

# **Business Performance Analysis for a Local Hardware Store**

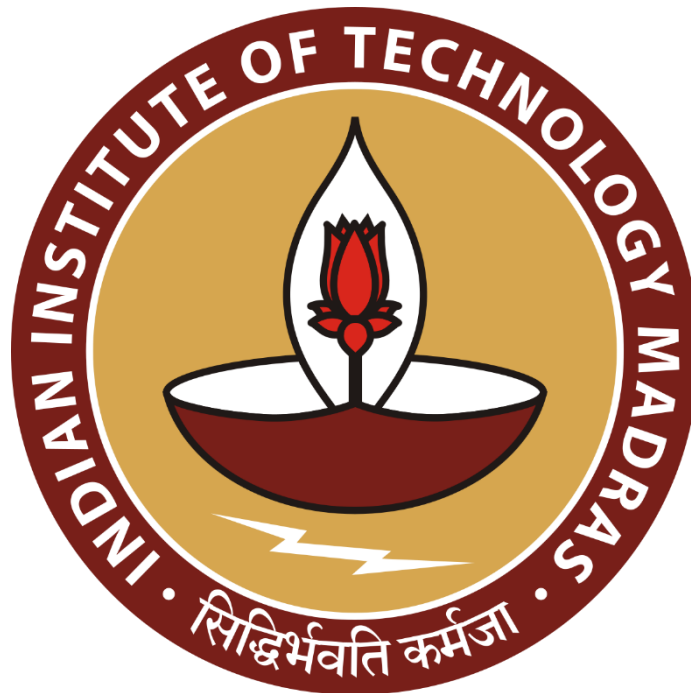
## **A Mid-term report for the BDM capstone Project**

Submitted by

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## **Declaration Statement**

I am Manjusha, working on a Project titled “**Business Performance Analysis for a Local Hardware Store**”. I extend my appreciation to ‘**Shri Dattakrupa Traders, Sirsam(Bk.)**’, 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 from 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 principles 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.



Signature of Candidate: **(Digital Signature)**

Name: Manjusha Sanjay Pundkar

Date: 08 June 2025

## 1. Executive Summary and Title

Shri Dattakrupa Traders is a small retail hardware shop located in Sirsam (Bk.), Hingoli, Maharashtra. This project, titled “Business Performance Analysis for a Local Hardware Store”, is focused on analyzing 604 transactions spanning from June 2024 to May 2025. The store sells essential items such as paints, electrical tools, plumbing fittings, and cement.

The objective of this project is to help the shop improve its inventory management, pricing strategy, and customer insights using data collected from handwritten bills. The project includes category-wise sales analysis, payment behavior study, ABC classification of products, association rule mining (Apriori), and forecasting with ARIMA. These findings were visualized, interpreted, and finally shared with the owner for implementation.

The project helped uncover issues such as overreliance on credit sales, underperforming stock, inconsistent pricing, and lack of bundling strategy. The suggested solutions aim to transform the shop’s decisions into data-backed ones, ensuring better profits and stock flow.

## 2. Proof of Originality



### 2.1 Video Interaction with the Owner:

## 2.2 Letter from the Business:

 <b>SHREE DATTAKRUPA TRADERS</b> HARDWARE & BUILDING MATERIAL STORE	 At.post sirsam (Bk.) , Hingoli-431513, Maharashtra
6 June 2025	
To, The Head of the Department, Indian Institute of Technology Madras, Chennai, Tamil Nadu - 600036	
<b>Subject: Proof of Data Provision for Business Data Management Project</b>	
Dear Sir/ Madam,	
<p>This letter is to certify that Shri Dattakrupa Traders, located at Sirsam (Bk.), Hingoli, has provided business data to Ms. Manjusha Sanjay Pundkar for the purpose of her Business Data Management project at IIT Madras. The data includes transaction records from June 2024 to May 2025, sourced from our handwritten bills and sales registers.</p> <p>The shared data contains product names, quantities, sale prices, and dates, and has been given to her only for academic use.</p> <p>We hope this data helps her in successfully completing her project. For any further information, please feel free to contact us.</p> <p>Thank you.</p>	
Sincerely, Dattatraya Kale Owner, Shri Dattakrupa Traders	
	
 shreedattakrupatraders9@gmail.com	
 +91 9960465005 , +91 9881684478	



### 2.3 Images of the Shop:



Google drive link : [\[click to see more images\]](#)

### 3. Metadata

#### 3.1 Origins of Data

The data was sourced from physical daily sales records maintained by Shri Dattakrupa Traders. All 604 transactions were manually entered into Excel from handwritten bills, dating from June 2024 to May 2025. Category and SKU standardization was handled using OpenRefine.

