

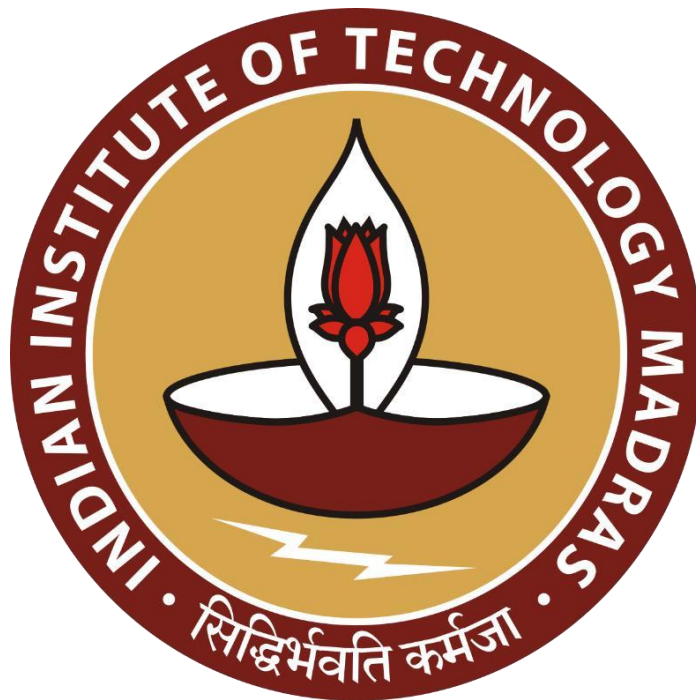
REVITALIZING SALES AND INVENTORY MANAGEMENT THROUGH DATA ANALYSIS

Mid Term Report for the BDM Capstone Project

Submitted by

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1. Executive Summary and Title

This project, 'REVITALIZING SALES AND INVENTORY MANAGEMENT THROUGH DATA ANALYSIS', aims to address key business challenges faced by Popular Electricals & Saniwares, Erattupetta, specifically focusing on declining sales and inefficient inventory management as outlined in the proposal. To gain a clearer view of recent sales declines, I decided to analyse sales data from the past few months. This analysis can help identify top revenue-generating products, enabling us to prioritize these items by maintaining a higher stock level and expanding options, such as different brands and colours. Conversely, we can reduce stock for lower-revenue items or consider offering alternatives in other brands or colours. Special promotions on low-revenue items may also encourage additional sales.

Furthermore, through inventory trend analysis, we can identify products that are overstocked or under stocked. Usually, inefficient inventory management can lead to two main issues: overstocking, which ties up capital, and under stocking, which leads to missed sales opportunities. Understanding the approximate sales volume of each product and adjusting stock levels accordingly can make inventory management more efficient.

To address these challenges, I have analysed six months of data (March to August 2024) for 25 selected products. Focusing on a smaller sample allows for a more detailed and manageable analysis, with findings that could provide insights applicable to other products in the store.

2. Proof of originality of the Data

The data analyzed in this project pertains to Popular Electricals & Saniwares, a B2C retail store located in Erattupetta, Kottayam, Kerala. The information was gathered through a series of in-person meetings with the store owner, Sri. G Suresh Babu. Photographs from these visits are included here as evidence of the data's authenticity and to provide context for the project.



Figure 2.1: Exterior view of the shop – Showcasing Storefront Design and Customer Accessibility



Figure 2.2: Arrangement of Goods and Merchandising Techniques



Figure 2.3: Business Card Demonstrating Branding Strategy and Essential Contact Points

POPULAR ELECTRICALS & SANIWARES
PEE CEE ARCADE, VADAKKERA, ERATTUPETTA-1
Phone No: 944733002, Email: elepopular@gmail.com
GSTIN: 32AJBPG1545N1ZF, STATECODE: 32 KERALA
TAX INVOICE - CASH

