

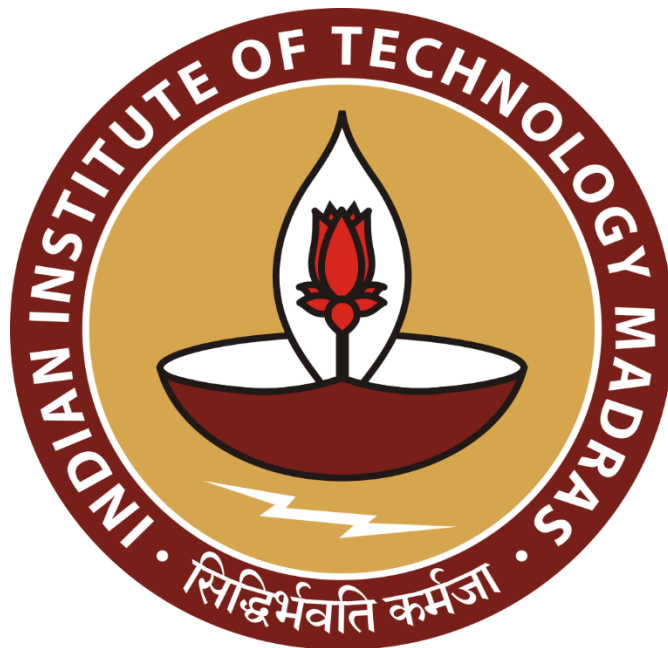
# Inventory and Product Optimization through Sales Analytics of a Fashion Outlet

**A Proposal report for the BDM Capstone Project**

Submitted by

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IIT MADRAS BS DEGREE PROGRAM

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## **Declaration Statement**

I am working on a project titled “Inventory and Product Optimization through Sales Analytics of a Fashion Outlet”. I extend my appreciation to **The Elegant**, for providing the necessary resources that enabled me to conduct my project.

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

Additionally, I affirm that all the procedures employed for the purpose of the 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 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 fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.



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Name: Jyoti Singh

Date: October 1, 2024

# 1. Executive Summary

This BDM Capstone Project is focused on studying and providing recommendations for the challenges faced by the business “**The Elegant**”, a B2C clothing and shoes store located at Ambedkar Chauraha, Rath, Hamirpur (Uttar Pradesh). The store frequently experiences stock shortages of fast-moving items, leading to missed sales opportunities. In contrast, some slow-moving products remain in inventory, taking up valuable shelf space and contributing to inefficiency. Additionally, there are seasonal understock situations for certain items, exacerbating the supply-demand mismatch during peak periods.

Another key issue is the slim profit margin on certain fast-moving items, which while in high demand, do not generate significant returns. Moreover, the store also struggles with outdated products that are difficult to move, further affecting profitability.

Addressing these issues is crucial to optimizing inventory management, improving profit margins, and ensuring a more balanced and profitable product offering. Therefore, the project attempts to understand these problems by employing data analysis methods such as real-time inventory tracking, identifying sales trends, and forecasting seasonal demand. Advanced tools and techniques will be used for profit margin analysis. Exploratory Data Analysis will help uncover insights and trends within store’s sales data.

## 2. Organization Background

**The Elegant**, located at Ambedkar Chauraha, Rath, Hamirpur (Uttar Pradesh), is a newly established clothing and shoes store for men and women, opened in April 2024 by Mr. Narendra Kumar. This B2C business, positioned at crossroads on the main road near the town center, serves the local community with high-quality fashion, ensuring a convenient and accessible location for its customers. With a dedicated team of 6 staff members, including 1 person focused on counter service, The Elegant offers a personalized shopping experience. Currently operating with only one shop and no additional branches, the store caters to around 900-950 customers over a period of 6 months, with an average of 120-150 customers visiting the store each month.

### 3. Problem Statement

**3.1 Inventory Management Issues:** “The Elegant” faces frequent stock shortages of fast-moving items and excess inventory of slow-moving products. Seasonal understocking during peak periods further worsens the supply-demand imbalance.

