Optimizing Inventory and Service Offerings for a Multi-Service Retail Shop

Proposal Report for BDM Capstone Project

Submitted by

Name: **Sneha Sarkar**

Roll number: **23f2004880**

IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

Contents

Declaration Statement

I am working on a Project titled **"Optimizing Inventory and Service Offerings for a Multi-Service Retail Shop"**. I extend my appreciation to **Cafe.com**, 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 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 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: Sneha Sarkar

Date: June 13, 2025

1. Executive Summary and Title

The project is set in a small multi-service retail store "Cafe.com" in a semi-urban area, serving B2C customers. The store has a variety of services ranging from Xerox, printing, photo ID card service, stationery, mobile accessories, and small electronics.

In spite of a broad product lineup, the store suffers from profitability issues arising from overstocking of low-demand items, poor inventory turnover, and a vague understanding of the patterns of service demand. Printer ink, spiral binding, PVC cards, and mobile accessories are purchased in bulk without demand forecasting, which results in blocked working capital as well as slow-moving inventory.

The project will entail detailed analysis of daily transactions and product/service demand frequency. Association rule mining, frequency distribution, ABC analysis, and clustering techniques will be utilized to determine high-performing products and seldom demanded items. The aim is to rationalize inventory, minimize unnecessary procurement, and concentrate on high-demand, high-margin services.

The anticipated result is enhanced inventory efficiency and increased profitability, with actionable insights that enable the company to efficiently allocate resources and cater better to customer demand.

2. Organization Background

The company I am associated with is a multi-service retail shop established by Mr. Biplab Ghosh. The shop, which is seven years old, is well-placed close to Suri Bus Stand in Birbhum, West Bengal. It runs as a modest but necessary business, catering to both the residents of the city and commuters with all sorts of services and goods. The shop has progressively grown from performing simple Xerox and printing work to serving customers in various fields such as photo printing, ID card help (Aadhar, voter, license), stationery, computer peripherals, mobile components, and even small electrical items such as torches and fans.

Mr. Ghosh, with a passion to offer convenience under one umbrella, has bootstrapped the business organically on the basis of immediate needs of the local residents. Though the business has a consistent customer base, it now aims to rationalize its inventory and services through data-led initiatives to improve profitability and operational effectiveness.

3. Problem Statement

3.1. Overstocking and Capital Blockage

The store is subject to low profitability because of overstocking products that are not subject to regular or high demand, causing capital blockage and inventory surplus.

3.2. Lack of Insight into Product and Service Performance

There is no data-driven insight into which products and services contribute the greatest revenue or customer demand, causing inefficient decision-making.

3.3. Absence of Analytical Tools for Forecasting

The company does not presently make use of any analytical tools to project demand or maximize inventory, thus resulting in lost opportunities for revenue growth and cost savings.

4. Background of the Problem

The retail store "Cafe.com", operates a host of services. The store has, over the years, increased its stock to cater to the different needs of customers. This increase in stock, however, has resulted in one main critical concern—large amounts of unsold or slow-moving merchandise, due to tied-up capital and less profitability.

The principal reason behind the issue lies in the lack of systematic inventory management and demand forecasting. The owner does not stock products based on data but rather on assumptions, resulting in an overstocking of low-demand products and a shortage of popular products.

Internal issues involve lack of digitized sales monitoring, lack of analytics facilities, and little knowledge of which products or services generate most of the revenue. This results in inefficient stock replenishment and service decisions.

External issues include unpredictable customer preferences, seasonal fluctuations in demand, and competition from surrounding establishments selling similar services. Further complicating operational efficiency are rising costs from suppliers and restricted shop space.

These problems need to be solved with an analytical strategy to determine trends and maximize inventory so as to enhance financial performance and customer satisfaction.

5. Problem Solving Approach

To address the problem of overstocking, lack of product performance insight, and lack of forecasting tools, structured analysis of the shop's sales and inventory is necessary. The steps below detail the methods, sources of data, and tools that will be used in this project.