Invoice No: GS2346
Date: 06/July/2024

To: CASH CUSTOMER
MOBILE NO.: STATECODE: 32 - KERALA

| SNo | Part | Unit | Qty | Rate | Taxable Value | GST Rate | GST Amt | GST Rate | GST Amt | Total |
|---------------------|------------------------|----------|---------|-------|------------------------------------|----------|--------------------------------------|----------|--|--------|
| 1 | LED SWITCH | 8536 | 5 No. | 25.42 | 127.12 | 9.00 | 11.44 | 9.00 | 11.44 | 150.00 |
| 2 | STRIP CONNECTOR 30A | 8536 | 10 No. | 40.68 | 406.78 | 9.00 | 36.61 | 9.00 | 36.61 | 480.00 |
| 3 | 30MM PVP UNICOLA HEVY | 30172890 | 10 No. | 30.91 | 309.12 | 9.00 | 27.84 | 9.00 | 27.84 | 360.00 |
| 4 | CABLE TIE STRONG 3.5MM | 3022 | 100 No. | 2.40 | 240.16 | 9.00 | 21.52 | 9.00 | 21.52 | 290.00 |
| Disc: 0.00 | | | | | Tax: 106.02 | | GST: 96.01 | | Taxable Value | |
| COST: 98.01 | | | | | Total quantity: 125 | | 118 %: 1096.98 | | 1096.98 | |
| Total quantity: 125 | | | | | 118 %: 1096.98 | | 1096.98 | | 1285.00 | |
| BANK DETAILS | | | | | Bank Name: ICICI BANK, ERATTUPETTA | | Account No: 1234567890123 | | IFSC Code: ICIC0008239 | |
| In Words: | | | | | Grand Total | | 1285.00 | | One Thousand Two Hundred and Eighty Five Rupees Only | |
| E&OE | | | | | | | | | | |
| Prepared By | | | | | Checked | | FOR: POPULAR ELECTRICALS & SANIWARES | | | |

Figure 2.4: Sample Bill Showing Itemized Costs, Taxes, and Total Amount Due



Figure 2.5: Customer Purchase Snapshot – Illustrating Items Bought and Customer Interaction



Figure 2.6: A Shared Moment Between Gopika and the Owner – A Key Interaction in Project

Link to the Meeting with the Owner:

<https://drive.google.com/file/d/1CBDMAJimOsUVYwi0q78n1VfVvMfVvK71b/view?usp=sharing>

Link to the Data Collected:

https://docs.google.com/spreadsheets/d/1UXgd5c5C-aSevnqxog89vjvA214Cl4v-/edit?usp=drive_link&ouid=105031207140672591614&rtpof=true&sd=true

Pee Cee Arcade, Vadakkekara, Erattupetta, Kottayam, Pin: 686 121
Ph: 9961033300, 8547333002 GSTIN : 32AJBPG1545N1ZF, Email : elepopular@gmail.com

To Whom It May Concern

DATE:-06-11-2024

G Suresh Babu
Popular Electricals & Saniwares

**POPULAR
ELECTRICAL & SANIWARES
PEE CEE Arcade
Vadakekara Erattupetta-1
PH:8547333002**

| PRODUCT | BRAND |
|-------------------|-----------------|
| 1 SQMM CABLE | FINOLEX |
| | RR |
| | V-GUARD |
| 6W CEILING LED | G-HOME |
| | RR |
| 9W LED BULB | GM |
| | RR |
| 12 WAY D/B BOX | DILTECH |
| | V-GUARD |
| | L&T |
| 20 MM WIRING PIPE | EXCEL HEAY |
| | CROMPTON |
| CEILING FAN | SILVER |
| | LEGRAND |
| | GM |
| 6A 1 WAY SWITCH | INDOASIAN |
| | KIRLOSKER |
| 1 HP PUMPSET | CERA |
| | MBRAND |
| LONG BODY TAP | STAR |
| | LENORA |
| PVC SUCTION HOSE | SUPREME(4 inch) |
| | SUPREM(2 inch) |
| PVC PIPE | STAR |
| | CERA |
| S TRAP | STAR |
| | CERA |

Table 3.1: List of products

The dataset includes six months of detailed inventory and sales data, from March 2024 to August 2024, extracted as a summary report in Excel from Tally. This sheet provides essential information for each product, including item name, model number and brand, opening stock as of March 2024, purchased quantity and value, sales quantity and value, and closing stock at the end of each month. This comprehensive data enables a thorough analysis of sales trends, inventory levels, and product performance over the selected period.

