Navigating Financial Obstacles: Leveraging Data in Vegetable Business

A Mid-Term report for the BDM capstone Project

Submitted by

Name: Yash Singhal

Roll number: 21f3002767

IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

Contents

1 Executive Summary

'Raj Kishore Gupta and Sons' is a well-established vegetable selling business with a 20-year legacy, located within the Subji mandi near Nangloi, Delhi. Operating alongside 60-70 vendors, the business caters to both wholesale and retail customers, offering high-quality produce to small retail vendors and individual consumers. Despite its longstanding presence and strong relationships within the market, the business faces financial challenges in transaction recording, pricing strategies, and credit management, hindering its financial stability and growth potential.

The challenges faced by 'Raj Kishore Gupta and Sons' arise from the absence of the proprietor's financial knowledge about the business, hindering the assessment of financial health and absence of metrics such as required daily turnover to reach a desirable income. Additionally, determining the appropriate pricing margins poses a struggle, impacting the achievement of desired financial targets. Furthermore, the lack of a structured credit allocation process adds to the complexity, necessitating a clear system for credit assessment and criteria establishment.

To address these challenges, I propose a comprehensive analytical approach. By analysing past transaction data and engaging in discussions with the business owner, I aim to identify pricing trends and understand the financial landscape better. This will help me provide the financial overview of the business. Analysing the details and transactions of key credit customers will enable me to help develop a structured credit management practice.

2 Proof of originality of the Data

- Business Name: Raj Kishore Kumar Gupta and Sons
- Address: Bhim Nagar Subji Mandi, Jwalapuri Vegetable Market, Nangloi, Delhi
- Owner's Name: Mr. Raj Kishore Kumar Gupta

Video of Interaction with Business Owner: 🗀 Video

Letter: 🗀 Letter

Fig 1. Me along with the Business Owner at the Business place.

The business owner utilises three primary methods for Recording Data:

1. **Laal Khata Book**: Used at the owner's residence for recording detailed vegetable data every few days. This included fixed costs (e.g., transportation from Azadpur Sabzi Mandi) and variable costs.
2. **Daily Notepad**: Used to record daily vegetable purchase quantities.
3. **WhatsApp Messages**: Used for credit and repayment communication with retail vendors. Frequency varied depending on the vendor, with some receiving daily updates and others receiving accumulated updates.

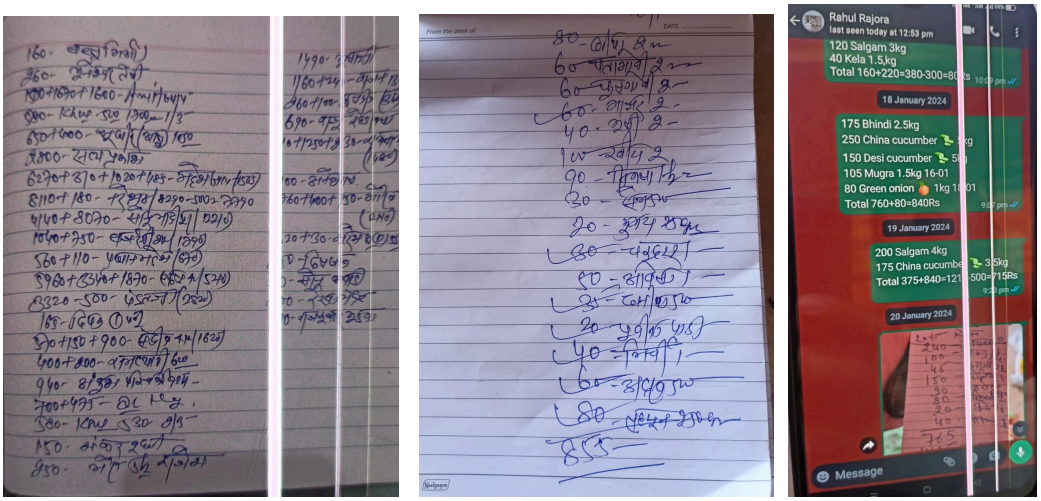


Fig 2. Snapshot of various Data Recordings

3 Metadata

- Data Format: CSV (Comma-Separated Values) and Excel/Sheets (XLSX)
- Range: January 16, 2024, to February 15, 2024
- Business Closed: The business was closed on January 26, 2024, and January 27, 2024.
- Units of Measurement for Features involving Money: Indian Rupee (₹)

