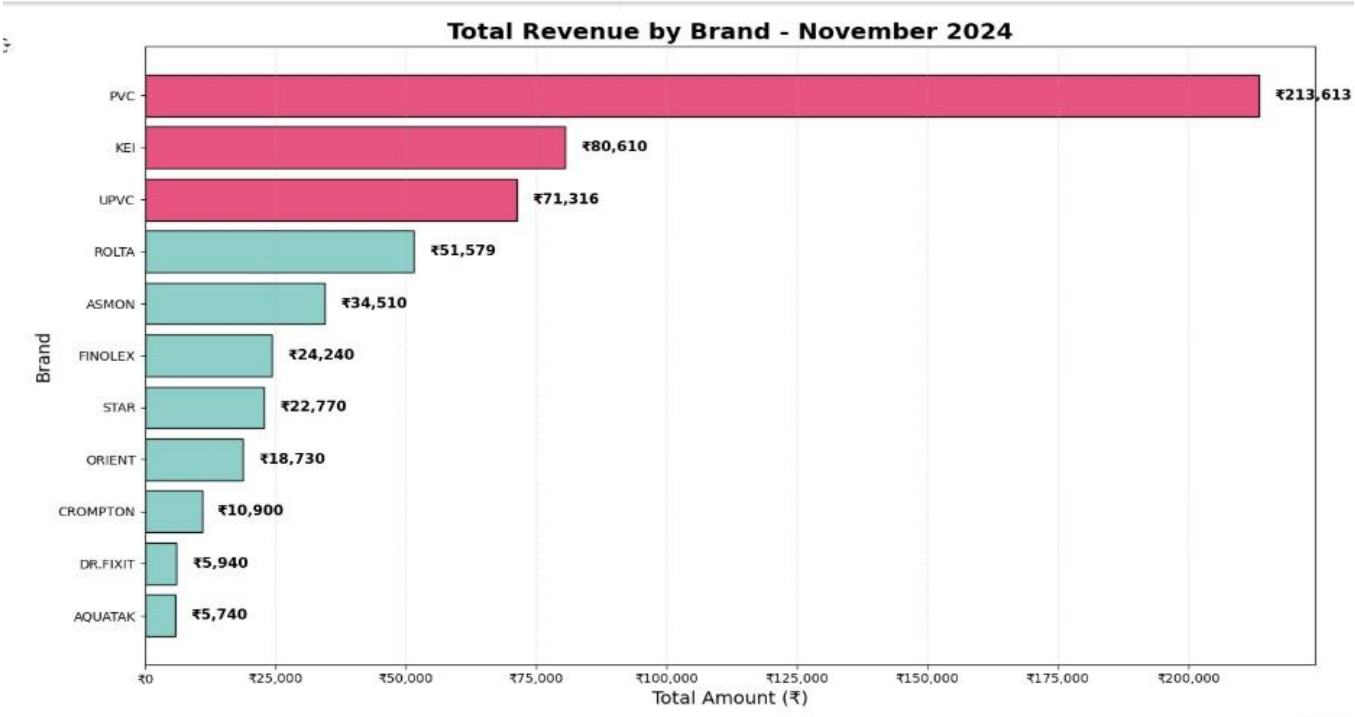

Fig-3.6.2

Key Discoveries:

- **PVC** remained the top revenue-generating brand in both months, though revenue dropped significantly from ₹386,715 to ₹213,613—indicating strong demand but possibly seasonal or supply-driven variation.
- **FINOLEX** experienced a sharp decline of over 84%, falling from second-highest in October (₹158,952) to mid-tier in November (₹24,240), suggesting potential market loss or reduced availability.
- **KEI** saw notable growth, climbing from ₹63,553 to ₹80,610, becoming the secondhighest brand in November—pointing to increasing customer preference or effective sales strategies.
- **UPVC** demonstrated healthy growth and stability, improving from ₹48,589 to ₹71,316, which may indicate expanding usage or successful positioning in the market.
- Brands like **DR. FIXIT** and **AQUATAK**, while still low in total revenue, showed slight improvement in November—possibly reflecting niche demand or targeted sales efforts.
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4. Interpretation of Results and Recommendation:

4.1 Interpretation of Results

1. <u>Sales Trend</u>

- The sales trends for October and November 2024 reveal distinct patterns in daily performance and weekday customer behavior. October exhibited sharp fluctuations, with significant peaks on specific days such as the 5th (₹157,770), 16th (₹195,686), and 27th (₹198,059), likely driven by promotional campaigns or seasonal demand. However, the month also experienced sharp dips on days like the 6th (₹3,215) and 31st (₹2,600), indicating inconsistent sales performance. The overall trend line for October suggests a gradual decline in average daily sales as the month progressed. Conversely, November showed steadier sales performance with smaller peaks on the 13th (₹127,525) and 15th (₹115,165).
- Despite this consistency, dips persisted toward the end of the month, such as on the 30th

(₹9,805), like to October's pattern. Weekday analysis revealed that customer visits were highest on Tuesday and Thursday in October and Saturday in November. Sundays consistently underperformed across both months, highlighting opportunities for improvement in engagement strategies during weekends.

