# Optimizing Inventory and Sales through Data-Driven Strategies for a Small B2C Retail Shop

A Mid-Term report for the BDM capstone Project

Submitted by

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1 Executive Summary

Rakesh Enterprises, a small mobile and stationery shop in A.G. Colony, Patna, Bihar, follows a Business to Consumer (B2C) model targeting local students, professionals, and residents. Though offering different ranges of products, which include mobile accessories, stationery, and printing and digital services, the store operates on a small range of monthly revenues (₹5,000 – ₹16,000), with low margins, stock-outs of faster-moving items and slow-moving items. The store's lack of digital, price distribution, marketing, and structured data management has not aided this retail business in serving local customers, retaining customers, nor being efficient in running this retail operation.

In order to aid the store with these issues, transactional sales data was collected for the period March through November 2024. The data set includes the following variable data: Date, Product Category, Quantity Sold, Unit Price, Revenue, and Stock Level. Some of the preliminary descriptive statistics and pivot-table summaries, which were generated from the dataset, showed a wide variation across product categories sold during different months, especially for higher months of fireworks and stationery only months over other months. The sales transactional data provided a good foundation for slow- and fast-moving items, as well as seasonal demand cycles.

Some of the analysis methodology included data cleaning and exploratory data analysis (EDA), including ABC inventory classifications, all within Excel. The initial findings generally show the application of ABC analyses as well as pricing strategy, and stock planning & distribution can free up tied capital and increase profitability by as much as, conservatively, 15-20%, and margins can be increased upwards of 12-18%. For the initial analysis, these below forecasted sales represent clear signs of an increase.

2 Proof of Originality of the Data

2.1 Letter From the Shopowner
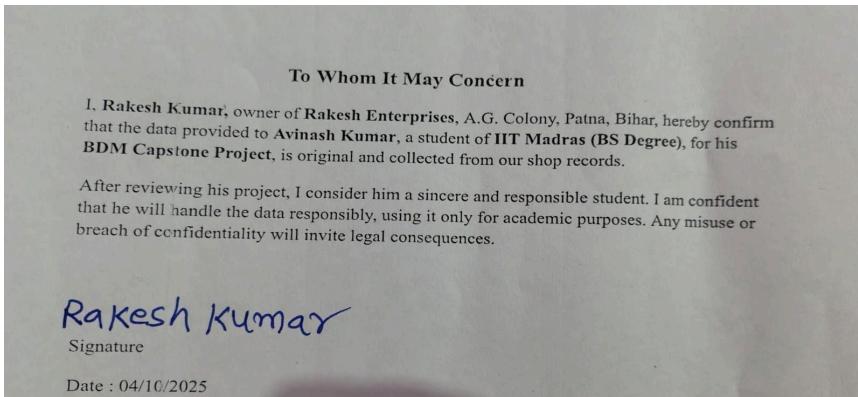
Fig 2.1: Permission letter from the shopowner

2.2 Image of shop Rakesh Enterprises

Fig 2.2 : Rakesh Enterprises Shop at A.G colony, Patna

Video Link:[Video (Cnversation with owner)](#)

3 Metadata and Descriptive Statistics

3.1 Metadata

Metadata is data that provides data — it describes what each dataset variable means, its structure, and what it is trying to accomplish. It also provides context to the data and ensures that the data collected is meaningful to support solving the business problems facing Rakesh Enterprises — low profit margins, bad inventory control, and variable sales.

A	B	C	D	E	F	G	H	I	J
Item Name	Category	Date	Month	Year	Quantity	Cost Price (Rs)	Selling Price (Rs)	Total Price(Rs)	Profit

Column Present in the Dataset:

A. Item Name - Refers to the name of the product that was sold.

B. Category - Refers to the category or type of product sold.

C. Date - Refers to the actual selling date of the product.

D. Month - Refers to the month in which the product was sold.

E. Year - Refers to the year in which the product was sold.

F. Quantity - Refers to the number of the item(s) sold on any single transaction.

G. Cost Price - The cost price the shop keeper paid for the product.

H. Selling Price - Refers to the price the shopkeeper sold the product.

I. Total Price - Refers to the total amount of the transaction; Total Price is calculated with the formula is Quantity × Selling Price.

J. Profit - Refers to the amount of profit incurred by the shopkeeper for the sale of the product subtracted from the cost price, Profit is calculated with the formula is (Selling Price - Cost Price) × Quantity.