Information about the Vegetable Data

Link: Vegetables Data

Features Collected about each vegetable:

- Vegetable Name: The name of the vegetable.
- Cost Price: Cost Price incurred while purchasing vegetables from Azadpur Mandi Sabzi.
- Sell Price: The selling price for the initial 60% of the quantity sold at the beginning of the day.
- Quantity: The total quantity of vegetables sold on a particular day.

Explanation:

The business owner sells 60% of the vegetables between 5 am and approximately 11 am - 12 pm at the predetermined selling price for that day. The remaining 40% is sold at the cost price to few vendors and customers facing financial hardship. This strategy helps clear out the remaining stock.

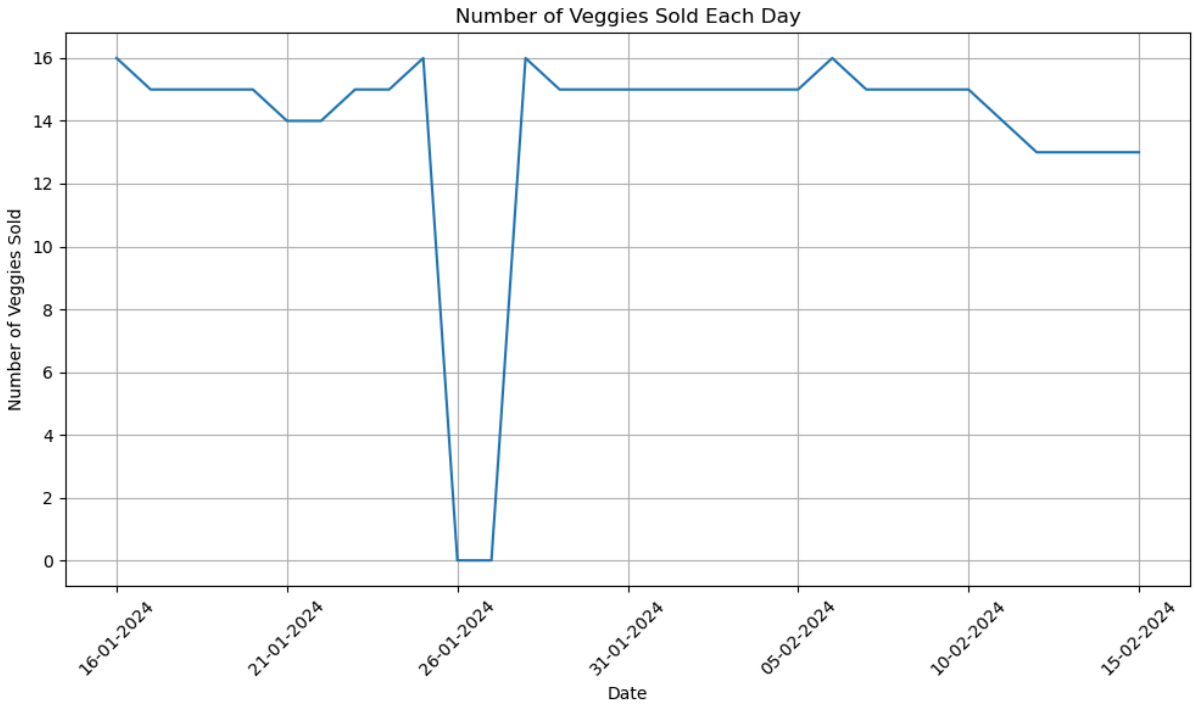


Fig 3. Plot of Number of Different Vegetables Sold Each Day

We can observe a consistent trend in the number of different vegetables sold with Max - 16 and Min-13.