| | | | | | | |
|-------------|-------------------------------|-----------|----------|-----------|-----------------|-----------|
| 1 | 1SQMM FINOLEX | | | | | |
| | POPULAR ELECTRICAL& SANIWARES | | | | | |
| | 1-Mar-24 to 31-Aug-24 | | | | | |
| | Inwards | | Outwards | | Closing Balance | |
| | Quantity | Value | Quantity | Value | Quantity | Value |
| | Opening Balance | | | | 132 NOS | 127962.70 |
| March | 40 NOS | 34606.80 | 43 NOS | 42599.97 | 129 NOS | 123434.27 |
| April | 60 NOS | 53875.20 | 45 NOS | 44355.90 | 144 NOS | 135092.93 |
| May | | | 30 NOS | 29822.01 | 114 NOS | 106948.57 |
| June | 100 NOS | 98108.00 | 86 NOS | 86523.68 | 128 NOS | 121984.21 |
| July | | | 48 NOS | 48020.59 | 80 NOS | 76240.13 |
| August | 100 NOS | 92419.00 | 49 NOS | 53487.42 | 131 NOS | 123872.95 |
| Grand Total | 300 NOS | 279009.00 | 301 NOS | 304809.57 | 131 NOS | 123872.95 |
| 2 | 1SQ MM RR CABLE | | | | | |
| | POPULAR ELECTRICAL& SANIWARES | | | | | |
| | 1-Mar-24 to 31-Aug-24 | | | | | |
| | Inwards | | Outwards | | Closing Balance | |
| | Quantity | Value | Quantity | Value | Quantity | Value |
| | Opening Balance | | | | 123 NOS | 138032.88 |
| March | | | 31 NOS | 31472.75 | 92 NOS | 103244.10 |
| April | | | 11 NOS | 11099.99 | 81 NOS | 90899.70 |
| May | | | 6 NOS | 6227.10 | 75 NOS | 84166.39 |
| June | | | 2 NOS | 2030.50 | 73 NOS | 81921.95 |
| July | | | 24 NOS | 24366.00 | 49 NOS | 54988.71 |
| August | 120 NOS | 115479.60 | 17 NOS | 18556.86 | 152 NOS | 156820.77 |
| Grand Total | 120 NOS | 115479.60 | 91 NOS | 93753.20 | 152 NOS | 156820.77 |
| 3 | 1SQ MM VGUARD CABLE | | | | | |
| | POPULAR ELECTRICAL& SANIWARES | | | | | |
| | 1-Mar-24 to 31-Aug-24 | | | | | |
| | | | | | | |

Figure 3.1: Raw Data

To prepare the data for effective analysis, I first organized it in a table format and

standardized the item names for clarity. This initial cleaning step ensures consistency and makes the data easier to interpret and analyze.

