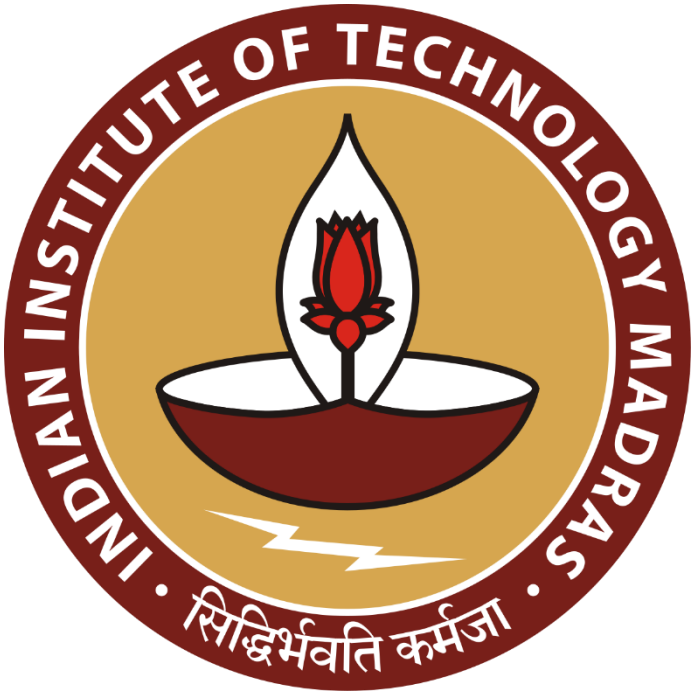
Harnessing Data-Driven Inventory Management to Boost Profits in Pipes and Sanitary Ware Store

A Proposal report for the BDM capstone Project

Submitted by

Name: PIYUSH KANT

Roll Number: 22F3002119



IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

Contents

Executive Summary 3

Organization Background 3

Problem Statement 4

1. Inventory Optimization 4
2. Boosting Profits 4
3. Improving Customer Satisfaction 4

Background of the Problem 4

Problem Solving Approach 4

Expected Timeline 6

Work Breakdown Structure : 6

Gantt Chart : 6

Expected Outcome 6

Executive Summary

The project focuses on a small shop named Chaudhary Pipes and Sanitary Ware, established in 2017 and located on NH22 in Jehanabad (Bihar), specializes in essential plumbing products for kitchens and bathrooms. Owned and managed by Sanjay Kumar, the shop serves both retail and wholesale market.

The main challenge faced by the business is inefficient inventory management, leading to overstocking and stockouts. These issues result in tied-up capital, missed sales opportunities, and customer dissatisfaction, ultimately impacting profitability.

This project aims to address these challenges through a data-driven approach. By collecting and analyzing sales and purchase data of the shop, demand forecasting models will be developed using Excel and Python with libraries like Pandas and Matplotlib. These tools will help clean, process, and visualize the data, identifying trends and patterns to optimize inventory levels. Additionally, real-time inventory tracking systems and digital catalogs will be implemented to enhance product visibility and customer experience.

The expected outcome is a significant reduction in excess inventory and stockouts, improved cash flow, and increased profitability. This approach will also boost customer satisfaction by ensuring product availability. Implementing these strategies will not only streamilne operations but also position the store for sustainable growth and success.

Organization Background

The firm I chose for this project is “Chaudhary Pipes and Sanitary Ware”. Established in 2017, it is strategically located on NH22 in Jehanabad (Bihar). The shop specializes in products essential for water supply in kitchens and bathrooms, including pipes, taps, water tanks, submersibles, sanitary ware, and many more. Catering to both individual and business customers, it aims to provide quality plumbing solutions.

Owned and managed by Sanjay Kumar, the shop also features notable brands like Ashirvad, and Unnati Pumps, for which he has received multiple awards. Additionally, it offers products from well-known brands like Pearl, Parryware, etc. The store is operated by Sanjay with the assistance of two staff members. With a vision to become the top choice for customers in Jehanabad, Chaudhary Pipes and Sanitary Ware is dedicated to enhance overall profitability

and customer satisfaction through reliable and efficient services. Their commitment to quality and customer satisfaction has helped them build a loyal customer base over the years.

Problem Statement

The following problems are identified after discussion:

1. **Inventory Optimization** : Inventory optimization is crucial to have enough stock to meet customer demand without overstocking.
2. **Boosting Profits :** By increasing profits, the store can reinvest in better stock and expand its product range.
3. **Improving Customer Satisfaction** : Satisfied customers are more likely to return and recommend the store to others.

Background of the Problem

After discussing with the owner of Chaudhary Pipes and Sanitary Ware, the main challenge faced like many businesses in the plumbing supplies sector, is inefficient inventory management. This leads to overstocking and also stockouts eventually leading to issues in profitability, cash flow, and customer satisfaction.

The key factors related to the problem are :

- **Large Variety of Items :** This sector deals with a wide range of products. Managing such a diverse inventory can be challenging without data-driven strategies to identify demand patterns and optimize stock levels.
- **Fluctuations in demand :** Due to seasonal and market trends and technological advancements fluctuations in demand occurs. Like pre-monsoon periods might have increased demand for water tanks and submersible pumps to prepare for rainy season. Innovations in this sector, such as new water-saving technologies, can shift customer preferences towards newer products.
- **Display Limitations :** The shop is small due to which there is a limited display space means not all varieties of products can be showcased, and customer might be unaware of the full range available unless they ask. what is seen is often what is sold. However, there is a godown for storage but it is also a little bit away from store.