#### 3.2 Data Format

The dataset includes the following fields:

Column	Type	Example	Description
<b>Date</b>	Date-Time	2025-05-29	Date of the transaction
<b>Invoice Number</b>	Number	INV/2025/0558	Numbers assigned during data entry
<b>Product Name</b>	Text	Wire Roll (10m)	Name of the SKU
<b>Category</b>	Text	Electrical	SKU category
<b>Quantity</b>	Number	3	Quantity of SKU sold
<b>Unit Price (Purchase)</b>	Currency	201	Unit Price of the SKU
<b>Selling Price</b>	Currency	231	Price at the time of sell
<b>Customer type</b>	Text	Construction worker	Construction worker, farmer, home improver
<b>Payment Method</b>	General	Cash	Cash, UPI, Khata

<b>Purchase Price</b>	Currency	1,250	Unit * Purchasing price
<b>Sell revenue</b>	Currency	2,250	Unit * Selling price
<b>Profit</b>	Currency	1000	Profit after sell

Link to dataset : [\[Go to dataset\]](#)

### 3.3 Data Cleaning and Preprocessing

- Duplicate invoices were dropped.
- Standardized inconsistent product names using OpenRefine.
- Added derived columns for Revenue, Cost, Profit, and Profit %.
- Converted all date strings into datetime format.
- Grouped SKUs into 5 categories: Building Material, Electrical, Hardware, Paint, Plumbing.

## 4. Descriptive Statistics

### 4.1 Dataset Overview

- Number of Transactions: 604
- Number of Unique SKUs: 46
- Time Frame: June 2024 to May 2025
- Total Revenue: ₹365,783
- Average Transaction Value: ₹605.60

### 4.2 Central Tendency and Distribution

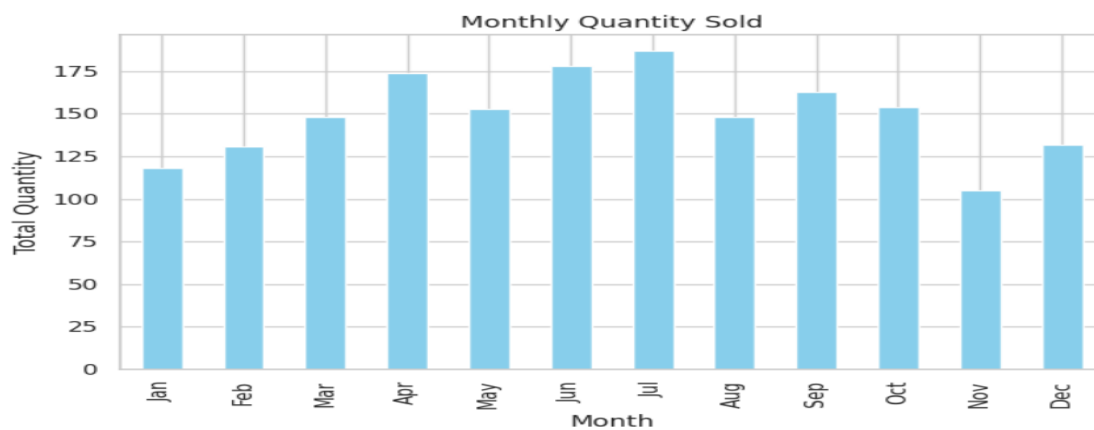
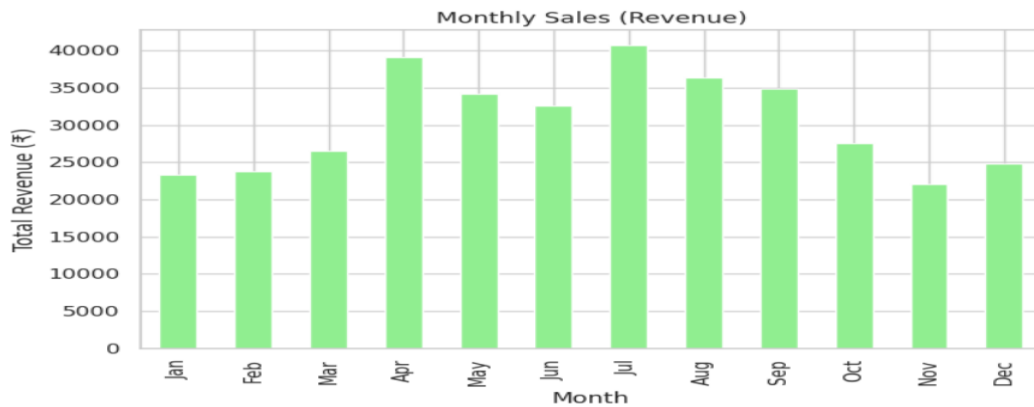
Unit Price(Selling Price) (₹), Quantity, and Total Price(Selling Revenue) (₹):



