"Optimizing Pharmacy Inventory A Four-Month Analysis of Seasonal Trends and DemandPatterns"

A Proposal report for the BDM Capstone Project

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Declaration Statement

I am working on a Project Title “Optimizing Pharmacy Inventory A Four-Month Analysis of Seasonal Trends and DemandPatterns”. I extend my appreciation to **MOHD UMAR**, 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 utilised for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this so this is demo declaration statement for mine how it should be do it

Signature of Candidate: 

Name: MOHD SHAD

Date: 22-09-2024

Executive summary

Kareema Medical Store was set up in 2016-17, located in Chandpur, Uttar Pradesh. It has an affiliation with 'Abrar Memorial Hospital' and owned by Dr. Asad Anwar. This small pharmacy serves both the urban and rural local population that lives in the city as well as those in nearby villages within a 10-12 km radius of the city. It plays a vital role in providing essential healthcare services, medicines to the local community. Pharmacist Mohammad Umar manages it as a B2B & B2C business venture where he maintains all kinds of operations.

The critical challenge that Kareema Medical Store is experiencing is in terms of the inventory control management of Kareema Medical Store are un-expected variations in patient requirements triggered by seasonal and viral health patterns. The store is unable to maintain the right inventory balance because most of the time one person manages stock levels. This is especially true when there are sudden spikes in demand due to viral diseases, outbreaks or seasonal illnesses. The result is frequent stockouts of essential medicines and occasional overstocking of less popular items. Such fluctuations in stock availability lead to potential revenue loss, potential wastages, customer dissatisfaction, and operational inefficiencies.

To tackle these issues, a data-driven approach will be adopted. By analyzing four months of historical sales and inventory data, pivotal revenue-driving SKUs and seasonal trends will be identified. If last year's data is available, a comparison will highlight year-over-year changes and factors influencing economic outcomes. Tools like Excel and Python will facilitate demand forecasting, debt minimization, and real-time inventory optimization.

The proposed solution aims to achieve enhanced inventory accuracy & Responsiveness, Reduction in Financial Risk and Debt, Improved Cash Flow and Profitability, reduced wastage, improved profitability, and operational efficiency. This data-backed approach will enable better decision-making, benefiting the store's long-term sustainability.

Organization Background

Kareema Medical Store affiliated with Abrar Memorial Hospital was Established in 2016-17 under the sole proprietorship DR. ASAD ANWAR. Kareema medical store is located at Exhibition Ground,Chandpur, Bijnor, Uttar Pradesh(246725) Northern India. Abrar memorial hospital have 3 qualified Doctors and a total of 15+ employees including pharmacists and

an undergrad assistant (Aaqib) who also help in Dr. cabins and some time in the medical store.

Kareema Medical store is efficiently managed by just one Pharmacist named Mohd Umar, He also manages the inventory and takes care of billing besides providing quality customer services. A big rush of customers at specific timings-mainly after consulting a doctor-copies induces serious problems of inventories, proper replenishments and supplies of essential drugs along with the right quantity in Karima Medical Store. The store serves approximately 100+ patients daily, though these numbers fluctuate with seasonal changes, viral outbreaks, and shifts in local health trends. Customer visits spike after doctor consultations, presenting challenges for timely stock replenishment and the supply of essential medicines. In the past four months, revenue has increased from INR **10-12K** to **14-15K** daily, with expenses rising similarly from INR **7-8K to 8k-9K,** reflecting the growing demand as infection rates increase. The store aims to optimize inventory management to meet rising demand effectively.

Problem Statement

From my all meetings with manager of the medical store and some general observations of the store from a season, I found out that

1. Kareema Medical Store faces critical challenges in inventory management, resulting in missed revenue targets and operational inefficiencies. Unpredictable demand patterns driven by seasonal and viral health trends cause frequent stockouts of high-demand medicines, leading to lost sales and reduced customer satisfaction. Conversely, overstocking of low-demand items increases wastage due to expired medicines and ties up working capital, adding financial strain.
2. Additionally, fluctuating distributor pricing and the presence of similar medicines with varying costs (e.g., “Zerodol SP” vs. “Zerodol”) complicate purchasing decisions, reducing profit margins. The lack of a systematic approach to inventory optimization further prevents the store from identifying high-revenue products (SKUs) and maximizing profitability. Addressing these issues through data-driven inventory strategies is essential to achieving revenue goals and minimizing waste.

PROBLEM BACKGROUND

The major problems of inventory management in Karima Medical Store are caused by the seasonal and dynamic demand for medicines due to changing health trends, which include viral or common cases of illness. This vagueness forces the store to either overstock or understock the required medicines. Over-purchasing the high-cost medicines often due to anticipation of demand results in

continued.. stock unsold and at risk of wastage and financial loss. Other issues with medicine pricing are inconsistent pricing among medications with similar therapeutic effects, making stock management especially difficult because the pharmacy needs to balance effectiveness with affordability. Lastly, staffing lacks the capacity to track and adjust inventory effectively to compound these operational inefficiencies.

