

# **Margin Analysis of “Alpha Mart”**

**A Proposal report for the BDM capstone**

**Project Submitted by**

**Name: Vimal Kumar**

**Roll number: 22ds1000184**



IITM Online BS Degree Program,  
Indian Institute of Technology, Madras,  
Chennai Tamil Nadu, India, 600036

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## Declaration Statement

I am working on a Project titled “**Margin Analysis of Alpha-Mart**”. I extend my appreciation to **Mr. Navneet Kumar [proprietor of Alpha Mart]**, for providing the necessary resources that enabled me to conduct my project.

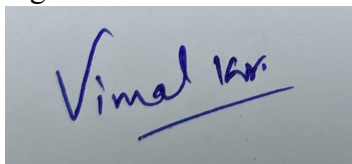
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analysed to assure its reliability.

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 information 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 agree that all the recommendations are business-specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.

Signature of Candidate:



Name: Vimal Kumar

Date: 04-Jul-2024

## **1. Executive Summary and Title (200 Words)**

The project titled "Margin Analysis of Alpha Mart" aims to analyze the sales data of a small grocery store, Alpha Mart, located in Begusarai, Bihar. The primary objective is to identify avenues for maximizing profitability and increasing revenue to support the store owner's goal of expanding the business by opening additional outlets.

Alpha Mart, a B2C business established in April 2022, offers a wide range of grocery and general items catering to the local community. Despite being operational for over a year, the store faces challenges in achieving desired profit margins due to intense competition from other small shops and major retail chains like V-Bazaar.

To address this issue, a comprehensive analysis of the store's sales data will be conducted. The data collection process will involve obtaining transactional records for a specific period, such as the previous three months, from the store's billing system. The analysis will leverage Python libraries like NumPy, pandas, and matplotlib to explore and visualize the data.

The project will employ various analytical techniques, including but not limited to identifying top-selling and most profitable products, analyzing customer purchase patterns, and evaluating the effectiveness of existing strategies like bulk purchasing and seasonal offerings. The expected outcome is a set of actionable insights and recommendations to optimize product selection, pricing strategies, and operational efficiencies, ultimately increasing the store's profit margins.

## **2. Organization Background (150 Words)**

Alpha Mart is a small grocery store located in Begusarai, Bihar, India, operating as a B2C business. The store was established on April 17, 2022, with the aim of catering to the grocery and everyday household needs of the local community. Under the management of Mr. Navneet Kumar, the store's proprietor, Alpha Mart has been steadily growing its product range, currently offering over 2,500 items, ranging from everyday essentials to premium products.

The store's annual turnover is currently around ₹35 lakh, with a team of 5 employees, including owner. Despite the store's steady growth, Mr. Navneet Kumar has identified a need to increase the overall profit margins to achieve his expansion plans, which include opening two additional stores in different localities within Begusarai.

The store's current challenges include stiff competition from both smaller local shops and larger retail chains, as well as difficulties in effectively tracking the most profitable and best-selling products. Additionally, the store owner's focus on day-to-day operations and supplier management has limited his ability to devote time to data-driven decision-making and strategic planning.



### 3. Problem Statement (Listed as objectives) (50-75 Words)

The primary objectives of this project are:

1. Identify the most profitable and best-selling products at Alpha Mart to help the store owner optimize his product mix and pricing strategies.
2. To analyze customer purchase patterns and preferences, providing insights into demand trends and enabling promotional strategies.
3. To evaluate the effectiveness of existing operational strategies, such as bulk purchasing, seasonal offerings, and delivery solutions, and recommend improvements or new initiatives to increase profitability.

## **4. Background of the Problem (200 Words)**

Alpha Mart, despite its relatively recent establishment, has achieved a commendable level of success in the local market. However, the store faces significant challenges in maintaining and increasing its profit margins due to several factors.

Firstly, the intense competition from numerous other small grocery stores and major retail chains like V-Bazaar has created a highly competitive market environment. These competitors often have greater resources and economies of scale, enabling them to offer products at lower prices or with more attractive promotions.

Secondly, the store's current inventory management and pricing strategies may not be optimized for maximum profitability. Without a systematic analysis of sales data, it is difficult to identify the true drivers of revenue and profitability, leading to potential missed opportunities or inefficient resource allocation.

Additionally, the operational challenges faced by Alpha Mart, such as staffing constraints and the lack of dedicated personnel for data analysis, have hindered the store's ability to leverage its sales data effectively.

