Enhancing Operational Efficiency and Customer Satisfaction: A Data-Driven Approach for MS Medical Store

A Proposal Report for the BDM Capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled “Enhancing Operational Efficiency and Customer Satisfaction: A Data-Driven Approach for MS Medical Store”. I extend my appreciation to **MS Medical Store**, 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 ensure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report or upcoming reports. 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 fulfilment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate:

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Date: 05/08/2024

1 Executive Summary

Medical shops are the backbone of the healthcare system, providing medicines and health products to society. Good management and customer satisfaction are key to their success. **MS Medical Store** is known for its quality service and customer care.

Located near **Nirphad Eye Hospital in Chhatikara, Mathura, Uttar Pradesh-281406**, MS Medical Store is a part of the local healthcare network by providing essential pharmaceutical products and services, including specialized eye-related medicines like drops, gels, and ointments. Despite its importance, the store has only one employee besides the owner and faces challenges like managing inventory to avoid overstock and understock, providing quick customer service to minimise waiting time and executing marketing strategies to engage potential customers and achieve optimal KPIs like revenue, units sold and market share. The lack of effective marketing strategies and the inability to promote high-margin products hinder the store's growth, competitiveness, and overall profitability.

This project will tackle these challenges through a data-driven approach. It will optimize inventory to avoid stock imbalance, improve customer service by reducing waiting time and develop targeted marketing campaigns to increase engagement and performance. By using data analysis and modern management tools the project will simplify operations, reduce cost, increase customer satisfaction and maximize revenue.

Expected outcomes are inventory accuracy, shorter waiting time, customer loyalty and more sales. These will not only improve the store’s operational efficiency but also its reputation as a trusted healthcare products provider in the community.

2 Organization Background

MS Medical Store, founded by **Mr. Prashant Sharma**(Sonu Sharma) around 15 years ago near Nirphad Eye Hospital in Chhatikara, Mathura, Uttar Pradesh-281406 is a main pillar of the local medical industry. It is a key part of the local healthcare network, providing a wide range of pharmaceutical products and services, including specialized eye-related medicines like drops, gels, and ointments. With only one employee besides the owner, the store is a pillar of the community, offering high-quality pharma products and exceptional customer care.

The store also offers products such as lubricating eye drops, antibiotic eye drops, anti-inflammatory eye gels, anti-allergy eye drops, and eye vitamins with prices starting from around ₹120. The store operates out of a single room, which serves as both an inventory space and a customer counter.

Though it’s a main pillar, MS Medical Store faces problems in inventory management, service time, marketing strategy and revenue optimization. To overcome these problems is a must to be excellent and customer-satisfied.

3 Problem Statement

MS Medical Store faces the following challenges:

3.1 **Inventory Management Challenges:** MS Medical Store can’t maintain optimal stock levels, resulting in overstocking, understocking and some medicines expiring. This affects the availability of essential medicines and healthcare products and reduces customer satisfaction and operational efficiency.

3.2 **Customer Service Bottlenecks and Staff Shortages:** The store can’t minimize the time taken to serve each customer when there’s a crowd due to inadequate staffing levels. Long wait times and service delay affects the customer experience and may lead to decreased customer loyalty and satisfaction.

3.3 **Marketing and Revenue Optimization Challenges:** The store has difficulties reaching and engaging potential customers, which directly impacts its key performance indicators (KPIs) such as revenue, units sold, and market share. The lack of effective marketing strategies and the inability to promote high-margin products hinder the store's growth, competitiveness, and overall profitability.

4 Background of the Problem

MS Medical Store is facing many operational challenges that affect its efficiency and customer satisfaction. One big issue is inventory management. The store stocks products from multiple companies that offer different prices for the same chemical compound, making pricing and inventory control difficult. This is further complicated by nearby stores, making it hard to manage stock levels and stay competitive.

Customer service is also an issue. The store gets a lot of customers during peak hours especially when doctors from nearby hospital prescribe meds during patient (admitted) visits. This results in a lot of patients’ relatives asking for meds at the same time, resulting in long wait times and reduced operational efficiency during peak hours.

Plus MS Medical Store doesn’t have a marketing strategy. The store focuses on daily-use products and hasn’t promoted high-margin items that can increase profitability. Developing a marketing strategy that covers both daily-use products and high-margin items is key to

increasing revenue and overall operational efficiency. Addressing these is key to performance and customer satisfaction.

5 Problem-Solving Approach

To tackle the operational challenges of MS Medical Store and increase overall efficiency and customer satisfaction I will use a problem-solving approach. This approach will include advanced data analysis techniques using Python and Excel to optimize inventory management, improve customer service and refine marketing strategies.