After gathering the sales data for Rakesh Enterprises, the employee next coded and analyzed the data within Microsoft Excel to identify relevant business insights. The program's differing tools were utilized to look at sales performance, cost structure and gross margin including pivot tables, descriptive statistics and graphic charts. Through the orderly analysis of the data, the employee was able to determine trending patterns in product sales, assess low gross margin and high gross margin items and assess how well the inventory was being turned over. This sourced analysis yielded improved insights into how effective their pricing was, how effective their stock management was and where to potentially focus some of their strategic interventions for better profitability and stock management.

DatasetLink:Excel File Link, Collab link

3.2 Descriptive Statistics

Throughout the observed time frame, 2,431 sales were recorded across several product categories occurring in 2024. On average each product sold 7.43 units, indicating fairly low sales overall. The average cost price was ₹7.45 versus selling price per each product of ₹11.93, which provided an adequate margin. The average total revenue per transaction was ₹37.95, and average profit was ₹20.39, which indicates overall profitability of items.

The data shows a distinct variation--the highest selling price of a product was ₹520.00, and highest profit was ₹785.65 for a product which resulted in enormous net income for some high-value products sold. Conversely, there are also products sold at very low prices (₹0.20), which indicates solid pricing distribution to represent all of the products in inventory. Both standard deviation of profit (₹35.72) and total price (55.24) indicate reasonably strong variability in performance on items.

	Date	Year	Quantity	Cost Price (Rs)	Selling Price (Rs)	Total Price(Rs)	Profit
count	2431.0	2431.0	2431.0	2431.0	2431.0	2431.0	2431.0
mean	15.73220896 7503086	2024.0	7.43480049 3624023	7.45443850 2673796	11.9250514191 69067	37.952694364459 07	20.386902509 255453
std	8.928123320 373915	0.0	17.4836951 18927788	22.4824635 07216025	25.2407625148 83485	55.244542623239 866	35.720306473 46078
min	1.0	2024.0	1.0	0.1	0.2	2.0	1.0
25%	8.0	2024.0	1.0	1.73	5.0	10.0	5.0
50%	16.0	2024.0	3.0	1.73	5.0	20.0	9.81
75%	24.0	2024.0	7.0	4.0	10.0	40.0	22.89
max	31.0	2024.0	350.0	500.0	520.0	950.0	785.65

Fig 3.1 : Descriptive Statistics Data

4. Detailed Explanation of Analysis Process/Method

4.1 Data Collection and Data Cleaning

The information was obtained manually at Rakesh Enterprises by meeting the shop owner and employees. Some of the sales records were handwritten in notepads, while some were provided orally. The data that was gathered included product name, price, quantity and date of transaction

and was entered into an Excel sheet. During the cleaning phase of this data, missing and erroneous values were obtained and verified with the owner. Duplicates were eliminated and missing entries filled in averages. Dates were standardized, columns for Month and Year were also converted to a separate column. All numeric fields were also formatted properly to provide a clean, accurate, and ready to analyze dataset.

4.2 Analysis Process/Method

1. **Descriptive Statistical Analysis:**
   The cleaned dataset was initially summarized with descriptive statistics, total revenue, total expenditure, and total profit in order to understand the overall business performance. This provided an initial overview of the company's financial trends.

2. **Monthly Trend Analysis:**
   A monthly line graph, plotting "Total Profit vs Months" was examined to analyse performance in time. Given some mathematics in the context, the monthly profit was calculated as:

   $$\text{Profit} = \text{Total Selling Price} - \text{Total Cost Price}$$

   This analysis identified more seasonal cycling patterns, fluctuation in performance and peak performance months. This analysis relates directly back to the problem statement and understanding the profitability trend in the context alongside the sales fluctuation over the year.

3. **Category-wise Sales Analysis:**
   A bar graph was created to determine which product categories seemed to contribute the most to total revenue: "Sum of Total Price vs Category." Due to the aggregation (SUM function), comparisons across various product lines could be performed in this way. This reinforced highlighting main categories, like "Black and Colour Print," which indicated the maximum contribution, in order for the business to focus on its trade-based revenues.

4. **ABC Analysis:**
   The ABC classification technique was employed to classify goods into groups based on revenue contribution:

- A= High-value items (≈70% revenue)
- B= Moderate-value items (≈20%)
- C= Low-value items (≈10%)

Mathematically, the cumulative percentage of revenue was calculated and items were placed in categories. This approach is helpful in that it makes clear which products can yield the most profit. That knowledge supports strategic inventory management and assists in directing the sales process toward the "A" stock items.

5. **Stock Category Analysis:**

Products were also assigned to "Normal Stock," "Slow-Moving," and "Dead Stock" categories based on how quickly they sell, and number sold. The product distribution in each stock topic was represented in a bar chart. This analysis helps to identify products that are unsold and/or have low demand, bounce outs, and thus supports the ability to turn over stock, which equates to addressing the initial issue of inefficient stock management.