	Quantity	Selling Price	Selling Revenue
<b>count</b>	604.000000	604.000000	604.000000
<b>mean</b>	2.965232	201.652318	605.600993
<b>min</b>	1.000000	30.000000	30.000000
<b>25%</b>	2.000000	107.000000	187.750000
<b>50%</b>	3.000000	188.000000	450.000000
<b>75%</b>	4.000000	280.000000	900.500000
<b>max</b>	5.000000	455.000000	2275.000000
<b>std</b>	1.408497	126.452549	523.795225

### 4.3 Sales and Quantity by Month

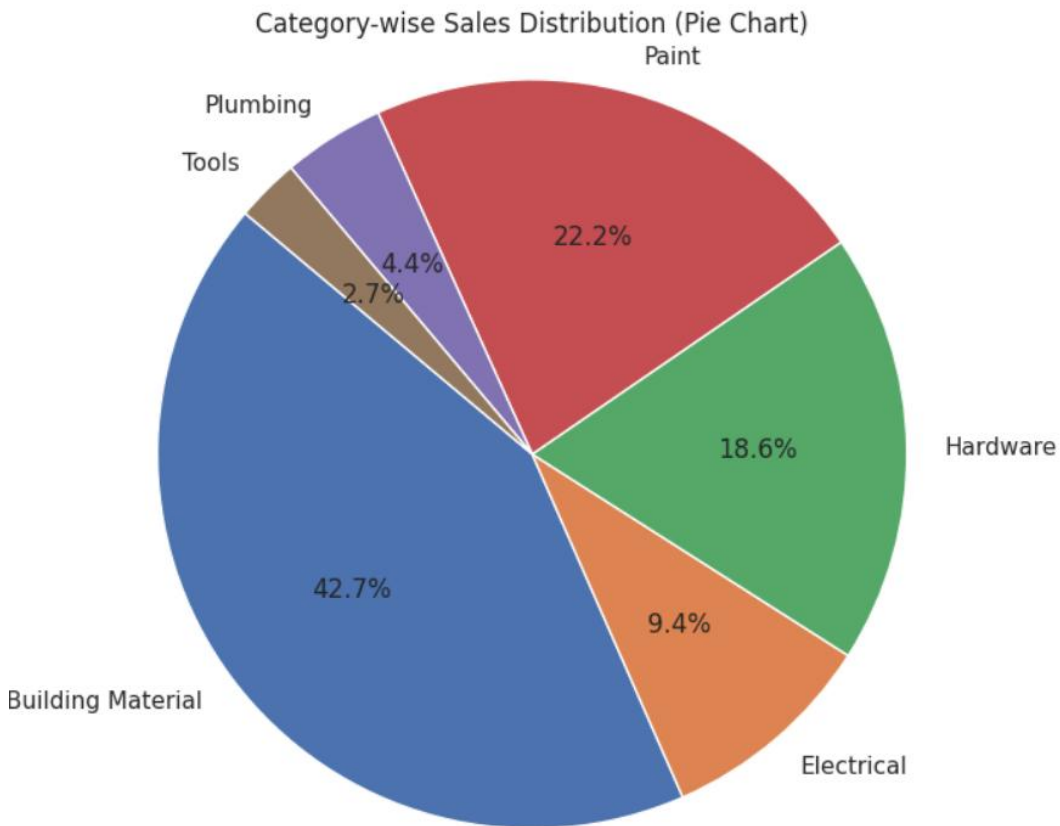
Sales remained consistent with a peak in August and slight dips in October and March, likely due to festivals and weather conditions. Quantity sold followed a similar trend, confirming purchase volume directly impacts revenue flow.