Information about the Credit Data

Link: [Credit Data]

Features Collected:

- Customer Name: The name of the borrower.
- Transaction Date: The date the credit transaction took place.
- Credit Amount: The amount of money loaned to the borrower.
- Repayment: The amount of money paid back by the borrower towards the loan.
- Outstanding Balance: The remaining amount owed on the loan after considering any repayments made and credit taken on the day.

Here, the 'Outstanding Balance' on January 15, 2024, reflects any existing loan balances that were outstanding before I began collecting data on the 16th.

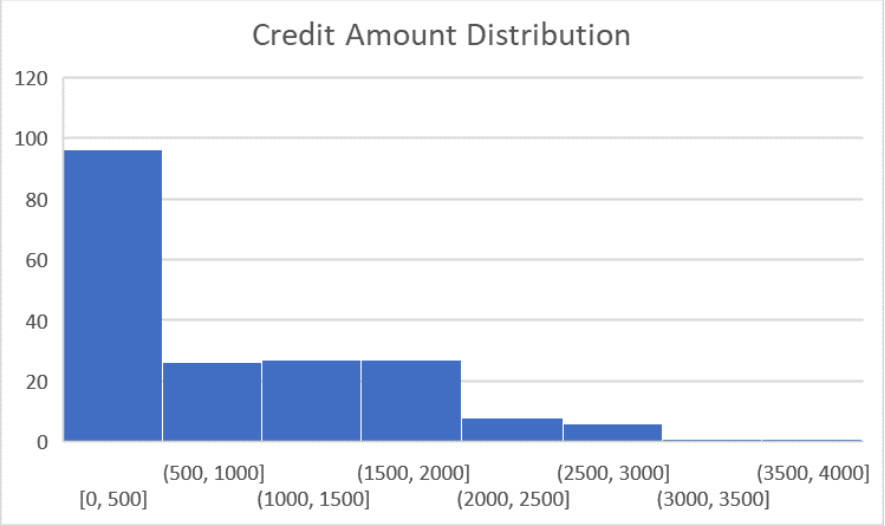


Fig 4. Shows the distribution of Credit Amount given each Day across Customers.

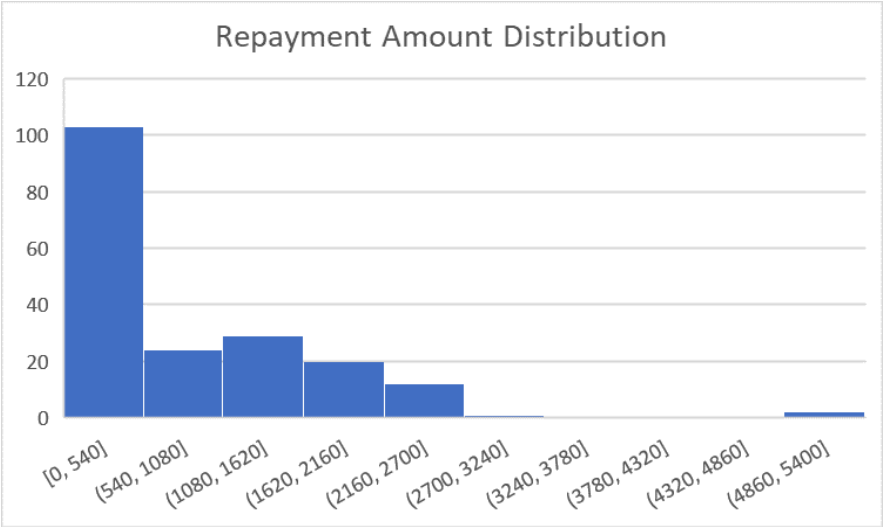
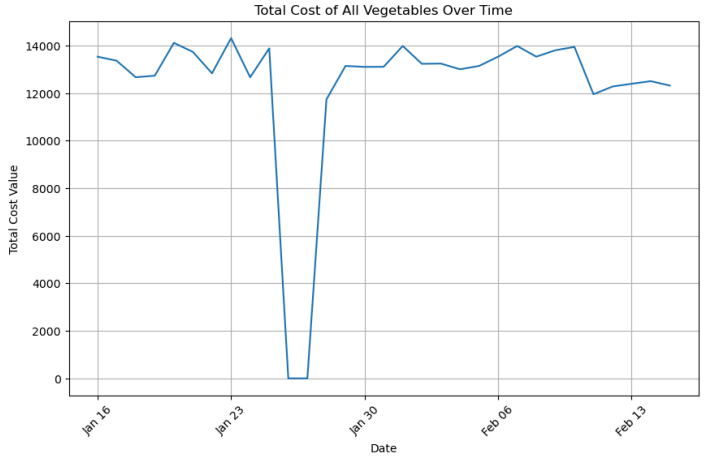