| ITEM | BRAND | UNIT | OPENING STOCK | | PURCHASE | | SOLD OUT | | CLOSING STOCK | | OPENING STOCK | | PURCHA |
|-------------------|-------------|------|---------------|-----------|----------|-----------|----------|-----------|---------------|-----------|---------------|-----------|---------|
| | | | QUANTITY | VALUE | QUANTITY | VALUE | QUANTITY | VALUE | QUANTITY | VALUE | QUANTITY | VALUE | |
| 1 SQMM CABLE | FINOLEX | NOS | 132.00 | 127962.70 | 40.00 | 34606.80 | 43.00 | 42599.97 | 129.00 | 123434.27 | 129.00 | 123434.27 | 53 |
| | RR | NOS | 123.00 | 138032.88 | 0.00 | 0.00 | 31.00 | 31472.75 | 92.00 | 103244.10 | 92.00 | 103244.10 | 0.00 |
| | V-GUARD | NOS | 81.00 | 82637.10 | 75.00 | 71187.00 | 35.00 | 34940.85 | 121.00 | 121092.30 | 121.00 | 121092.30 | 45 |
| | G-HOME | NOS | 2.00 | 520.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 520.00 | 2.00 | 520.00 | 0.00 |
| 6W CEILING LED | RR | NOS | 294.00 | 70560.00 | 0.00 | 0.00 | 9.00 | 1830.51 | 285.00 | 68400.00 | 285.00 | 68400.00 | 0.00 |
| | GM | NOS | 128.00 | 10240.00 | -1.00 | -80.00 | 74.00 | 5017.20 | 53.00 | 4240.00 | 53.00 | 4240.00 | 0.00 |
| 9 W LED BULB | RR | NOS | 44.00 | 3520.00 | -5.00 | -400.00 | 14.00 | 949.20 | 25.00 | 2000.00 | 25.00 | 2000.00 | 0.00 |
| | DILTECH | NOS | 4.00 | 3960.00 | 8.00 | 3410.46 | 6.00 | 5184.90 | 4.00 | 3237.27 | 4.00 | 3237.27 | 9 |
| 12 WAY D/B BOX | V-GUARD | NOS | 4.00 | 7920.00 | 0.00 | 0.00 | 1.00 | 1677.97 | 3.00 | 5940.00 | 3.00 | 5940.00 | 0.00 |
| | L&T | NOS | 7.00 | 10322.76 | 0.00 | 0.00 | 0.00 | 0.00 | 7.00 | 10322.76 | 7.00 | 10322.76 | 0.00 |
| | SILVER | NOS | 16.00 | 25600.00 | 0.00 | 0.00 | 6.00 | 8177.96 | 10.00 | 16000.00 | 10.00 | 16000.00 | 0.00 |
| CEILING FAN | CROMPTON | NOS | 43.00 | 83341.53 | 0.00 | 0.00 | 1.00 | 1949.15 | 42.00 | 81403.35 | 42.00 | 81403.35 | 45 |
| | LEGRAND | NOS | 141.00 | 5499.00 | 0.00 | 0.00 | -8.00 | -263.19 | 149.00 | 5811.00 | 149.00 | 5811.00 | 5 |
| 6 A 1 WAY SWITCH | GM | NOS | 339.00 | 8136.00 | 0.00 | 0.00 | 260.00 | 5270.20 | 79.00 | 1896.00 | 79.00 | 1896.00 | 0.00 |
| | INDOASIAN | NOS | 216.00 | 3458.53 | 0.00 | 0.00 | 57.00 | 976.61 | 159.00 | 2545.86 | 159.00 | 2545.86 | 0.00 |
| | CERA | NOS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3 |
| LONG BODY TAP | MBRAND | NOS | 5.00 | 4450.00 | 0.00 | 0.00 | 2.00 | 1508.56 | 3.00 | 2670.00 | 3.00 | 2670.00 | 0.00 |
| | STAR | MTR | 236.50 | 19393.00 | 600.00 | 24480.00 | 74.00 | 5142.27 | 762.50 | 43133.02 | 762.50 | 43133.02 | 0.00 |
| PVC SUCTION HOSE | LENORA | MTR | 93.50 | 6451.50 | 600.00 | 22998.00 | 138.00 | 7560.67 | 555.50 | 26065.18 | 555.50 | 26065.18 | 0.00 |
| | STAR | NOS | 12.00 | 17760.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12.00 | 17760.00 | 12.00 | 17760.00 | 0.00 |
| S TRAP | CERA | NOS | 12.00 | 15716.04 | 0.00 | 0.00 | 0.00 | 0.00 | 12.00 | 15716.04 | 12.00 | 15716.04 | 0.00 |
| 2 INCH PVC PIPE | SUPREME | MTR | 368.40 | 28877.58 | 400.00 | 19828.00 | 384.50 | 28676.01 | 383.90 | 26403.49 | 383.90 | 26403.49 | 19 |
| 4 INCH PVC PIPE | SUPREME | MTR | 310.50 | 70794.00 | 200.00 | 26634.00 | 267.40 | 51667.03 | 243.10 | 49627.26 | 243.10 | 49627.26 | 53 |
| 20 MM WIRING PIPE | EXCEL HEAVY | NOS | 300.00 | 6884.00 | 0.00 | 0.00 | 168.00 | 5210.21 | 131.00 | 2997.28 | 131.00 | 2997.28 | 11 |
| 1 HP PUMPSET | KIRLOSKER | NOS | 4.00 | 38137.28 | 0.00 | 0.00 | 1.00 | 9152.54 | 3.00 | 28602.96 | 3.00 | 28602.96 | 0.00 |
| GRAND TOTAL | | | 2915.90 | 790153.90 | 1915.00 | 202664.26 | 1564.90 | 248701.37 | 3266.00 | 763062.14 | 3266.00 | 763062.14 | 1649.00 |

Figure 3.2: Cleaned data

While reviewing the data, I noticed some discrepancies, such as negative outward quantities. Upon discussing this with the owner, Sri. G Suresh Babu, I learned that these negative quantities stem from product returns, which are typically due to customers returning leftover items after construction projects, rather than faulty products. Additionally, some products showed negative closing stock in certain months. As mentioned in the proposal, the shop is transitioning from eZCom to Tally. During this process, sometimes products are sold before their purchase is entered into the system, which leads to negative closing stock in those instances. This is an operational issue arising from the data migration and timing discrepancies in the recording of purchases and sales.