2. Product Analysis

- The product analysis highlights significant disparities in performance across different items. Pipe emerged as the top revenue generator in both months due to its higher price point, despite being second in quantity sold after Wire. Wire led in sales volume with 8,186 units sold but contributed less revenue due to its lower price per unit. LED showed strong growth in November, becoming the second-highest revenue contributor (₹99,520), reflecting shifting customer preferences toward premium products.
- Moderate contributors included Socket and Elbow, while low-performing products like Coupling, Junction, and Screw generated negligible revenue and sales volumes. Inventory management issues were evident for high-purchase items like Pipe and Wire, where purchases exceeded sales significantly, leading to overstocking concerns. This suggests inefficiencies in aligning inventory levels with actual demand.\

3. Customer Preference

- Customer preferences demonstrated a clear inclination toward premium products such as Pipe and LED that combine utility with higher price points. The rise of brands like Orient and Crompton further underscores the growing demand for high-quality branded items. Weekday visit patterns revealed that customers preferred shopping on specific days such as Tuesday and Thursday in October and Saturday in November.
- Sundays consistently saw low footfall across both months, indicating reduced customer engagement or operational focus during weekends. This trend highlights untapped potential for improving customer interaction and driving sales during traditionally low performing days.

4. Revenue Analysis

- Revenue generation was concentrated heavily in a few high-performing products and brands. Pipe consistently dominated revenue due to its higher profitability per unit sold, while Wire contributed less despite leading in sales volume. LED showed increasing revenue contributions in November, reflecting its growing popularity among customers.
- Brand analysis revealed that PVC led revenue generation across both months (₹386,715 in October; ₹213,613 in November), far surpassing other brands like KEI and UPVC. However, this heavy reliance on a limited portfolio poses risks to long-term sustainability if market conditions shift or demand for these specific products declines. Lowperforming brands like Aquatak and Dr. Fixit contributed minimally to overall revenue, suggesting limited market appeal or poor positioning.

4.2 Recommendations

1. Sales Trend Optimization

- Launch targeted promotions during low-performing periods such as Sundays and end-ofmonth days to boost engagement.
- Analyze factors driving high peaks in October (e.g., marketing campaigns or events) to replicate successful strategies.
- Implement predictive analytics to better forecast seasonal demand fluctuations.

2. Product Portfolio Management

- Prioritize high-performing products like Pipe, LED, and Wire by ensuring adequate inventory levels without overstocking.
- Reevaluate low-performing products like Coupling and Screw; consider discontinuing them or repositioning them with improved marketing efforts.
- Introduce complementary products that align with customer preferences for premium quality.

3. Customer Engagement Strategies

- Use high-footfall days (e.g., Tuesday, Thursday, Saturday) for special offers or events to maximize sales while addressing Sunday underperformance with weekend-specific campaigns.
- Enhance digital marketing efforts to attract online customers and reflect broader consumer trends toward e-commerce.

4. Revenue Diversification

- Reduce dependency on top-performing products by promoting mid-tier items like Socket and Fan to balance revenue streams.
- Expand offerings within premium categories to cater to customers willing to pay for quality.
- Strengthen underperforming brands through improved branding strategies or innovative product launches.

5. Inventory Efficiency

- Use demand forecasting tools to align purchases with actual sales trends to reduce holding costs associated with overstocking.
- Monitor inventory turnover rates regularly to identify slow-moving items early.

Conclusion:

By implementing these recommendations, Sadhana Electrical can enhance its operational efficiency, stabilize sales performance, and improve customer satisfaction. Focusing on targeted promotions during low-performing periods, such as Sundays and end-of-month days, will help address inconsistencies in sales trends.

Additionally, prioritizing high-performing products like Pipe and LED while reevaluating or discontinuing low-performing items such as Coupling and Screw will streamline inventory management and reduce holding costs. These measures will ensure that the business maintains a steady supply of essential products while minimizing risks associated with overstocking or stockouts.