Problem Solving Approach

In order to tackle the inventory management challenges at Chaudhary Pipes and Sanitary Ware, a systematic and data-driven problem-solving approach will be implemented. This approach involves multiple phases :

Data Collection – The first step is to gather sales and purchase data from Chaudhary Pipes and Sanitary Ware. This raw data includes details of all transactions, product types, quantities, and dates.

Data Processing and Cleaning – After collecting the data, it will be processed and cleaned using MS Excel or Google Sheets. This will involve removing duplicates, correcting errors, and filling in missing values if any to ensure the data consistency. Proper data cleaning will set a strong foundation for the data analysis.

Data Analysis Using Excel and Python – The cleaned data will be analyzed using Excel for initial statistics. Advanced analysis will be conducted using Python, with libraries such as Pandas for data manipulation and matplotlib/seaborn for visualization. In this step, the trends, patterns, and anomalies in sales and purchase data will be identified. This will allow is us to understand demand fluctuations and product performance.

Inventory Optimization – On the basis of insights gained from data analysis, demand forecasting models will be developed to predict future sales more accurately. In this step, the cleaned data will be used to identify seasonal patterns and market trends. By understanding the demand fluctuations, the store can maintain optimal stock levels. This will reduce both overstocking and stockouts.

Boosting Profits – To increase profitability, the project will identify high-demand products and ensure their availability. Improving inventory turnover will free up capital, enabling reinvestment in expanding the product range and enhancing quality. Analyzing sales data will help identify underperforming products, allowing the store to adjust its inventory to focus on more profitable items.

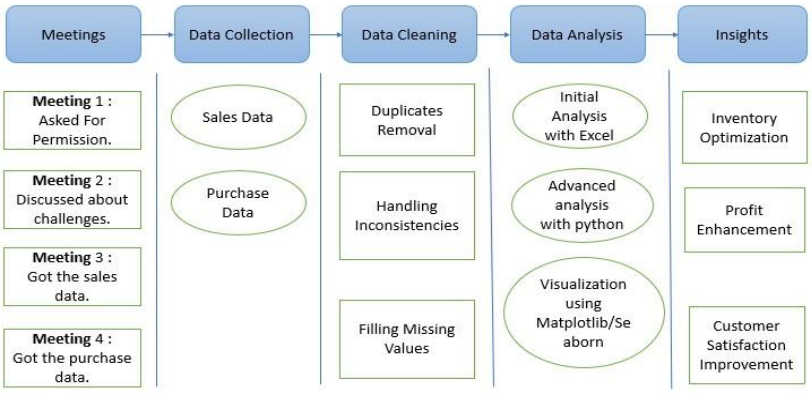
Improving Customer Satisfaction – Inventory optimization will ensure that every time a customer comes to the shop will not go without buying. The other thing will be to work on enhancing customer experience. Due to limited display space in the shop, showcasing the

entire inventory is not possible. This will be addressed by using digital catalogs and in-store digital displays to showcase the entire inventory.

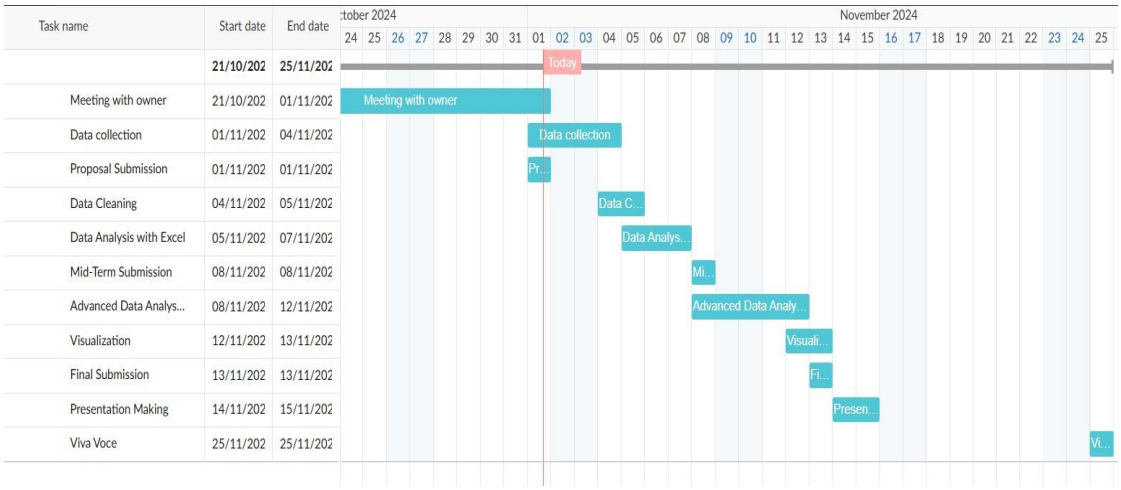
This approach aims to streamline operations, improve financial performance, and enhance customer loyalty, positioning Chaudhary Pipes and Sanitary Ware for sustainable growth and success. By leveraging data-driven strategies, the store can create a more efficient and profitable operation, better serving its customers and the community.

Expected Timeline

Work Breakdown Structure : (Fig. 01)



Gantt Chart : (Fig. 02)



Expected Outcome

1. Better Inventory Planning Insight : It will ensure that the store maintains optimal stock levels, avoiding the pitfalls of overstocking and stockouts to improve cash flow.

2. By analyzing the sales data, this project will identify patterns and trends in customer purchasing behaviour. It will highlight which products consistently sell well and have high demand, as well as those that do not perform as expected.
3. Insight on boosting overall profitability by improving inventory turnover and implementing cost-saving measures. Improving inventory turnover involves ensuring that stock moves through the store efficiently, reducing the time products are in shop.
4. Insights gained from data-driven strategies in this project will empower Chaudhary Pipes and Sanitary Ware with a robust foundation for long-term planning and decision making.