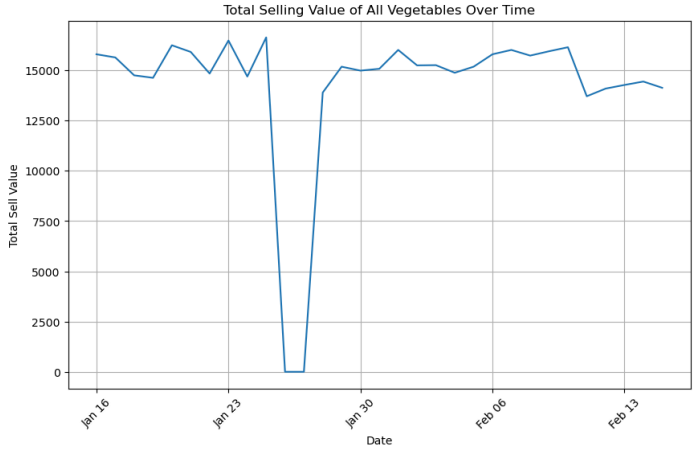
Fig 5. Shows the distribution of Repayment Amount each Day across Customers.

4 Descriptive Statistics



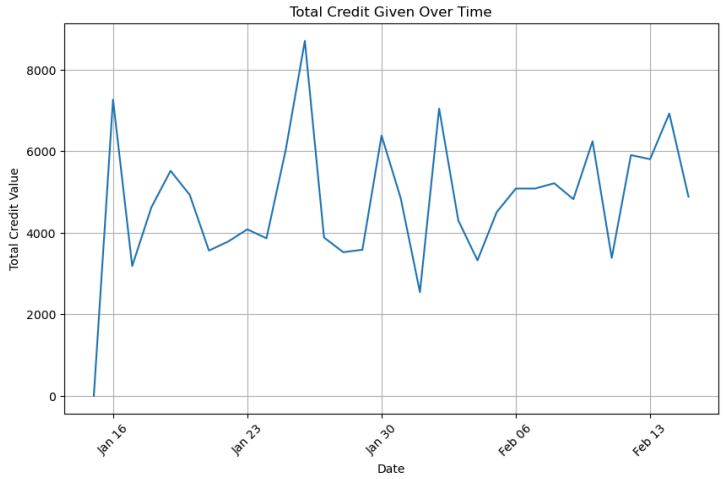
index	total cost
count	31.0
mean	12312.5
std	3350.8
min	0.0
25%	12582.5
50%	13140.0
75%	13630.0
max	14310.0

Fig 6. Shows the trend of Total Cost of all Vegetables and its respective Descriptive Statistics



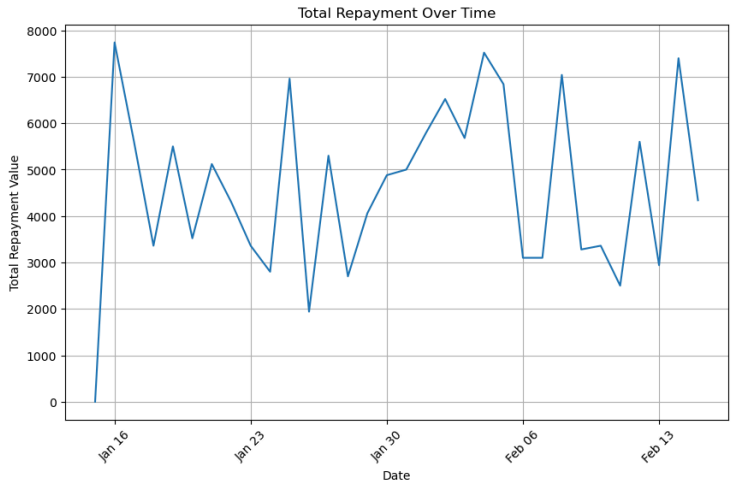
index	net
count	31.0
mean	14251.1
std	3882.9
min	0.0
25%	14539.5
50%	15186.0
75%	15862.0
max	16643.0