4. Detailed Explanation of Analysis Process/Method:

Before performing trend analysis, I first grouped the items by their type, irrespective of colour or brand, reducing the product list to 12 categories. While analysing data by brand could provide insights into the popularity of specific brands, I've chosen to focus on the item type for now to simplify the analysis.

From the cleaned data, I have calculated the following key metrics:

- **Total:** I calculated the sum of both volume (quantity) and revenue (value) for each product and each month using the Excel function SUM.

- **Average:** I computed the average volume and revenue for each product and each month using the Excel function AVERAGE.

These calculations provide an overview of the overall sales performance and can help in identifying trends and outliers for each product across the months.

- **Cost price:** The cost price is the amount of money spent to acquire or produce an item before it is sold. It is calculated using the following equation:

$$\text{Cost Price} = \frac{\text{Total Purchase Cost}}{\text{Number of Items}}$$

- **Selling price:** The selling price is the amount at which a product is sold to customers. It is calculated using the following equation:

$$\text{Selling price} = \frac{\text{Total Selling Price}}{\text{Number of Items}}$$

- **Profit:** Profit is the financial gain realized when the revenue from selling a product or service exceeds the expenses, costs, and taxes involved in producing or acquiring it. In simple terms, profit is the money a business keeps after covering all its expenses.

$$\text{profit} = \text{no of units sold} * (\text{selling price} - \text{cost price})$$

To keep the analysis manageable and avoid unnecessary complexity, I have excluded other costs such as transportation, labour costs, rent, electricity bills, etc. This ensures the focus remains on the core aspects of sales and inventory.

Additionally, I have organized the data and analysis into separate sheets for clarity and ease of access. These include sheets for raw data, cleaned data, sales data, inventory data, and so on. This structure helps maintain a clear workflow and makes it easier to track the progress of different analyses.

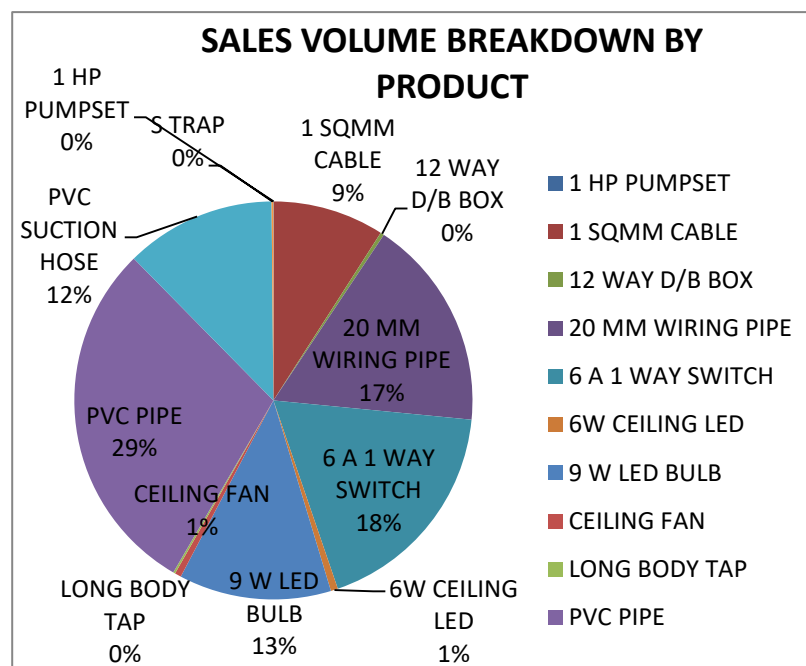
5. Results and Findings

After calculating the necessary terms, I used Pivot Tables to summarize and analyse the data. Pivot Tables in Excel are powerful tools that help in organizing large amounts of data, allowing you to group, filter, and perform calculations without modifying the original dataset. This makes it easier to identify trends and patterns.