5 Results and Findings

1. Monthly Revenue, Expenditure and Profit Trend

Insights:
The trend of profits on a month by month basis demonstrates varying performance over the course of the year. This may suggest seasonal or operational fluctuations. The month with the greatest profits occurred in September (9,000 units), whereas the lowest month for profits occurred in March (3,600 total units).

After a continuous decline in profits from April through to March, profits began to recover starting in May, this would indicate some improvement in sales or cost reductions during the months of the middle to later months of the year. The smooth and uninterrupted increase in profitability from May to September indicates that, in terms of volume or gross profits, this was the most profitable and likely to be associated with higher customer demand, marketing or operational benefits of favorability in the pertinent market.

The slight decline to the months of October and November after September suggests that there may be a slow down to profitability after the peak season with elevated demand profits.
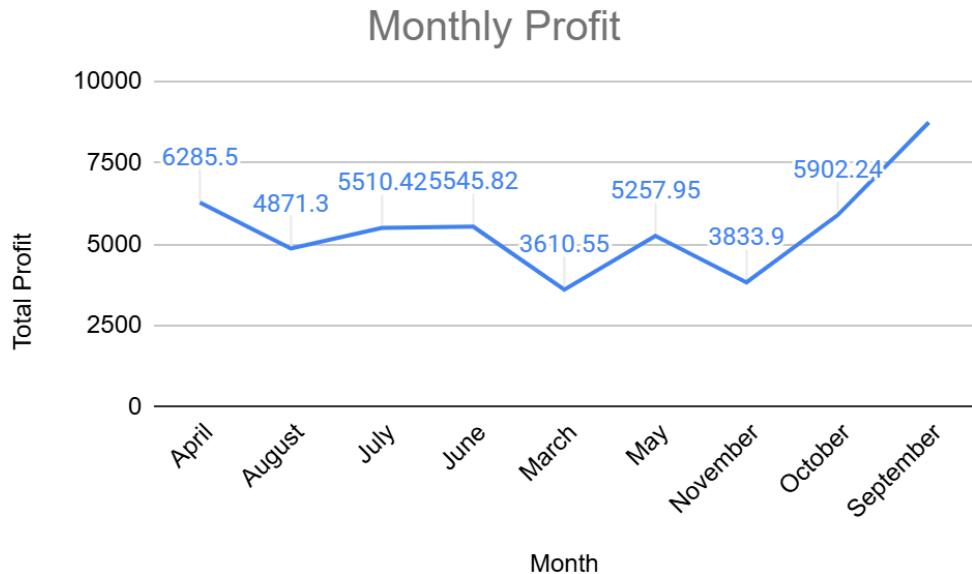

Fig 5.1: Line Graph – Total Profit vs Months

- **X-axis:** Months (April, August, July, June, March, May, November, October, September)
- **Y-axis:** Total Profit (in currency units)

2. Category-wise Sales Distribution:

Insights:

The results show that the highest total sales is generated by Black and Colour Print services, and therefore generating the most revenue from all four categories. Thus, it could be said that printing services are the primary income earning category for the business - widespread printing.

Decoration and Stationery also perform at a healthy level. These categories generate helpful revenue that suggests that there is a habit of buying these products and/or they have steady, reliable demand which earns revenue for your business.

In contrast, Typing, Toys, Digital and Enrolment show that they provide no significant revenue and indicate limited or low levels of demand based on sales.

This distribution illustrates your business relies significantly on printing services primarily, whereas non-print services could have either growth potential or simply be worth reevaluating. To be more equal, engaging promotions or marketing strategies towards weak performing areas could better distribute revenue and balance out sales with more product lines.

SUM of Total Price(Rs) vs. Category
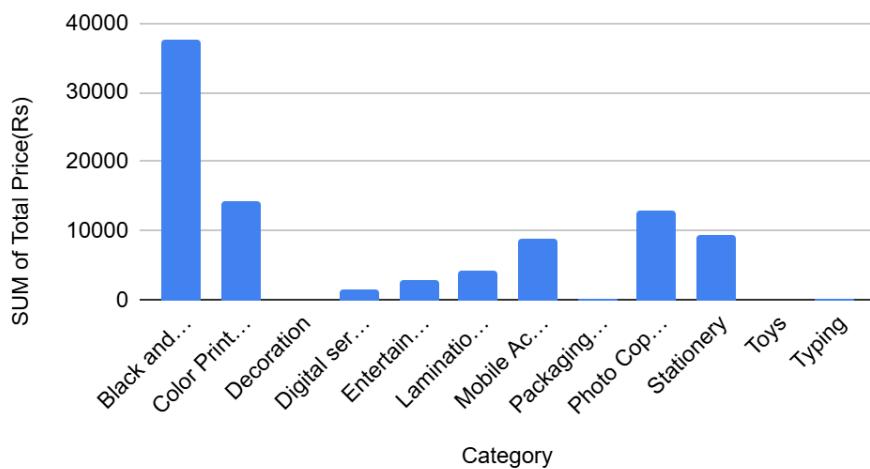
Fig 5.2: Bar Graph – SUM of Total Price (Rs) vs Category