I. Methods to be Used with Justification

- **Frequency Analysis:** This analysis will be utilized in determining the most and least frequently sold items. Through analyzing how frequently each service or product is utilized, the shop will be able to make informed decisions to eliminate or decrease demand-low items. This will assist in eliminating inventory wastage and freeing up blocked capital.
- **ABC Analysis:** This method classifies inventory according to its revenue contribution: high (A), medium (B), and low (C). It will assist in prioritizing what to stock more intensively. Under this strategy, with this method we can make sure limited resources are channelled towards high-profit products, increasing profitability.
- **Association Rule Mining:** Association rule mining will determine customer purchase patterns—like products that are often purchased together. Knowing these patterns will allow for more optimal placement and bundling of products, which can result in more sales and create an improved customer experience at no additional cost.
- **Demand Forecasting:** Predicting future demand with straightforward predictive models will enable the shop to make preparations more effectively and prevent overstocking or stockouts. Methods such as moving averages will identify trends and seasonality, which will result in better restocking decisions and cost control in the long run.

II. Data Collection with Justification

Data was gathered directly from the shop owner via email correspondence to keep it authentic and relevant. The method gave flexibility to the owner and facilitated secure sharing of sales data without necessitating physical visits. It helped establish trust and kept sensitive business data under wraps.

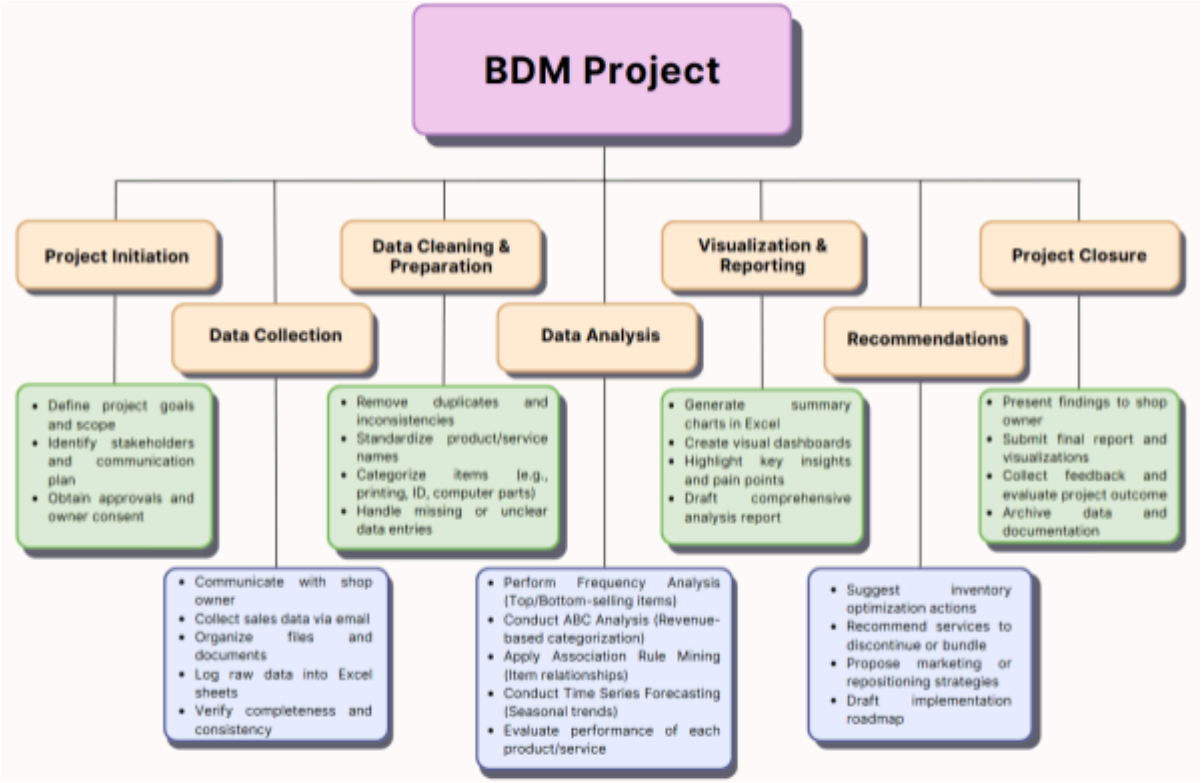
III. Analysis Tools with Justification

- **Google Spreadsheets:** Google spreadsheet is suitable for first data entry, cleaning, and basic descriptive statistics. Its friendly interface and in-built functions (including pivot tables, filters, and charts) are suitable for item frequency analysis and summary creation without requiring much technical expertise.

- **Python (with Pandas, NumPy, and Matplotlib):** Python is a strong platform for more complex analysis, such as ABC classification, association rule mining, and demand forecasting. Pandas and NumPy provide adaptable data manipulation, while Matplotlib or Seaborn can create valuable visualizations to reveal trends and patterns in large data sets.