Fig 7. Shows the trend of Total Selling Value of all Vegetables and its respective Descriptive Statistics



index	Total Credit
count	32.0
mean	4772.2
std	1638.1
min	0.0
25%	3730.0
50%	4830.0
75%	5825.0
max	8700.0

Fig 8. Shows the trend of Total Credit Given and its respective Descriptive Statistics



index	Total Repaymer
count	32.0
mean	4598.1
std	1862.6
min	0.0
25%	3235.0
50%	4610.0
75%	5705.0
max	7740.0

Fig 9. Shows the trend of Total Credit Given and its respective Descriptive Statistics

The data collected is directly linked to the problem statements as follows:

- Transaction Records: The data on vegetable transactions, including cost price, sell price, and quantity, address the first problem statement by providing a thorough financial overview of the business and basis for analysing and setting the right margins to achieve the desired monthly income.
- Credit Management: The credit data, with details on customer names, transaction dates, credit amounts, repayments, and outstanding balances, helps in establishing a clear credit criteria system, tackling the second problem statement.

5 Detailed Explanation of Analysis Process & Methods

The analysis process for the project involves a combination of quantitative and qualitative methods, each chosen for their ability to address specific aspects of the business's challenges.

- Extensively utilised spreadsheets and their functions for various calculations essential to the analysis process. Tasks such as computing the Total Credit across customers or determining the Total Vegetable Cost were efficiently handled using spreadsheet functionalities.

Spreadsheets provided a familiar and user-friendly interface for conducting complex calculations and aggregating data. Functions such as SUM, AVERAGE, etc were employed to streamline the process of summarising and analysing large datasets.

- Time-Series Analysis: This method is particularly suitable for financial data, which is inherently time-dependent. By examining trends, patterns, and variations over time, we can gain insights into the business's financial health and performance. This method stands out because it allows for understanding of trends based on historical data, which is crucial for setting margins and making informed business decisions. For example, this method can help us observe credit performance among vendors and devise credit management practices that can improve the financial health of the business.

- Python, along with libraries like Pandas, was instrumental in conducting descriptive statistical analysis. Through Pandas, I computed measures of central tendency and variability, enabling us to understand the distribution of financial data points and identify any outliers or anomalies. This facilitated a deeper understanding of the business's financial health and performance.

- Conversations: Engaging with the business owner provides qualitative insights that are not captured by quantitative data alone. Understanding the owner's perspective on credit decisions and margin preferences is essential for tailoring recommendations that are practical and actionable.

The chosen methods are more appropriate than others because they offer a comprehensive view of the business's operations, combining hard data with the owner's subjective experiences. This holistic approach ensures that recommendations are not only data-driven but also grounded in the reality of the business environment.The combination of time-series analysis, statistical computation, and conversations offers a balanced and thorough understanding of the business's challenges and opportunities.

6 Results and Findings

One of the Key Observations is the Daily Profit Trend over the month.