**3.2 Profit Margin Limitations:** Slim profit margins on fast-moving items reduce overall profitability. Additionally, outdated products remain unsold, further straining the store’s financial health.

### 4. Background of the Problem

**The Elegant** is a clothing and shoes store in Rath, facing a series of operational challenges that impact its profitability and inventory management. As a B2C business, it is essential for the store to maintain a balanced and responsive approach to stock levels and pricing.

**4.1 Stock Imbalance – Fast-Moving Stockouts and Slow-Moving Overstock:** Fast-moving items frequently run out of stock, especially during peak seasons or festive seasons, causing lost sales and customer dissatisfaction, while slow-moving products accumulate, tying up capital and taking up valuable shelf space without contributing to revenue.

**4.2 Inefficient Restocking During High Demand Seasons:** The inability to restock fast-moving items efficiently exacerbates shortages during high-demand seasons or festive seasons.

**4.3 Outdated Products:** Products that remain unsold contribute to the outdated inventory, further complicating stock management.

**4.4 Pricing Strategy:** By adhering strictly to Maximum Retail Price (MRP) creates further financial strain, as the store lacks a dynamic pricing strategy to adjust to market conditions, seasonal demands or customer preferences. In the case of fast-moving products, while they are in high demand, the slim profit margins due to competitive MRP pricing limit overall profitability. On the other hand, slow-moving products remain unsold because customers are not motivated to purchase them at full price, especially when newer alternatives are available at the same cost. This pricing strategy reduces the store’s flexibility in managing its inventory, preventing it from implementing discounts or promotional pricing to clear out older stock.

## 5. Problem Solving Approach

### 5.1 Inventory Management Issues:

- **ABC Inventory Classification:** Utilizing ABC analysis, inventory will be categorized based on sales velocity into three groups: A-items (fast-moving), B-items (moderate-moving), and C-items (slow-moving). This classification will prioritize inventory management efforts, ensuring that A-items are consistently available while reducing the overstocking of C-items.  
Historical stock data will be analyzed to assign products to the appropriate category. Stock levels will be adjusted based on demand patterns to prevent overstocking and understocking.
- **Demand Forecasting:** Using historical stock data, forecasting models will predict future demand for both fast-moving and slow-moving products. This approach helps the business plan stock levels more accurately, avoiding shortages during high-demand periods and excess stock during slow seasons.  
Time series analysis will be performed using past stock data to help forecast seasonal trends and adjust stock levels accordingly.
- **Just-in-Time (JIT) Inventory Management:** JIT ensures that inventory is replenished as needed, based on real-time stock data, reducing the holding costs associated with excess inventory while ensuring that fast-moving products are in stock.  
Real-time stock levels will be closely monitored to trigger reordering when needed, minimizing unnecessary stock buildup.
- **Safety Stock Calculation:** Safety stock levels will be calculated and maintained to act as a buffer during peak seasons. This ensures that fast-moving products are readily available, even when demand exceeds regular forecasts.  
Safety stock levels will be based on demand variability and lead times. Historical stock data will guide the calculation of appropriate buffer stock for different product categories.

## 5.2 Profit Margin Limitations:

- **Dynamic Pricing and Discounting:** A dynamic pricing strategy will be used to manage slow-moving products. Applying discounts to clear out these items can help free up storage space and reduce financial losses.  
Stock data will be analyzed to identify slow-moving items that need to be discounted and determine the optimal timing and discount percentage to clear these stocks.
- **Premium Pricing for high-demand items:** For certain fast-moving items that exhibit consistent high demand, implementing a premium pricing strategy is efficient. This involves slightly increasing the price during peak seasons or promotional events, capitalizing on customer willingness to pay for more popular products.
- **Customer Segmentation for Pricing:** Tiered pricing will be implemented based on customer segments. For example, offering discounts to loyal customers or bulk buyers can foster customer loyalty and increase sales volume, ultimately boosting profits.
- **Supplier Negotiations:** Engage with suppliers to negotiate better terms for fast-moving items. This can include volume discounts or improved payment terms, which can enhance profit margins even when selling at MRP
- **Economic Order Quantity (EOQ) Model:** The EOQ model will be applied to determine the optimal order quantity for each product, minimizing both ordering and holding costs. This ensures that slow-moving products are stocked at optimal levels to meet demand. Inventory turnover data and cost-related data will be used to calculate EOQ, ensuring inventory is maintained at most cost-efficient level.