*Bar Charts of Months vs Sales and Quantity*

#### 4.4 SKU Categories

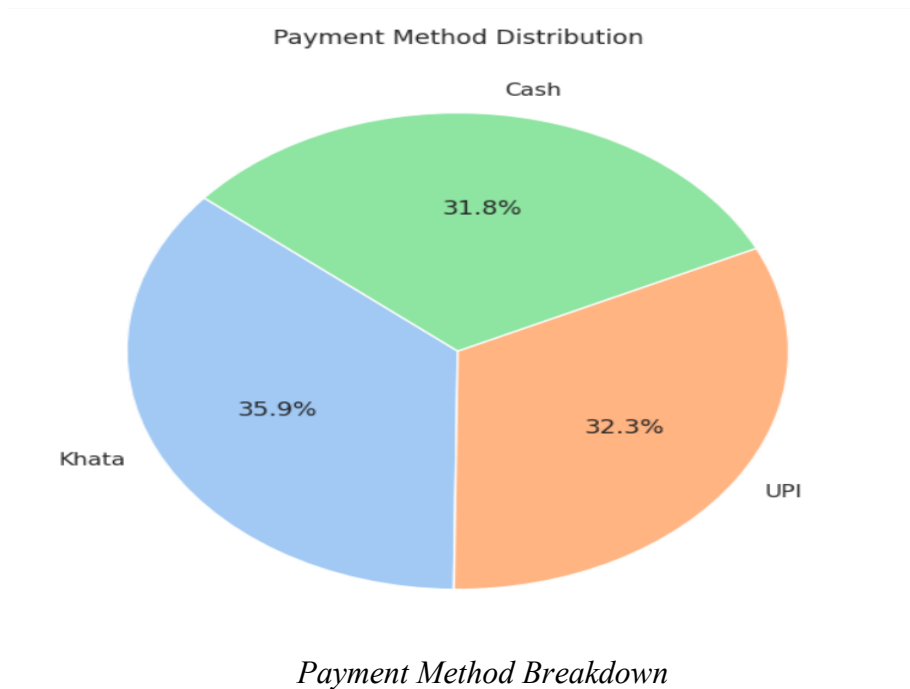
Revenue is dominated by **Building Materials**, followed by **Paint** and **Hardware**. Electrical and Plumbing have lower impact but are essential items and contribute to customer footfall.



*Category-wise SKU Distribution*

#### 4.5 Payment Method Breakdown

The chart below shows that Khata accounts for 35.9% of payments, followed by UPI (32.3%) and Cash (31.8%). This indicates the shop relies heavily on credit-based transactions which can delay cash flow.



## 5. Explanation of the Analysis Procedure

### 5.1 Categorical Influence on Sales

**AIM:** To understand how each category influences overall revenue.

**Justification:** Some categories have a higher number of SKUs but generate comparatively less revenue. To correct for this imbalance, revenue per SKU was calculated to get a normalized view of category performance.

**Method:** Category-wise sales were divided by number of unique SKUs in each category to get adjusted category performance. This helps identify real top performers.

### 5.2 SKU Performance Classification (ABC)

**AIM:** To classify SKUs as high, medium, or low performers.

**Justification:** Helps the owner decide what to reorder frequently, promote moderately, or phase out.

**Method:** ABC analysis based on cumulative revenue:

- Class A: Top 70% of revenue
- Class B: Next 20%
- Class C: Bottom 10%

This classification was done using a Pareto approach.