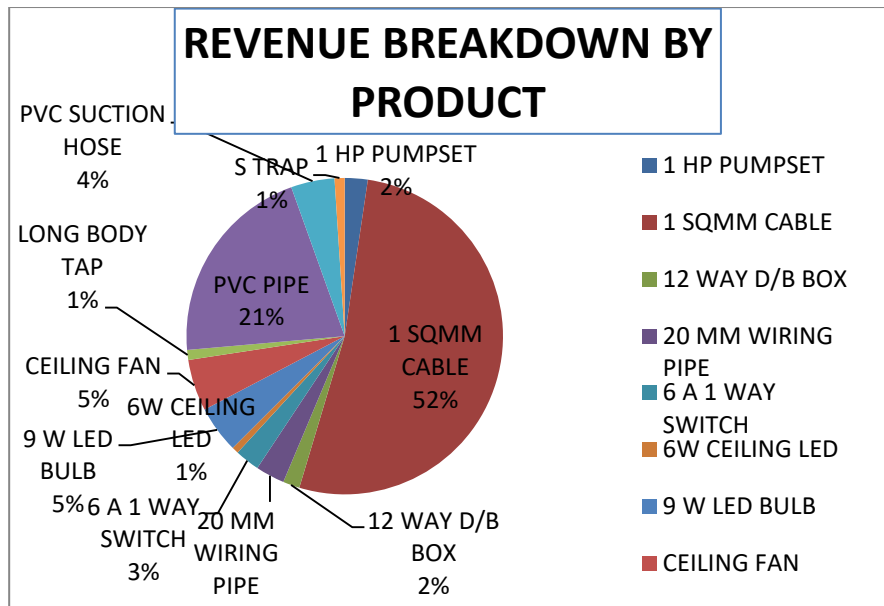
For better visualization and analysis, I copied the Pivot Tables into separate cells rather than directly using them for creating charts. This approach ensures that the data remains intact while enabling me to generate charts tailored to specific analysis needs. The charts derived from these Pivot Tables helped present the findings in a more accessible and understandable format.

1) Sales Volume and Revenue Proportion

Creating pie charts to visualize the proportion of sales volume and revenue is an excellent way to understand the relative contribution of each product. Sales Volume Proportion Pie Chart shows the percentage share of each product in total sales volume. It helps identify which products are contributing the most to the overall sales quantity. Revenue Proportion Pie Chart displays the share of each product in the total revenue generated. It helps highlight which products are the most profitable, even if their volume isn't the highest.



Graph 5.1: Sales Volume Breakdown by Product



Graph 5.2: Revenue Breakdown by Product

When comparing the two pie charts—sales volume proportion and revenue proportion—we can observe a significant insight: the products that drive the most sales in terms of volume may not necessarily be the highest revenue generators.

For example:

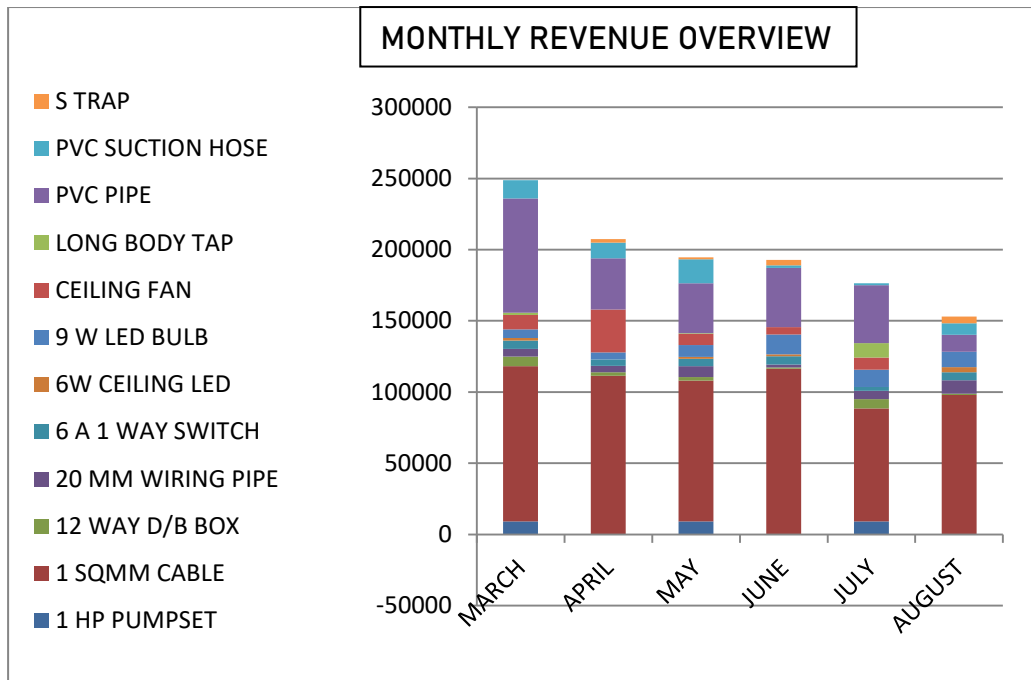
- PVC Pipe is the highest-selling product in terms of volume, contributing 29% of the total sales volume.
- 1 SQMM Cable, despite having a lower sales volume, generates the most revenue, contributing 52% of the total revenue.