Kareema Medical Store is a small but busy pharmacy under the Abrar Memorial Hospital. The patients whom this pharmacy caters have highly changing demands with seasonal health trends. This variation in demand poses inventory management problems as the pharmacy overestimates demand for some medicines and hence overbuys anticipating more demand. This leads to financial strain and debt to distributors when these products lie unsold. For instance, while "Zerodol SP" drugs are in very high demand and are prescribed a lot of times, the buying price is not fixed and varies, hence creating problems for inventory planning.
Seasonal changes and viral attacks also directly affect the types of medicines required and therefore the demand for those medicines is not easily predictable. For example,
this year, gastrointestinal disorders and general diseases were more in demand compared to viral fevers and so there was a change in product demand. Having extremely few staff members in a pharmacy, the inventory as well as sales are being managed by one pharmacist, and all this makes the scenario complex. All this together creates operational inefficiencies that reduce profitability and hence make it difficult for a pharmacy to serve customers reliably and sustainably.

PROBLEM SOLVING APPROACH

1. Data Analysis and Demand Forecasting

Historical sales data and inventory records will be analyzed to identify demand patterns. Using tools like Excel and Python, a **time-series analysis** will be conducted to forecast seasonal and viral trends that significantly affect medicine demand. This forecast will enable the store to proactively adjust inventory, ensuring adequate stock of high-demand medicines while avoiding overstocking low-demand items.

For example, seasonal spikes in digestive health products or fever medications can be anticipated by analyzing past data, reducing stockouts and improving customer satisfaction. Forecasting models will also help predict future demand for essential medicines, making the store more resilient to health trends.

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2. Inventory Classification (ABC Analysis)

An **ABC inventory classification** will be employed to prioritize stock management. Medicines will be categorized into:

Group A: High-demand, high-revenue medicines.

Group B: Moderately-used seasonal products.

Group C: Low-demand or specialized items.

This classification ensures the allocation of financial resources to critical items while maintaining an optimal balance in stock. For instance, Group A medicines will receive higher investment focus, minimizing the risk of shortages during peak demand periods.

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3. Cost Optimization through Price Comparison

By comparing the purchase prices and sales data of similar medicines (e.g., "Zerodol SP" vs. "Zerodol"), cost-benefit analysis will guide more economical purchasing decisions without compromising quality. This strategy helps maintain healthy profit margins while offering cost-effective solutions to customers. The store can focus on buying cheaper alternatives when they offer equivalent therapeutic benefits, reducing unnecessary financial strain.

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4. Real-Time Inventory Tracking

Marg ERP will be integrated with Excel to enable **real-time tracking** of stock levels, sales, and profitability metrics. Pivot tables, dashboards, and visualization tools will monitor inventory turnover and alert the store to sudden demand spikes, ensuring immediate stock adjustments. This approach minimizes wastage and ensures that high-demand items are always available.

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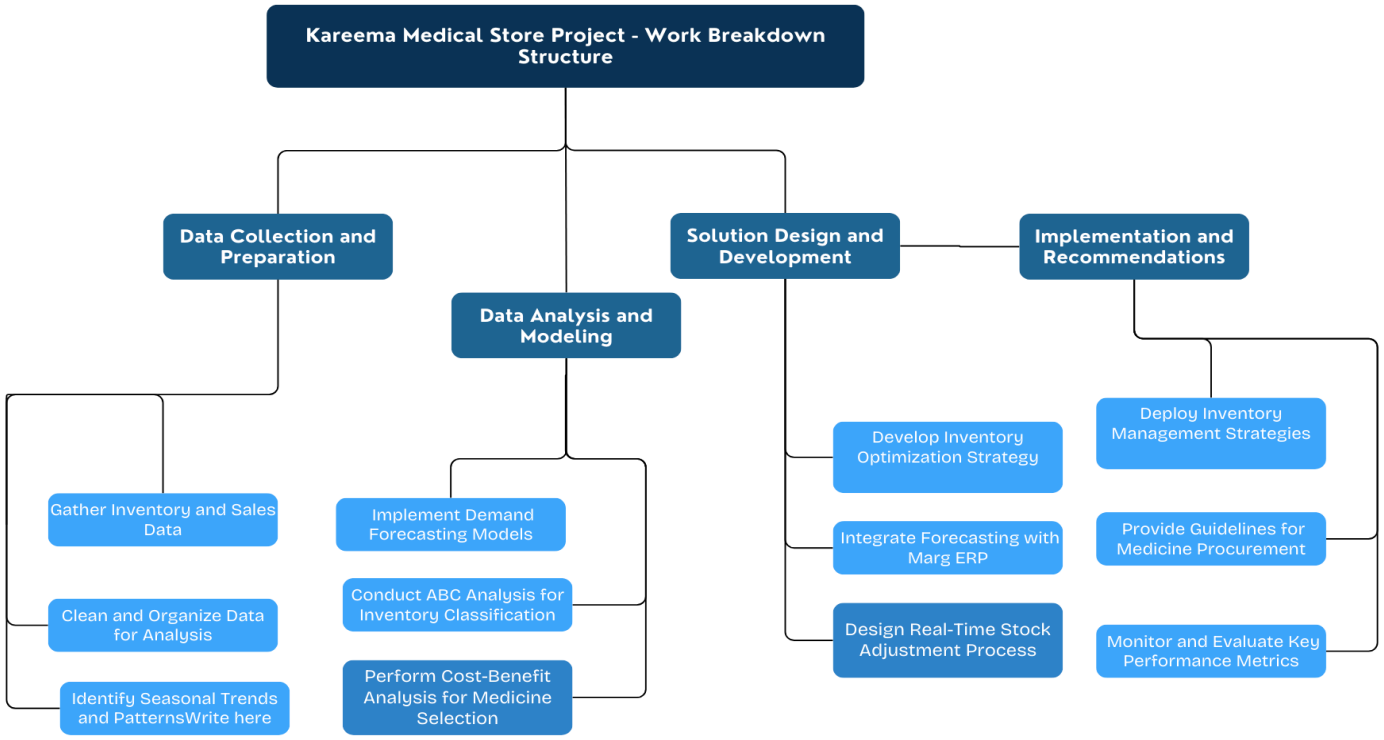
5. Performance Metrics and KPIs