- **X-axis:** Category (Black and Colour Print, Decoration, Digital, Enrolment, Lamination, Mobile, Packaging, Photo Copy, Stationery, Toys, Typing)
- **Y-axis:** Sum of Total Price (Rs)

Insights:

The ABC analyses categorize the product mix into three categories, based on revenue contribution:

Category A: High-value which produces approx 70% of the total revenue.

Category B: Medium-value which produces the next 20% of total revenue.

Category C: Low-value which produces the last 10% of the total revenue.

From the chart, the "Big Printer" and "Colour Printer" dominate the A category with total revenue of approx (Rs 36,000 and Rs 28,000). Therefore, printing services is a major profit engine of the business.

The items in Category B (e.g, New Charger, A5 Page Size Lamination, Mobile Tempered Glass) contribute modestly to overall revenue, showing continued, but less critical importance to overall revenue contribution compared to Category A products.

Category C, including stationery and small accessories, creates limited revenue — indicating low customer demand or limited profit margins.
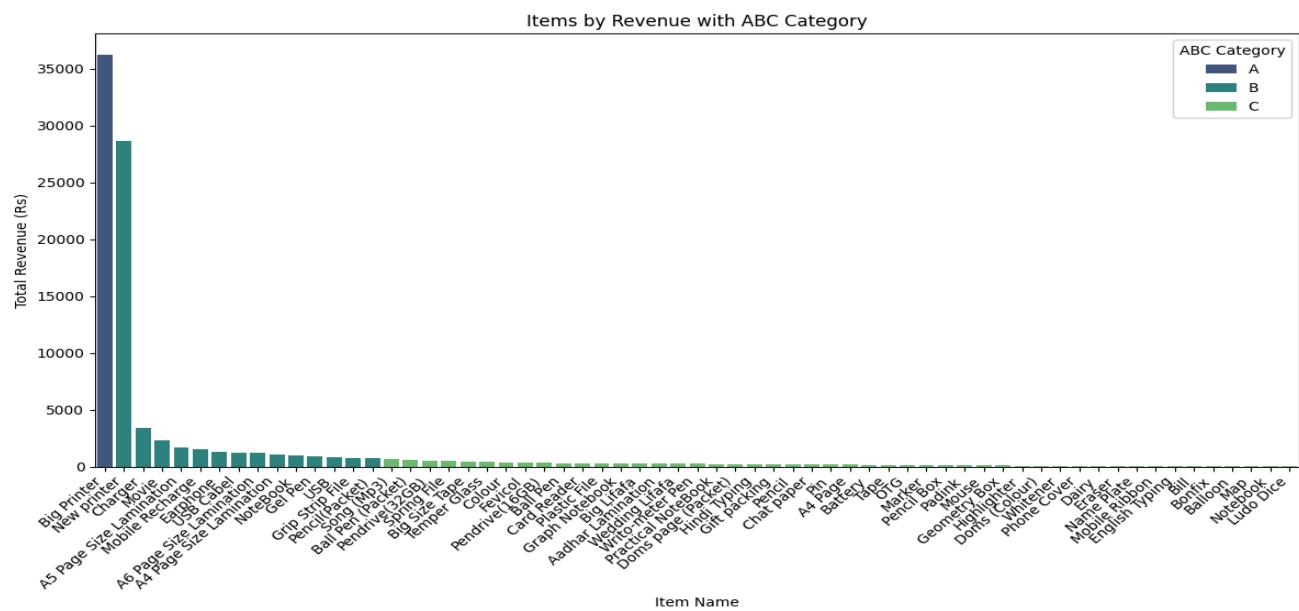
Fig 5.3: Bar Graph – Items by Revenue with ABC Category

- **X-axis:** Item Name
- **Y-axis:** Total Revenue (Rs)
- **Legend:** ABC Category – A (High Revenue), B (Moderate Revenue), C (Low Revenue)

 Insights:
The graph shows how products are categorized across the three ABC categories and it is clear that there is an imbalance in the number of items that contribute to the total revenue.