Furthermore, the store's limited financial resources have posed a barrier to expansion plans. Despite the desire to open additional outlets, the current profit margins are insufficient to fund such growth initiatives.

By addressing these issues through a comprehensive data analysis project, Alpha Mart can gain valuable insights into its product performance, customer behaviour, and operational efficiencies. These insights will enable the store to make informed decisions, optimize its strategies, and ultimately increase profitability, paving the way for successful expansion and growth.

## 5. Problem Solving Approach (400 Words)

To address the challenges faced by Alpha Mart and achieve the objectives outlined, a comprehensive data-driven approach will be employed. The analysis will be conducted using the following methods, data sources, and tools:

### **Method:**

- a. **Descriptive Analysis:** Perform exploratory data analysis to gain insights into sales patterns, product performance, and customer behaviour. Utilize statistical techniques such as measures of central tendency, dispersion, and correlation to identify trends and outliers.
- b. **Market Basket Analysis:** Implement association rule mining algorithms to uncover frequently co-purchased item combinations, enabling cross-selling and bundling opportunities.
- c. **Profitability Analysis:** Evaluate the profitability of individual products and product categories by analyzing factors such as cost price, selling price, discounts, and profit margins. Identify high-margin items and underperforming products for strategic decision-making.
- d. **Customer Segmentation:** Analyze customer purchase histories to segment customers based on their buying behaviour, preferences, and value to the business. Develop targeted marketing strategies and loyalty programs to retain valuable customers.
- e. **Pricing Optimisation:** Assess the impact of various pricing strategies on profitability by analyzing elasticity of demand, competitor pricing, and customer willingness to pay. Recommend optimal pricing strategies for different product categories.

### **Data:**

The primary data source for the analysis will be the sales transaction records provided by Alpha Mart. Specifically, the following datasets will be utilized:

- a. Stock Dump as of May 2, 2024:

This dataset includes information on cost prices, purchase prices, discounts, selling prices, and maximum retail prices (MRP) for each product, enabling detailed profitability analysis.

- b. Gross Sales Transactions for February, March, and April 2024:

This dataset comprises approximately 25,000 records of individual sales transactions, providing insights into customer purchasing patterns, product demand, and revenue generation.

To supplement the provided data, additional information may be collected through interviews and discussions with the store owner, Mr. Navneet Kumar, and other key personnel. These interactions will provide context and qualitative insights into the store's operations, challenges, and strategic goals.

### **Tools:**

The project will leverage the power of Python's data analysis ecosystem, utilizing following libraries. These tools will be used for data manipulation, exploratory analysis, statistical modelling, and data visualization.

a. **NumPy**: For efficient numerical computations and array operations. b. **Pandas**: For data manipulation, cleaning, and preprocessing tasks. c. **Matplotlib**: For data visualization and creating informative charts and plots.

Additionally, other Python libraries and packages may be utilized as needed, such as scikit-learn for machine learning tasks, and seaborn for advanced data visualization.

The chosen tools are widely used in the data science community and offer robust capabilities for handling and analyzing large datasets. Their flexibility and extensive documentation also facilitate the integration of custom algorithms or techniques, should the need arise during the project.

### **Justification:**

The proposed problem-solving approach is designed to address the specific challenges faced by Alpha Mart and align with the project objectives. The combination of exploratory data analysis, product performance analysis, customer behaviour analysis, and operational efficiency analysis will provide a comprehensive understanding of the store's performance and identify opportunities for improvement.

By leveraging the store's sales data and supplementing it with qualitative insights from key stakeholders, the project will generate data-driven recommendations tailored to Alpha Mart's unique business environment and strategic goals.

The choice of Python and its associated data analysis libraries is justified by their widespread adoption in the data science community, their powerful capabilities, and their extensibility. These tools will enable efficient data manipulation, advanced statistical modelling, and effective visualization of the analysis results, ultimately facilitating the communication of insights and recommendations to the store owner.