### 5.3 Market Basket Analysis using Apriori

**AIM:** Identify which products are frequently purchased together.

**Justification:** Useful for in-store bundling and combo offers.

**Method:** I used a method called Apriori to find which items are often bought together. I did this using a Python tool. I told it to look for item pairs that appear in at least 2% of the bills and are related. It found that people often buy Cement with Putty, and Paint with Brush.

### 5.4 Customer Insights

**AIM:** Understand who the frequent buyers are and how often they purchase.

**Justification:** Knowing who your regular and walk-in customers are helps the shop make smarter decisions. Regular customers can be rewarded with loyalty programs or special discounts to keep them coming back.

**Method:** Customers were segmented based on frequency (Regular or Walk-in), and visit patterns were visualized. Walk-in customers are less predictable, but regular buyers offer opportunities for loyalty programs and bulk discounts.

### 5.5 ARIMA Sales Forecasting

**AIM:** Forecast future revenue to guide restocking and financial planning.

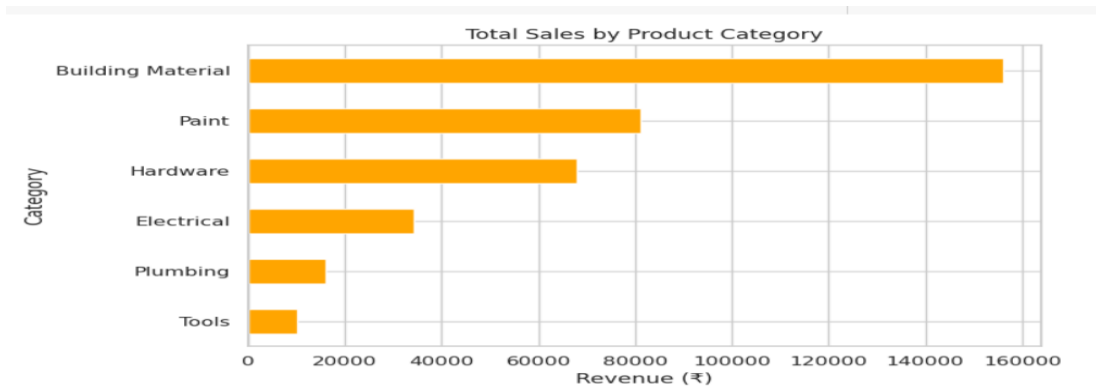
**Method:** Monthly revenue was aggregated and modeled using ARIMA(1,1,1). The forecast predicts steady sales with slight decline in off-season months.

**Justification:** Helps the shop prepare ahead, manage cash flow, and stock in advance before peak months.

## 6. Results and Findings

### 6.1 Category-Wise Revenue Summary

- Building Materials contribute nearly ₹1.5 lakhs, making it the top-performing category.
- Paint-related items rank second, indicating consistent demand for home renovations.
- Electrical and Plumbing are niche but essential, contributing smaller but steady revenue.



*Category-Wise Revenue Summary*

## 6.2 ABC Analysis Results

- Class A Products: Tile Adhesive, Cement Bag, Steel Rod, Wire Roll (10m) - account for 70% of revenue.
- Class B Products: Putty (5kg) , Wall Primer , PVC Pipe (6ft) and Paint(1L) - moderate contribution (20 %) , recommended for promotions.
- Class C Products: Paint Brush , Nail Pack - Lower selling SKUs (10 %) - potential discontinuation or bundling suggested.

## 6.3 Market Combo Rules

- Cement + Putty frequently appear together → recommend combo packaging.
- Paint + Brush is a natural pair → promote with bundled discount.
- Sand + Cement + Nails → common construction bundle → possible bulk-order strategy.

## 6.4 ARIMA Forecasting Results

- Forecast indicates stable monthly revenue around ₹27,000 to ₹32,000 with seasonal dip around February.
- Recommendation: Increase stock before monsoon and festival months (Aug–Oct).