This indicates that, while PVC Pipe is sold in large quantities, it likely has a lower unit price compared to 1 SQMM Cable, which, despite fewer units sold, has a higher price and thus generates more revenue.

This distinction is crucial for inventory and pricing strategy. Even if certain products like PVC Pipe sell more units, focusing on high-revenue products like the 1 SQMM Cable could have a more significant impact on overall profitability. Adjusting stock levels and promotional efforts accordingly can help optimize both sales volume and revenue.

2) Revenue Analysis Month wise

For month-wise revenue analysis, the stacked column chart is a great choice as well. This chart will provide a clear visual of how revenue is distributed across products each month and help you understand trends over time.

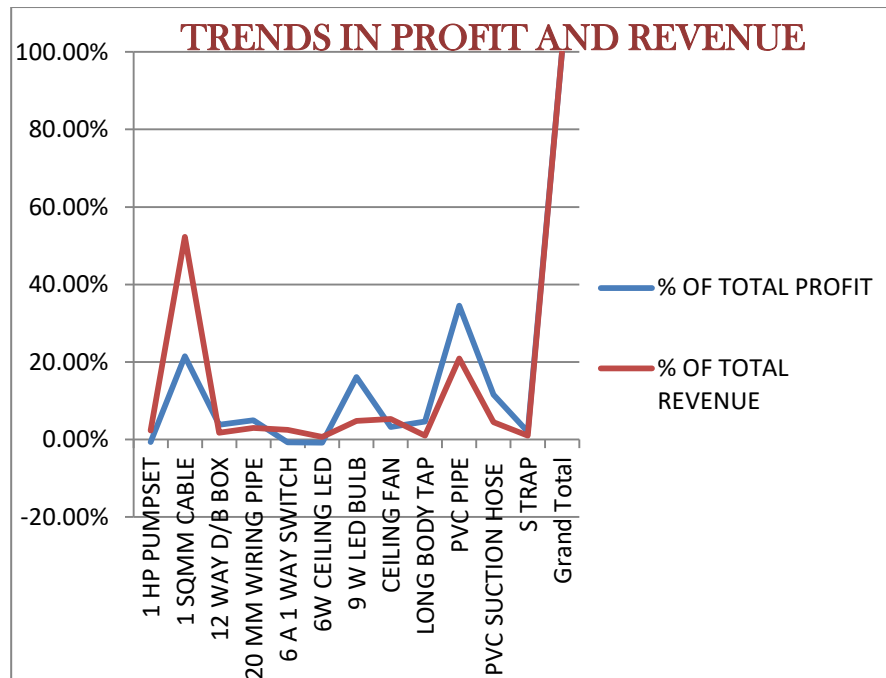


Graph 5.3: Monthly Revenue Overview

- The revenue analysis clearly indicates a decline in total revenue over the months, which can be partially attributed to seasonal changes. It is assumed that in Summer Season, during the hot weather, there is typically an increased demand for items such as fans, pumpsets, and PVC pipes due to water scarcity and natural damage to items. This would explain higher sales during the earlier months (March to May).
- In contrast, as the monsoon arrives, construction activity generally slows down due to heavy rains, leading to reduced demand for construction-related items. Since Popular Electricals & Saniwares is closely tied to the construction sector, this slowdown directly impacts sales, especially in August, which is consistently the lowest-performing month.