## Data Analysis and Visualization:

Microsoft Excel and Google Sheets will be used to manage inventory and analyze stock data effectively. By leveraging tools like Pivot Tables, VLOOKUPS, graphs and charts, product performance can be analyzed, identifying pin point areas for improvement at The Elegant.

Using Python libraries like Matplotlib and Pyplot, charts can be created to visualize complex data relationships. This graphical representation of large datasets facilitates informed and data driven decisions.

## 6. Expected Timeline

### 6.1 Work Breakdown Structure:

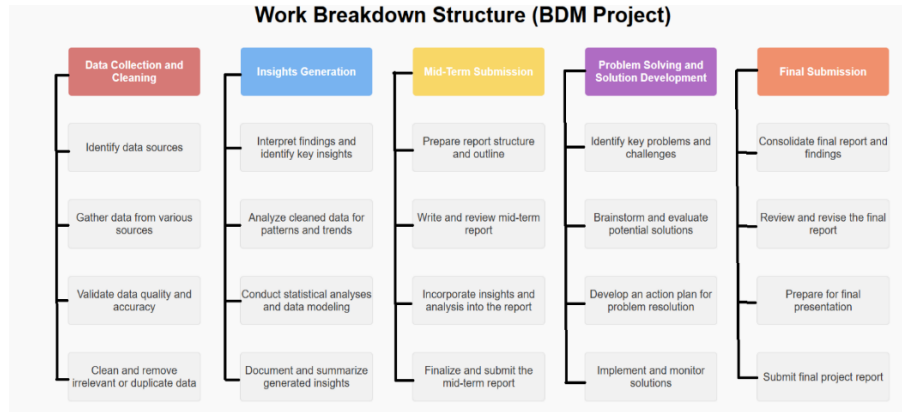


Figure 1. Work Breakdown Structure for the project.

### 6.2 Gantt Chart:

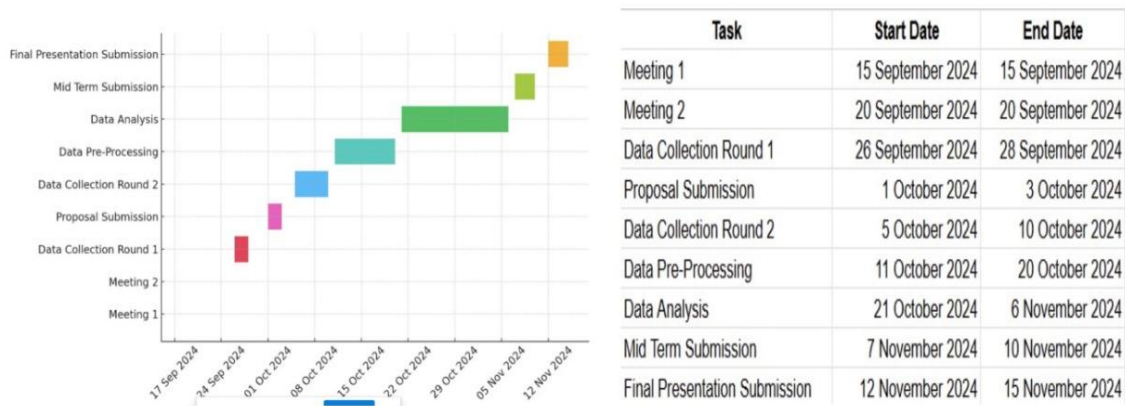


Figure 2. Expected Timeline for Completion of Project.

## 7. Expected Outcome:

Better stock availability will align inventory with customer demand, minimizing stockouts of fast-moving item. Optimizing pricing strategies will help clear excess stock, increasing overall profit margins. Additionally, proactive preparation for seasonal peaks will boost sales opportunities, while real-time inventory monitoring will streamline management processes, reducing operational costs from overstocking and stockouts.