Category A: Has the fewest items (about 1) but it contributes the greatest portion of total revenue, meaning that these are high value products and carefully considered by the business.

Category B: Has a moderate number of items (around 14) that provide consistent, but mid-level revenue, meaning the business has products that are consistently sold but not significantly.

Category C: Has the fewest items (around 48) but has the greatest overall revenue contribution to the total, which means the business has the majority of its inventory as low value or slow moving products.
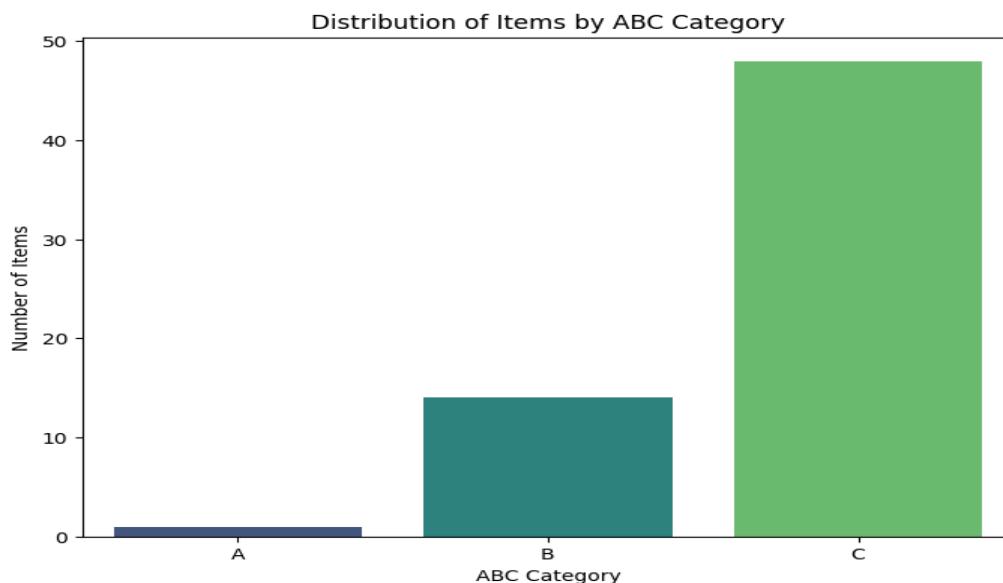

Fig 5.4: Bar Graph – Distribution of Items by ABC Category

- **X-axis:** ABC Category (A, B, C)
- **Y-axis:** Number of Items

Insights:
The analysis indicates that the vast majority of the items are considered Normal Stock, suggesting a relatively stable trend of sales. A smaller share of items is classified as Slow-Moving and Dead Stock which is, mostly, low sales or no sales. This analysis allows Rakesh Enterprises to find an opportunity to work with Slow-Moving or Dead stock by selling through promotions or clearance, to improve cash flow and inventory efficiency.
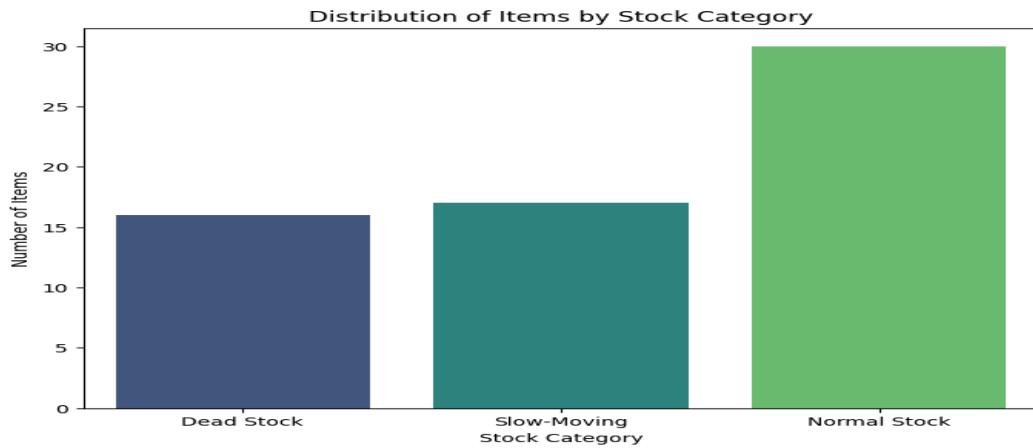
Fig 5.5: Bar Graph – Distribution of Items by Stock Category

- **X-axis:** Stock Category (Dead Stock, Slow-Moving, Normal Stock)
- **Y-axis:** Number of Items

DatasetLink: Excel File Link, Collab link