3) Profit and Revenue Analysis

Creating a line chart to compare profit and revenue is a great way to visualize their relationship over time.



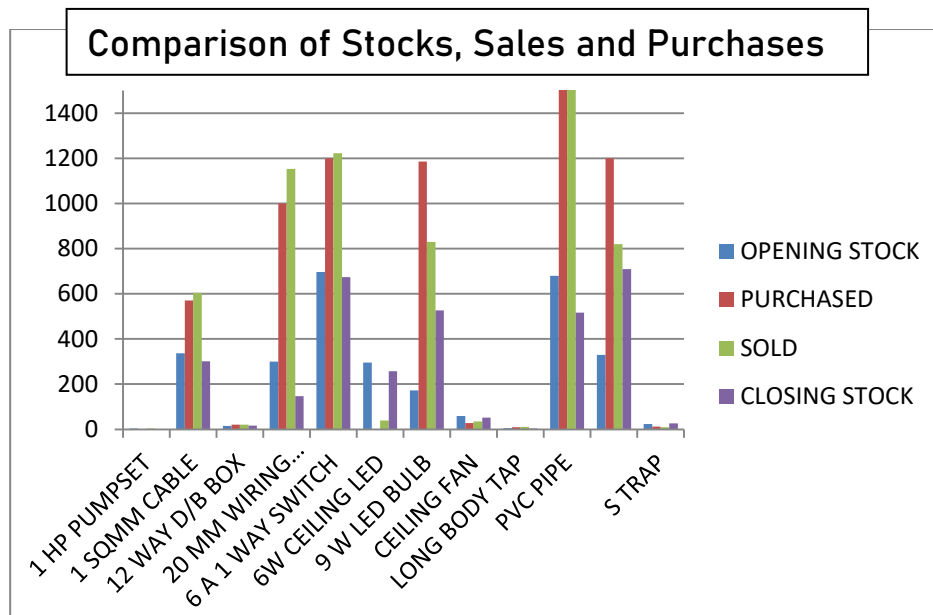
Graph 5.4: Trends in Profit and Revenue

The line chart comparing profit and revenue provides valuable insights into the product performance, as you've observed:

- **Revenue vs. Profit Discrepancy:** It's clear that while products like 1 SQMM Cable generate the most revenue, they may not necessarily be the highest contributors to profit. On the other hand, PVC Pipe, despite having lower revenue, shows the highest profit, likely due to its lower cost of goods sold or higher margins. However, items that generate higher revenue also tend to contribute more to profit.
- **Negative Profit for Certain Products:** The negative profit for products like Pump Set, 1 Way Switch, and Ceiling LED is a significant concern. This suggests that these items are being sold at a loss. Given that there were no purchases for the Pump Set and Ceiling LED over the past 6 months, it's reasonable to assume that their prices may have decreased in the market.

4) Inventory Analysis

Creating a column chart for each product in your inventory analysis is an effective way to visualize stock levels and identify trends in inventory management.



Graph 5.5: Comparison of Stocks, Sales and Purchases

- It is evident that products like the pump set, 12-way D/B box, and long body tap are less visible in the chart due to their lower stock quantities.
- For items such as 1 SQ MM Cable, 1 Way Switch, S Trap, Ceiling Fans , the opening and closing stock levels are nearly equal, suggesting that inventory management is fairly balanced. This could be a sign that demand is predictable, and purchasing strategies are in sync with sales.
- However, for products like PVC pipe, LED bulb, wiring pipe, and PVC suction hose, there is a noticeable difference in the quantities of opening stock, purchased quantity, sales, and closing stock. The purchasing quantities of these items should be revised to prevent stock outs or overstocking. If closing stock is consistently lower than opening stock, it may suggest that these products are selling out too quickly, leading to lost sales opportunities. If closing stock is consistently lower than opening stock, it may suggest that these products are selling out too quickly, leading to lost sales opportunities. In both cases, the purchasing quantity for these products should be revised based on historical sales data to avoid these issues.