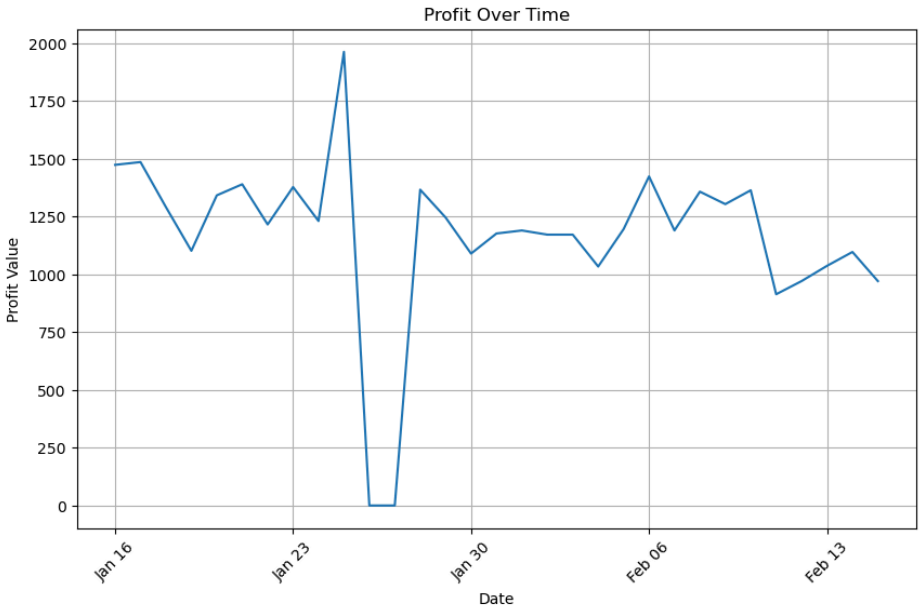


Fig 10. Shows the trend of Daily Profit over Time

A **consistent** pattern can be seen in the Daily Profits.

Mean Daily Profit stood at Rs. 1166 with a Standard Deviation of Rs 369.6.

These numbers are also affected by the two business closure days. Excluding these days, we can observe:

- Mean: Rs. 1246.4
- Standard Deviation: Rs. 206.3
- Min: Rs. 914
- Max: Rs. 1963

A peak profit of **Rs. 1963** was observed on January 25, 2024. This can be attributed to several factors, such as:

- Environmental factors in the region surrounding the business: Protests in the region along with Republic Day the following day (January 26th).
- Sudden spike in the profit-margin of vegetables.

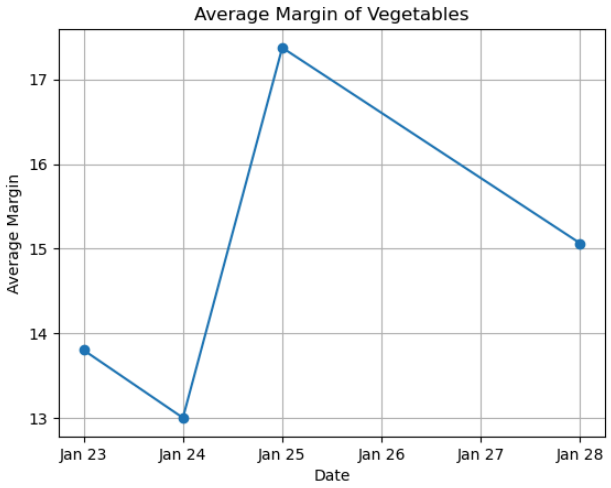


Fig 11. Shows the trend of Avg. Margin of All Vegetables over Time

Another key observation is that February had lower average daily profits compared to January, as can be seen in the figure.

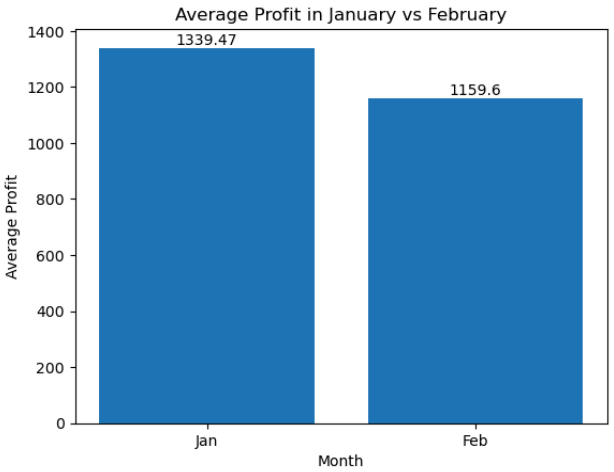


Fig 12. Shows the Average Profit in the months of January and February

Additional Information: BDM PROJECT