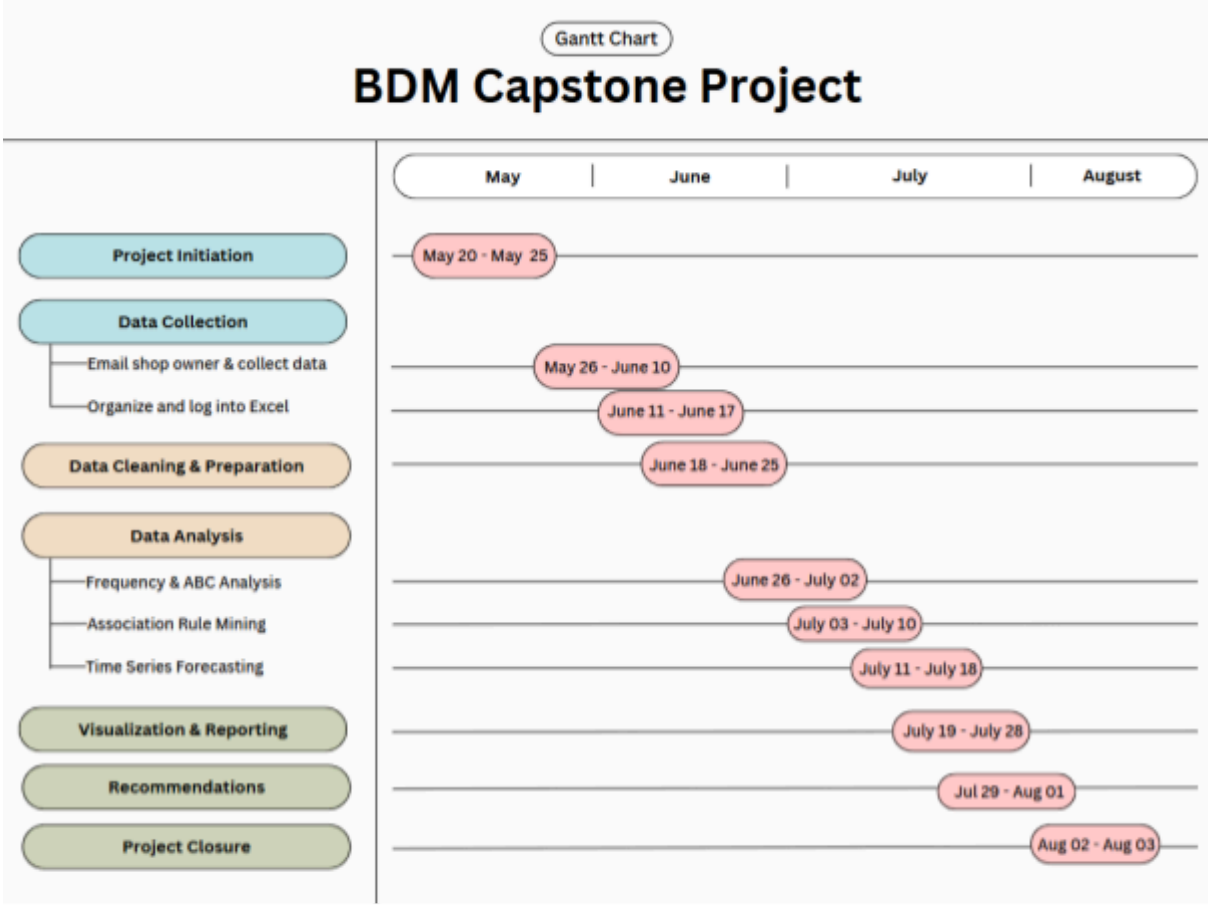
6. Expected Timeline

6.1. Work Breakdown Structure:



WBS Chart

6.2. Gantt chart



Gantt Chart

7. Expected Outcome

The project shall offer data-driven insights into the sales performance of different products and services available in the retail shop. Through scientific analysis, the shop owner will understand easily which products generate most revenue and which lead to inventory stagnation. Through seasonal trend and preference identification, the store will be able to more precisely align inventory levels with real demand, thus minimizing overstock and reducing capital tie-up. Moreover, the implementation of minimum forecasting and product performance tools will enhance better decision-making. In the end, this will contribute to enhanced inventory turnover, higher profitability, and a more customer-oriented business strategy. The store will also get access to simple-to-understand dashboards and visualizations so that even non-technical stakeholders can take action-oriented steps for sustainable business development.