## 6. Expected Timeline

### 6.1 Work Breakdown Structure (WBS):

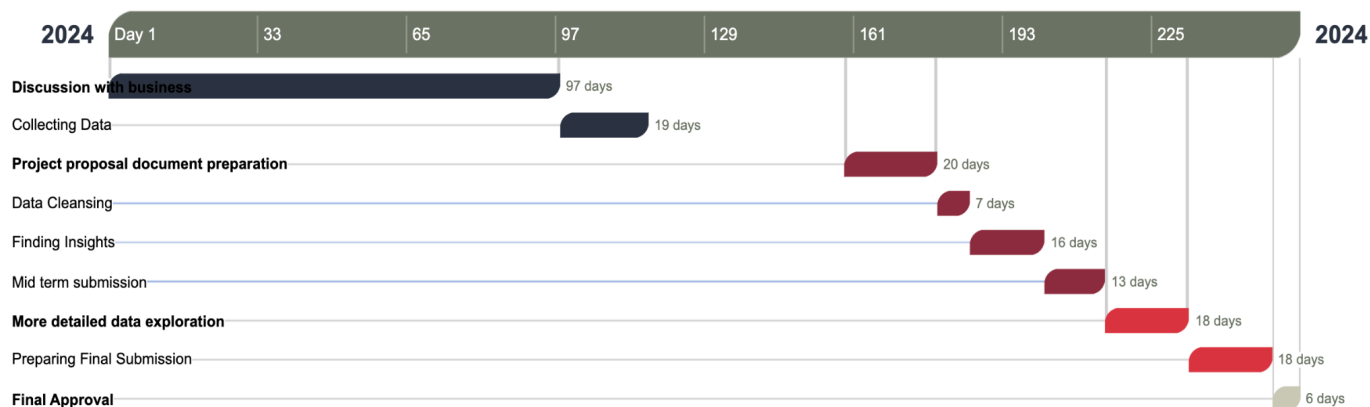
The project will be divided into the following deliverables and tasks:

- i. **Data Acquisition and Preparation**
  - Obtain sales transaction data from Alpha Mart
  - Preprocess and clean the data
- ii. **Exploratory Data Analysis (EDA)**
  - Conduct statistical summaries and data visualization
  - Identify patterns, outliers, and potential data quality issues
  - Feature engineering and data transformation
- iii. **Product Performance Analysis**
  - Categorize products based on attributes
  - Identify top-selling and most profitable products
  - Analyze product margins and pricing strategies
- iv. **Customer Behaviour Analysis**
  - Analyze purchase patterns and preferences
  - Identify popular product combinations and cross-selling opportunities
  - Segment customers based on purchase behaviour
- v. **Operational Efficiency Analysis**
  - Evaluate the effectiveness of bulk purchasing strategies
  - Assess the impact of seasonal offerings
  - Analyze the performance of delivery solutions
- vi. **Synthesis and Report Preparation**
  - Compile findings and recommendations
  - Develop the final project report

## 6.2 Gantt Chart:

	Tasks	Start Date	End Date	No. Of Days
1	BDM Project			
1.1	Discussion with business	10-Jan-24	15-Apr-24	96
1.2	Collecting Data	16-Apr-24	04-May-24	18
1.3	Project proposal document preparation & proposal acceptance	16-Jun-24	05-Aug-24	50
1.4	Data Cleansing	06-Aug-24	12-Aug-24	6
1.5	Finding Insights	13-Aug-24	28-Aug-24	15
1.6	Mid-term submission	29-Aug-24	10-Sep-24	12
1.7	More detailed data exploration	11-Sep-24	28-Sep-24	17
1.8	Preparing Final Submission	29-Sep-24	15-Oct-24	16
1.9	Final Approval	16-Oct-24	21-Oct-24	5

## BDM Capstone Project



## **7. Expected Outcome (Briefly explain in 150-200 words)**

Upon the successful completion of this project, Alpha Mart will have a comprehensive detail of actionable insights and recommendations to enhance profitability and support the business owner's expansion plans.

The report will encompass the following key outcomes:

- Identification of the most profitable products and product categories, enabling the store to optimize inventory management and product assortment.
- Recommendations for pricing strategies tailored to specific product categories, considering factors such as demand elasticity, competitor pricing, and customer willingness to pay.
- Insights into customer purchasing patterns and segmentation, facilitating the development of targeted marketing campaigns and loyalty programs to retain valuable customers.
- A comprehensive report outlining the project's findings, their implications, and a detailed implementation plan to guide the store owner in executing the recommended strategies.

The insights and recommendations provided through this project will empower Alpha Mart to make data-driven decisions, maximize profitability, and maintain a competitive edge in the local market, ultimately supporting the business owner's vision of expanding operations.