Key financial metrics, such as gross profit margin, inventory turnover ratio, and net profit margin, will be tracked to measure the effectiveness of implemented solutions. Regular monitoring of these metrics will ensure that inventory strategies remain aligned with profitability goals, allowing for timely adjustments based on data insights.

By integrating these data-driven methods, Kareema Medical Store will achieve better inventory control, minimize wastage, and maintain financial sustainability, ensuring reliable service for its customers.

Expected Timeline

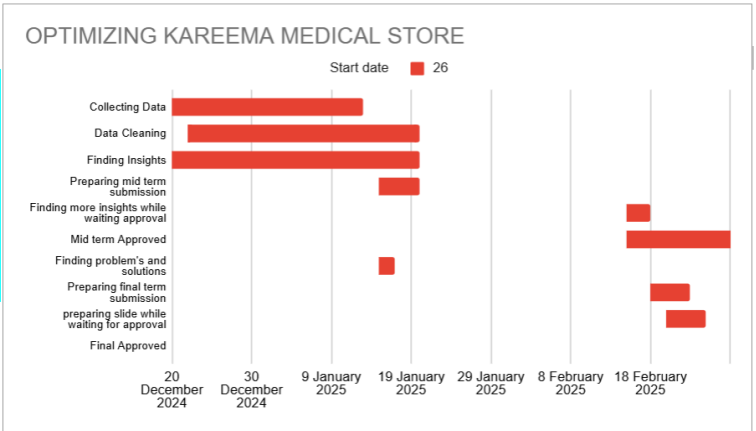
The project follows a structured timeline from September to February , covering phases like **Data Collection**, **Analysis**, **Problem-Solution Identification**, and **Final Submission Preparation**. Each phase has specific tasks to ensure systematic progress, with key milestones like midterm submission on **JAN-Feb** and final approval by **Feb**. This plan ensures timely completion and aligns tasks for optimal efficiency and accuracy.



Start date 20/12/2024 End date 28/02/2025

GANTT CHART FOR BDM PROJECT

Task	Start date	End date	Duration	Status
Collecting Data	20-Dec	15-Jan	26	work in progress
Data Cleaning	22-Dec	15-Jan	24	work in progress
Finding Insights	20-Dec	18-Jan	29	work in progress
Preparing mid term submission	15-Jan	15-Feb	31	Pending
Finding more insights while waiting approval	15-Feb	20-Feb	5	Pending
Mid term Approved	15-Feb	18-Feb	3	Pending
Finding problem's and solutions	15-Jan	18-Feb	34	Pending
Preparing final term submission	18-Feb	20-Feb	2	Pending
preparing slide while waiting for approval	20-Feb	25-Feb	5	Pending
Final Approved	23-Feb	28-Feb	5	Pending



Expected Outcome

This project aims to transform the way Kareema Medical Store manages its inventory and overall operations. By analyzing sales data and forecasting demand, the store will achieve:

1. **Smarter Inventory Management**: Leveraging insights from historical trends and seasonal data, the pharmacy will maintain optimal stock levels, ensuring popular medicines are always available while minimizing overstock of less-needed items. This will reduce waste and avoid stockouts, improving service efficiency.
2. **Better Demand Awareness**: Seasonal and viral trends will be studied to help the store proactively prepare for fluctuating customer needs. This will allow real-time adjustments to stock, ensuring the store is responsive and well-prepared for high-demand periods.

3. **Cost-Effective Purchasing Decisions**: By comparing pricing for similar medicines, the store can choose economical options without compromising on quality. This approach ensures balanced profitability and affordability for customers.
4. **Improved Customer Experience**: Efficient inventory systems will reduce waiting times, especially during peak hours, ensuring faster service and better customer satisfaction.
5. **Sustainable Business Growth**: Optimizing stock levels and streamlining operations will help reduce costs, increase profits, and build long-term trust with customers, securing the store's position as a reliable healthcare provider.