5a. Methods Used with Justification:

1. **Inventory Management Optimization:**
    - *Time Series Analysis:* Use of time series analysis techniques like ARIMA (AutoRegressive Integrated Moving Average) or Exponential Smoothing using Python to forecast future demand based on historical sales data. This will help in predicting inventory needs and avoid overstocking or understocking.
    - *ABC Classification:* Implement ABC classification to categorize inventory into three classes (A, B, and C) based on sales volume and importance. Python will be used to analyze sales data and apply ABC classification to high-impact items for more precise management.
2. **Customer Service Efficiency:**
    - *Staff management and Cost Analysis:* Analyze transaction data to identify peak periods and customer volume trends using Python. This will help optimize staffing by aligning it with high-traffic times, reducing wait times, and preventing revenue losses. Correlate staffing costs with current and forecasted revenue to ensure cost-effective staffing decisions.
    - *Service Time and Revenue Impact Analysis:* Conduct regression analysis on service time in data using Python to determine how peak-hour service times affect revenue. This will identify factors causing delays and their impact on customer satisfaction and sales. Integrate staffing costs to assess financial implications and use Excel to visualize and summarize the relationship between service times, staffing costs, and revenue for better staffing and service efficiency.
3. **Marketing Strategy Development:**
    - *Market Basket Analysis:* Perform market basket analysis using Python to understand customer purchasing patterns and identify frequently bought-together items. This will help in creating effective promotions and cross-selling strategies.

5b. Intended Data Collection with Justification:

1. **Sales and Transaction Data:**
    - Details: Collect comprehensive data on transaction date and timestamps, product types, and quantities sold. This includes records of when customers are served.
2. **Inventory Data:**
    - Details: Track current stock levels, consumption and reorder points

5c. Analysis Tools with Justification:

1. **Python:**
    - *Details*: Utilize Python for advanced data analysis, including time series forecasting, regression modelling, market basket analysis, and customer segmentation.
2. **Excel:**
    - Details: Use Excel for organizing data, performing preliminary analyses, and creating visualizations of service times, customer flow patterns, and inventory data.

This problem-solving approach is designed to address MS Medical Store's operational challenges through a data-driven methodology. By leveraging Python for detailed analysis and Excel for visualization, I aim to optimize inventory management, improve customer service efficiency, and develop effective marketing strategies. This structured approach will enable the store to enhance its operations and better serve its customers.

6 Expected Timeline

6.1 Work Breakdown Structure:

- *Discussion with MS Medical Store*: Initial meetings to understand current practices and challenges.
- *Data Collection*: Gather sales data, inventory records and marketing information.
- *Data Cleaning and Preparation*: Process and prepare the collected data for analysis.
- *Analysis and Problem Identification*: Conduct analysis to identify specific issues and define problem statements.
- *Develop Problem-Solving Strategies*: Create solutions based on analysis findings to address identified challenges.
- *Report Generation and Presentation*: Prepare and present reports summarizing findings and recommendations.
- *Review and Feedback*: Review the final report with management and gather feedback.

6.2 Gantt chart

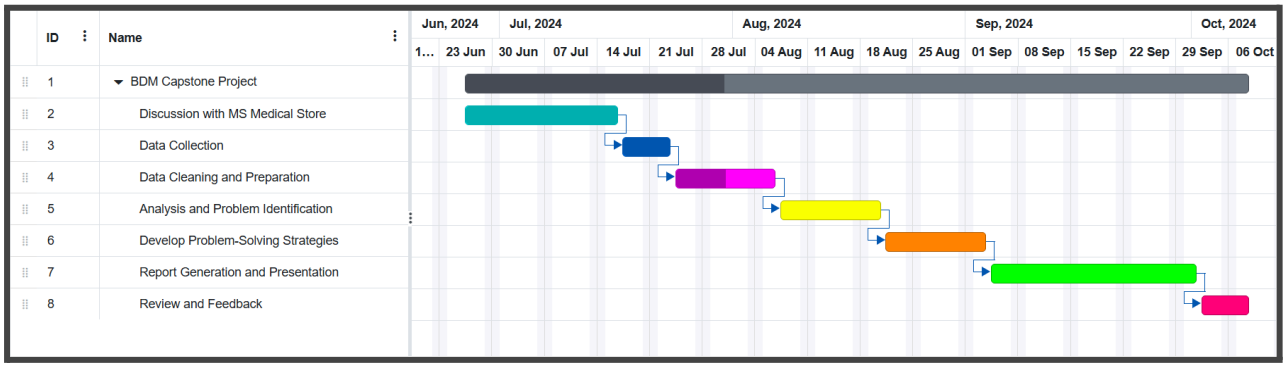

Figure 1 Expected timeline for completion of project.

7 Expected Outcome

7.1 **Improved Inventory Management:** Enhanced forecasting and optimized stock levels, reducing overstocking and understocking.

7.2 **Enhanced Customer Service Efficiency:** Reduced wait times and improved operational efficiency during peak periods.

7.3 **Effective Marketing Strategies:** Increased sales of high-margin products and better customer engagement through targeted marketing.

7.4 **Increased Revenue:** Through targeted promotions and cross-selling strategies derived from market basket analysis, the store can drive higher sales volumes and enhance revenue streams.